

Imperial College London

**Organisational health in healthcare organisations:
*an extended exploration of application across a
range of settings***

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*With a ridiculous amount of thanks to my amazing wife, Kristina
and my ever supportive Mum.*

*Stephen Williams
London, 2018*

Declaration of originality

I hereby declare that I am the sole author of this thesis and that all work within this thesis is my own, except where it is referenced or carried out in collaboration with others who are appropriately credited.

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Abstract

For us to comprehend fully the drivers of high performance in healthcare, we must shift our focus, from existing down-stream markers of quality, up-stream to the elements within an organisation that allow high performance to be both established and maintained in the long term. These elements are best conceptualised under the heading of organisational health, a term coined in the management literature in the 1950s, where organisations with a strong complement of these elements are perceived as ‘*healthy*’ organisations. In this thesis, organisational health is considered across a range of different healthcare settings.

The thesis itself is divided into three sections. In the first of these, an existing measure of organisational health, the *Healthcare-OH* questionnaire, was utilised in a nationwide survey of acute NHS trusts. Analysis of results, in concert with other existing contemporaneous datasets, allowed for extended testing of both the validity and reliability of this measure. Confirmatory factor analysis revealed an eight factor model, with each domain of organisational health denoted as a separate factor, demonstrated good fit. The sum scores of each domain were subjected to external validity testing and were seen to correlate with a variety of different performance metrics including existing measures of both staff satisfaction and trust finance.

The second section considered organisational health in previously unconsidered healthcare contexts. This involved the use of the *Healthcare-OH* questionnaire in the setting of independent healthcare organisations, with the resulting data subjected to measurement

invariance analysis prior to comparison with data from the nationwide survey in the first section. Two further studies presented in this section considered organisational health in the context of primary care, beginning with a qualitative study to re-define the construct within this setting. Organisational health in primary care was thus considered as a theoretical framework, consisting of the elements of *Strategy, Leadership, Resources, Staff wellbeing, Ways of working* and *Capacity for change*. The output of this work was then used as the basis for the generation of a context specific measure, the *GP-OH* survey, which was tested across staff from 191 GP practices to permit an examination of validity and reliability.

The third and final section considered organisational health as a dynamic entity and aimed to identify events and interventions which might confer improvements in organisational health. It consists of a cross-sectional repeated-measure study considering organisational health across a twelve-month period within a single acute NHS trust. Differences in organisational health over time were examined and compared to events occurring both within and around the trust during the same time period. This study noted a fluctuation in the trust's *Resilience* during the year and considered the reasons behind this with note to the complex web of internal and external drivers exerting influence ranging from organisational restructuring through to 'never' events and junior doctor strikes.

There follows a concluding chapter reflecting on the successes and failures of the thesis. This body of work has attempted to address limitations found within the current literature on organisational health in healthcare organisations, providing a series of empirical studies including work in a variety of unconsidered healthcare contexts. However, it has raised theoretical questions as to the relative importance of the consistent elements of

organisational health. Further work, with both qualitative studies, to re-examine the theoretical framework of organisational health for hierarchy and confounders, and quantitative studies, to extend organisational health measurement into the mental health sector and to healthcare organisations outside of the UK, is proposed.

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Chapter 1: Introduction

All organisations strive for high performance. This statement holds true for organisations in all sectors; it is the definition of ‘high performance’ which can be considered to differ. In the case of healthcare organisations, this definition is particularly nuanced with criteria for high performance principally intertwined with conceptions of healthcare quality. This, in itself, has been described in a variety of different ways, with notable definitions including the Donabedian model of structure, process and outcome and that of Darzi (in *High Quality Care for All*) comprising patient safety, patient experience and effective care.^{1,2}

High performance in healthcare is also tied in with finance. Indeed, it has been projected that the NHS will face a £22 billion funding gap by 2020-21 and so the need to often balance pursuit of high quality care with financial efficiency is increasingly crucial for a healthcare organisation to be considered ‘high performing’.³

The impact of organisational elements on healthcare performance is often only highlighted in the aftermath of investigations into episodes of poor healthcare quality. Both of the Institute of Medicine’s publications *To Err is Human* and *Crossing the Quality Chasm* make specific note of organisational deficiencies as drivers of poor performance.^{4,5} Closer to home, one does not have to look far for a UK example of this, with the events at Mid Staffordshire NHS Foundation Trust and Winterbourne View stark reminders of the potentially disastrous outcomes of institutionalised organisational failings.^{6,7}

1.1 The concept of a 'healthy' organisation

For us to fully comprehend the drivers of high performance, we must shift our focus, from down-stream markers of quality, up-stream to the elements within an organisation that allow high performance to be both established and maintained in the long term. These elements are best conceptualised under the heading of organisational health, a term coined in the management literature in the 1950s, with organisations with a strong complement of these elements perceived as 'healthy' organisations.⁸

Some definitions of organisational health extend this metaphor of 'health' in a more direct manner using it as a coverall term when discussing occupational stress and its effects on productivity.^{9,10} The focus of this thesis will be on more systemic definitions of organisational health extending beyond its individual employees. Much of the recent work on organisational health has been driven by the management consultancy firm McKinsey & Company with the use of their *Organisational Performance Profile Survey* and *Organisational Health Index*.^{11,12} They stress the importance of long-term thinking in business planning and warn against the pursuit of short-term performance goals, with immediate payoffs, which can come at the expense of more prudent planning and so long-term stability and success.¹³ They define organisational health as *"more than just culture or employee engagement. It's the organisation's ability to align around a common vision, execute against that vision effectively, and renew itself through innovation and creative thinking"*¹⁴ and suggest that healthy organisations display five characteristics which allow them to orient themselves towards long-term success (see *Figure 1-1*).¹²

Complementarity	→	Do different things complement each other to create additional value?
Renewal	→	Can you drive change to spur growth, innovation and ability to adapt to market shifts?
Alignment	→	Do people agree about what they are trying to do and why?
Execution	→	Can you make good decisions and execute essential tasks?
Resilience	→	Do you have what it takes to weather risks, shocks and competitive threats?

Figure 1-1 McKinsey's five characteristics of healthy companies (from De Smet A, Loch M, Schaniger W. Performance and health: in search of sustainable excellence. McKinsey and Company 2006)¹²

Discussion of organisational health is not confined to thought pieces from commercial consultancy firms, however, but is firmly rooted within the management literature. It has been operationalised by a variety of different academics since its original (and somewhat poetic) description by Argyris in 1958, where *"a healthy organisation is one that enables mature human functioning"*.⁸

Bennis, in 1962, wrote of the flaws of traditional measures of organisational performance and was the first to propose organisational health as a robust marker of sustained success in the face of ever changing demands, suggesting that an organisation *"can be unhealthy even if its performance and efficiency figures are higher than last month's. Unhealthy and healthy, that is, in relation to the ability to cope with change, with the future"*.¹⁴ This was echoed by Schein who, writing in 1965, concluded that the health of an organisation was dependent on how it adapted within its environment, particularly that it was flexible enough to cope with changes.¹⁵

The seminal work of Miles considered organisational health in the setting of education, within the American schooling system. In 1965 he suggested that a healthy organisation is one that *“not only survives in its environment but continues to cope adequately over the long haul, and continuously develops and extends its surviving and coping abilities”*. He operationalised organisational health as a series of ten inter-related dimensions, which were then grouped into themes of based around those which were *Task-centred*, those which were responsible for *Maintenance* and those which related to *Growth* (Figure 1-2).

Task-centred factors	Maintenance factors	Growth factors
Goal focus Communication adequacy Optimal power equalisation	Resource utilisation Cohesiveness Morale	Innovativeness Autonomy Adaptation Problem-solving adequacy

Figure 1-2 Dimensions of organisational health (from Miles MB. Planned change and organisational health: figure and ground. In: Change processes in the public schools. 1965;11-34)¹⁶

He also wrote that the success of any planned organisational change effort was dependent on the health of the organisation and that *“short-run operations on any particular day may be effective or ineffective, but continued survival, adequate coping, and growth are taking place”*.¹⁶ The central role of long-term thinking is also championed by both Corbett (2004), who states that *“leaders in healthy organisations approach short term problems with holistic strategies”*,¹⁷ and Bruhn and Chesney (1994), who note that whilst it is possible for an unhealthy organisation to be successful in the short-term, such organisations will eventually witness declining levels of performance.¹⁸ They describe health as a robust predictor of long-

term high performance and define it as consisting of a number of different characteristics (as are outlined in *Figure 1-3*).

Leadership	Culture	Employees
Values and expectations are explicit Collaborative decision making Participative management Delegation with trust Encourage creativity and innovation Encourage feedback Deal with conflict without procrastination Manage paradoxes well Plan and set priorities and share progress Shared vision or mindset Tolerance for failure	Clear mission and set of principles that remain consistent Organisational democracy Autonomy and entrepreneurship Empowerment Open communication; shared information Freedom to establish and negotiate boundaries Plan for change; initiate and manage renewal and change	Rewards explicit and clear Maximise individual creativity and growth Employee buy-in to mission Feedback on performance Employees feel valued, effective and in control Free to take risks, to suggest

Figure 1-3 Characteristics of a healthy organisation (from Bruhn JG, Chesney AP. Diagnosing the health or organizations. Health Care Superv 1994;13(2):21-33)¹⁸

Many of these characteristics overlap with the definitions proposed by Albrecht and Albrecht (1987), who suggest that *“a healthy organisation is one in which the authority structure, value systems, norms and reward systems operate to support the success of the organisation, its environment and the wellbeing of its personnel”*,¹⁹ and West (2000) who identified *healthy leadership, healthy workplace planning, people focus, process management* and the *measurement and evaluation of outcomes* as the five drivers of a healthy workplace.²⁰

Latterly, publications on this concept have revisited the adaptive relationship an organisation must have to its external environment to be considered healthy. This is found in the writing of Biswas and Biswas (2010), who consider organisational health as *“an ultrasystem to optimise the effectiveness and the well-being of employees, maintaining a balance between internal and external changes effectively”*,²¹ and Meng *et al.* who define organisational health as a state in which an organisation can *“operate efficiently, enhance internal competency of employees and sections, and adapt to changes in the external environment to achieve sustainable development”*.²²

A recent systematic review, considering definitions of organisational health across all organisational sectors, reveals a raft of different frameworks with each listing a number of constituent domains. A summary figure from this systematic review is reproduced in *Figure 1-4* and suggests that organisational health, as a latent construct, is multidimensional.²³

Organisational Health element	Publication (first author, year)																		
	Bennis ¹⁴ , 1962	Miles ¹⁶ , 1965	Schein ¹⁵ , 1965	Albrecht ¹⁹ , 1987	Hoy ²⁴ , 1987	Abbey-Livingston ²⁵ ,1988	Lyth ²⁶ , 1991	Rosen ²⁷ , 1991	Bruhn ¹⁸ , 1994	Beckhard ²⁸ , 1997	Leggette ²⁹ , 1997	Kruger ³⁰ , 1999	Hart ³¹ , 2000,	Lyden ³² , 2000	Thaw ³³ , 2002,	Shoaf ³⁴ , 2004,	De Smet ¹² , 2007	Quick ³⁵ , 2007	Ramdass ³⁶ , 2012
Communication		✓						✓	✓	✓	✓	✓		✓	✓			✓	✓
Goal focus and alignment	✓	✓			✓	✓	✓		✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
Staff morale and happiness		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
Resilience and innovativeness	✓	✓	✓		✓	✓		✓	✓	✓	✓		✓				✓	✓	
Evaluation and feedback	✓			✓		✓			✓	✓	✓		✓				✓	✓	
Staff power equalisation		✓		✓		✓			✓		✓		✓	✓					
Resource utilisation (staff and supplies)		✓			✓	✓	✓	✓			✓		✓	✓	✓	✓	✓		
Autonomy		✓					✓		✓		✓							✓	
Effective management					✓	✓			✓	✓	✓	✓	✓		✓				
Effective leadership									✓		✓		✓	✓	✓		✓		✓
Standards and staff training					✓	✓			✓				✓	✓				✓	✓
Staff performance recognition							✓	✓	✓	✓		✓		✓				✓	
Safety focus																		✓	
Integrity																		✓	
Quality focus on end user								✓		✓	✓	✓	✓	✓			✓	✓	✓

Figure 1-4 – Summary of existing definitions of the elements of organisational health (reproduced, with permission, from Nicolay CR, Williams SP, Purkayastha S, Greenhalgh A, Chaturvedi S, Phillips N, Darzi A. Organisational health: the concept and its implications for healthcare. A systematic review. [currently unpublished]¹⁷⁾)

1.2 Organisational health and healthcare organisations

Whilst organisational health has long been championed within other organisational sectors, it has gained attention more recently for its potential application within healthcare, largely through the work of the NHS Institute for Innovation and Improvement in a document published in 2009 entitled *Organisational Health: a new perspective on performance improvement*.³⁷ Unfortunately, in the decade which has followed this there remains a surprising lack of research within this context.

Work presented in this thesis draws on the established body of literature on organisational health in other sectors and previous work by our group here at Imperial College London. The most significant work to date, within the context of healthcare, is that of Nicolay *et al.*, in which organisational healthcare is defined in the setting of acute sector healthcare organisations in the UK.³⁸ This involved an extensive qualitative study, with organisational health reported to consist of eight inter-related themes: *Strategy, Resilience, Leadership & Management, Staff Wellbeing, Finance & Investment, Patient Safety, Efficiency* and *Communication* (see *Figure 1-5*).

This qualitative definition was built using grounded theory but if one examines both the individual themes (and subthemes) in detail, there are strong similarities with existing definitions found in other sectors (as previously discussed in *section 1.1*). Indeed, whilst there is something of a paucity of work exploring the concept of organisational health within the healthcare sector, high performance in healthcare has been considered under a number of other guises, many of which demonstrate further similarities with the individual themes presented in *Figure 1-5*. The importance of staff aligning themselves with the overall *Strategy*

of their organisation has been highlighted by Yağar and Dökme,³⁹ whilst van Gool *et al.* champion the ‘flexible’ organisation, adaptive to its environment (and so very similar to the theme of *Resilience*).⁴⁰ Looking to the literature on organisational change within the setting of healthcare, further cross-overs with organisational health are demonstrated, particularly the role of *Leadership & Management* and the culture of the organisation (with links to components of both *Staff Wellbeing* and *Communication*).⁴¹

Strategy	• Alignment • Direction	• Patients first • Teamwork
Resilience	• Staff attraction • Future survival	• Adversity coping
Leadership & Management	• Effective management • Effective senior management	• Effective leadership
Staff Wellbeing	• Staff satisfaction • Staff appointment • Training and workload	• Patient interaction • Temporary staff
Finance & Investment	• Efficient use of funds	• Investment
Patient Safety	• Presenteeism • Error reporting	• Staffing levels • Safety culture
Efficiency	• Planning and processes • Patient delays	• Data collection • Bureaucracy
Communication	• Information flow • Staff communication • Patient communication	• Information feedback • Openness

Figure 1-5 – Organisational health within acute sector healthcare organisations, as defined by Nicolay *et al.* (Development and validation of the Healthcare-OH survey to measure the organisational health of acute sector healthcare organisations. Nicolay CR, Williams SP, Brkic M, Purkayastha S, Chaturvedi S, Phillips N, Darzi A. *International Journal of Healthcare Management* 2019;5:1-13³⁸)

If we consider, in turn, the composite themes within this model, one can see that many of the terms used already come with their own definitions and, in many cases, existing quantitative measures. The strength of organisational health as a concept, however, is that it considers all

of these themes collectively with the understanding that only an organisation with a strong provision of each of these elements can be considered to be 'healthy'.

That being said, from work to date, it remains unclear whether these themes capture all the facets of a healthy healthcare organisation with any degree of accuracy, reliability and, crucially, repeatability. Furthermore, it is also unclear what the relationships between organisational health and its composite themes are and, in particular, what the relative importance of each different element is.

This leads us to ***RESEARCH QUESTION ONE: What are the underlying themes of organisational health in the context of healthcare organisations?***

1.3 Measuring organisational health

Organisational health is an abstract construct, since it cannot be directly observed and its definition can be found to vary based on context or source. As has been outlined above, it has been operationalised by a variety of different academics since its original description by Argyris in 1958,⁸ though the majority of publications since this point concern themselves largely with either advancing theoretical definitions of organisational health or discussing how its principles might be applied in particular spheres of work.¹⁷

There have been some, however, who have built on existing theory and considered its application within organisations, beginning with its quantitative measurement. The opportunity to be able to quantify these frequently difficult to measure, and often up-stream drivers of performance is an attractive prospect, allowing the researcher the chance to

pinpoint areas of relative strength and weakness within a particular organisation. Organisational health measurement lends itself towards the use of surveys with the inclusion of attitudinal questions, allowing for quantitative information to be gained from across the entire breadth of an organisation. It also allows for empirical research in investigating associations between organisational health measurements and organisational performance.

Of particular note, in this respect, is the work of Hoy and colleagues who, in 1991, published a text in which they draw on pre-existing definitions of organisational health within schools (largely from the work of Miles)²⁴ and then used this to develop the *Organizational Health Inventory-Elementary* (OHI-E; *Figure 1-6*), for use in the setting of elementary schools.⁴² Work by multiple other groups has explored the validity of this instrument, both in terms of its internal structure (and so construct validity and reliability) but also in terms of its association with other performance markers. Mehta and colleagues found significant associations (on regression analysis at $p < 0.05$) between elements of organisational health, as measured using the OHI-E, and results from the quality of teacher work life survey in elementary school teachers.⁴³ Attempts at comparing OHI-E organisational health measurements and student performance have been more challenging with a study by Thomasson reporting that it was only the elements *Academic Emphasis* and *Institutional Integrity* which showed a significant correlation with student achievement (again on regression analysis at $p < 0.05$).⁴⁴

In recent years, a series of publications from McKinsey & Company, largely in the form of company reports, have highlighted the commercial recognition of organisational health as both a marker of performance and as a method of identifying opportunity for improvement.¹² Indeed, the text *Beyond performance: how great organisations build ultimate competitive*

advantage (authored by Keller and Price from McKinsey) charts the application of their *Organisational Health Index* (OHI; *Figure 1-6*) survey in a large number of organisations (currently quoted at > 1,300)⁴⁵ across a wide range of fields, though predominantly within the banking, insurance, oil and telecommunication industries.⁴⁶

Whilst these documents contain limited raw data, they do state that organisational health, as measured by the OHI, appears to correlate with organisational performance, in terms of financial metrics. Results are given in terms of *earnings before interest, taxes, depreciation, and amortization* margin (EBITDA) and, ranking organisations by percentile groups based on OHI score, relationships between organisational health and performance are considered in terms of the likelihood of an organisation scoring in the top quartile for a particular element of the OHI having an above median EBITDA. Results are convincing for elements such as *Direction* (with top quartile scorers 1.9 times more likely to be above median) but less marked for elements such as *Leadership* and *External Orientation* (with top quartile scorers having only a 59% likelihood of being above median for both) and whilst one can presume that given the large sample size that results will be adequately powered, no inferential markers of significance are provided.⁴⁶

Each of these surveys, whether used within schools or commercial industry, utilises the employees within an organisation as participants – harnessing the aggregate perspective of all staff within an organisation as its organisational health ‘score’. Correlating these results with existing performance metrics adds weight to the application of organisational health within these contexts, using these instruments.

The *Healthcare-OH* survey is the only survey specifically designed and validated in a healthcare setting (*Figure 1-6*).³⁸ In comparison with the organisational sectors discussed above, healthcare is a complex context with multiple performance metrics based around not only financial position but also markers of quality of care and patient safety. Previous work within the department here at Imperial College London considered associations between organisational health, as measured by the *Healthcare-OH* survey, and a handful of performance markers. Results were encouraging given significant associations were found between figures for inpatient mortality and the survey domain of *Patient Safety* but no link was seen between organisational health and financial ratings.⁴⁷

OHI-E (Organisational Health Inventory-Elementary) ⁴²	OHI (Organisational Health Index) ⁴⁵	Healthcare-OH ³⁸
Teacher Affiliation	Direction	Strategy
Institutional Integrity	Leadership	Resilience
Collegial Leadership	Culture and climate	Leadership & Management
Resource Influence	Accountability	Staff Wellbeing
Academic Emphasis	Coordination and control	Finance & Investment
	Capabilities	Patient Safety
	Motivation	Efficiency
	External Orientation	Communication
	Innovation and learning	
Elementary schools	Commercial organisations	Healthcare organisations

Figure 1-6 – Table displaying the elements of organisational health as measured by existing surveys for elementary schools (OHI-E), commercial organisations (OHI) and healthcare organisations (Healthcare-OH)

Whilst the initial development work of the *Healthcare-OH* survey involved attempts to establish correlations with existing performance metrics, this measure has yet to be subjected

to definitive external validity testing. For an instrument to become established it also must be proven to be reliable across different settings and times. This brings us to **RESEARCH QUESTION 2: Can organisational health be reliably measured in acute sector healthcare organisations?**

If we return to the multiple over-lapping definitions of organisational health discussed above, a core thread runs from the early writing of Bennis, Schein and Miles through to the more contemporaneous work of Biswas and Biswas and Meng in that healthy organisations respond and adapt to external drivers in their environment to ensure high performance in the long term.^{14-16,21,22} Yet previous research lacks any empirical studies which consider organisational health measurements over time. This represents a significant gap in the literature as this idea of sustained success underpins so much of what makes organisational health an appealing concept. Thus, to **RESEARCH QUESTION 3: Does organisational health vary with time, driven by events within and around an organisation?**

1.4 Organisational health in other healthcare settings

As has been outlined above, in comparison with the theoretical and empirical evidence bases found in other sectors, there remains a relative dearth of research within healthcare and, in order for organisational health to be truly applied within the context of healthcare organisations, it must be able to be both reliably conceptualised and measured. This holds true for all healthcare settings which presents something of a challenge given their heterogeneous nature as an organisational sector. Healthcare organisations are diverse entities and, whilst they all prioritise patient care, even the methods and means through which that priority is expressed differ markedly; whether one contrasts primary and

secondary care, physical health versus mental health or even publically funded versus privately funded.

1.4.1 Organisational health in independent sector healthcare organisations

Shorter waiting times; a private room; lower infection rates; better facilities – these are just some of the reasons patients give for electing to ‘go private’ and choosing to receive their healthcare from providers in the independent sector over standard NHS care.⁴⁸ The number of patients receiving such care from independent sector healthcare providers is ever increasing, largely as sequelae of governmental health policy.⁴⁹ Over the past decade, successive governmental healthcare reforms, most recently with the Health and Social Care Act of 2012,⁵⁰ have introduced a market based model in healthcare accelerating the involvement of independent sector healthcare providers as competitors in the provision of state-funded care in an ultimately commercial market.⁵¹ Indeed, it has been argued that if current rates of increase are maintained, the independent sector could account for a quarter of all outpatient attendances by 2020.^{49,52}

As we move towards a healthcare system in which an ever increasing proportion of the population’s healthcare is delivered by the independent sector it is important that performance data, especially that relating to the quality and safety of care provided, is collected and reviewed with a similar rigour as it is within the NHS.^{53,54} All healthcare providers, both those within and outside of the NHS, are subject to inspections by the Care Quality Commission and there is a drive towards uniform performance monitoring in the private sector, though currently the Private Hospital Information Network requires a less comprehensive dataset than that submitted routinely by NHS trusts. Indeed, even senior

figures within the UK independent healthcare sector have gone on record to say they feel current levels of data collection are inadequate to the point where it limits their ability to ensure high quality care.⁵⁵

The differences, and indeed similarities, in culture and practice that exist between NHS and independent sector hospitals can be hypothesised and discussed at length but what is needed are objective methods of measuring these elements to permit their comparison. However, extensive searching within the literature reveals a stunning lack of work considering such quotients of performance in the independent healthcare sector. Whilst inherent differences in the way healthcare is provided between these two sectors make any exercise challenging, if one were to consider the organisational health of independent sector healthcare providers, it might allow for the opportunity for shared learning between this sector and that provided by the NHS. Hence, we are brought to **RESEARCH QUESTION 4: Can organisational health be measured in independent sector healthcare organisations?**

1.4.2 Organisational health in primary care healthcare organisations

The ongoing drive towards high performance in healthcare has become synonymous with conceptions of healthcare quality and the pursuit of improvement in clinical outcomes through the adoption of a variety of different quality metrics. Primary care is no exception to this and, within the UK, currently works to criteria set out within the Quality Outcome Framework (QOF) which not only defines quality for GP practices but also relates this to financial reimbursement and so represents performance-related pay.⁵⁶

Whilst there are a number of excellent publications reviewing quality indicators in primary care and making a case for quality improvement (QI),⁵⁷ it is important that we recognise the limitations of existing markers of quality. Healthcare organisations, especially those in primary care, are complex and multidimensional and there has been much discussion about the potential dangers of focussing on outcomes as quality indicators in isolation without understanding the processes and system characteristics that drive them.⁵⁸ Whilst downstream clinical outcomes could be said to represent an ultimate measure of quality, they can be considered something of a '*blunt instrument*', not truly indicative of performance nor indeed reflective of variation in standards in primary care.⁵⁹ Indeed, it has been suggested that existing performance measurement systems, such as the QOF, can influence organisational behaviour and drive clinicians towards performing well in the areas in which they are monitored, at the expense of others.⁶⁰

Organisational health could represent an up-stream marker of long-term high performance in primary care, seeking to address many of the weaknesses inherently present in these existing metrics. Yet GP practices are an extremely heterogeneous group of organisations and it is this diversity which is frequently cited as a hurdle when engaging with large-scale QI within primary care, much of which focuses on homogenisation.⁶¹ A large proportion of the diversity amongst GP practices reflects changes which have evolved slowly over time, often to meet the specific demands of the local population and so should be perceived as an organisational strength. It makes any attempt at extrapolating existing measures of organisational health fraught with difficulties however as it is far from clear as to the actual elements which comprise a 'healthy' GP practice. This presents **RESEARCH QUESTION 5: What are the elements of organisational health in primary care sector healthcare organisations?**

The importance of primary care healthcare organisations, GP practices, cannot be overstressed, representing as they do over ninety per cent of all patient/clinician interactions in the UK.⁶² If it is possible to address research question 5, then this definition could be used to design a new instrument to measure the organisational health of GP practices - **RESEARCH QUESTION 6: Can organisational health be measured in primary care sector healthcare organisations?**

1.5 Structure of the thesis

The aim of the thesis is, principally, to examine whether metrics (such as the *Healthcare-OH* survey) can be used to understand the mechanisms that drive organisational health, accepting the internal and external factors within different healthcare settings.

The studies that comprise this thesis build on prior work, subjecting existing organisational health measures to extended validity and reliability testing. It also seeks to address limitations found in the current literature through exploring the application of organisational health within different settings, challenging and amending existing theory and creating a new measure for a new healthcare setting, in primary care. Viewing the thesis as a whole, a mixed methods approach is seen with both qualitative and quantitative research methodologies employed, often in a complementary manner. This reflects not only the variety of research questions addressed within the thesis but the necessary journey one must embark upon when considering an abstract construct such as organisational health.

The thesis itself is divided into three sections (I-III). They are outlined below but revisited (to allow individual chapters to be mapped to specific research questions) in the *Aims* section which follows.

1.5.1 Section I

The first of these considers current theories of organisational health within acute sector healthcare organisations. An existing measure of organisational health, the *Healthcare-OH* survey, is utilised in a nationwide survey of acute NHS trusts. Analysis of results, in concert with a series of established and contemporaneous datasets, allows for extended testing of both the validity and reliability of this measure. The construct validity of the *Healthcare-OH* survey is examined in **Chapter 2**, whilst **Chapter 3** presents evidence for external (criterion-referenced) validity with organisational health scores linked to a series of existing outcome metrics.

1.5.2 Section II

The second section considers organisational health within previously unconsidered healthcare contexts. This involves the application of the *Healthcare-OH* questionnaire in the setting of independent healthcare organisations (**Chapter 4**), with the resulting data subjected to measurement invariance analysis prior to comparison with public sector data from the nationwide survey in the *Section I*. Two further studies presented in this section consider organisational health in the context of primary care, beginning with a qualitative study to re-define the construct within this setting (**Chapter 5**). The output of this work is used as the basis for the generation of a context specific measure, the *GP-OH* survey, which is then piloted to permit an examination of both its validity and reliability within **Chapter 6**.

1.5.3 Section III

The third and final section considers organisational health as a dynamic entity. This comprises a cross-sectional repeated-measure study considering organisational health across a twelve-month period within a single acute NHS trust (**Chapter 7**). Differences in organisational health over time are examined and compared to events occurring both within and around the trust during the same time period. This section aims to identify events and interventions which might confer improvements in organisational health.

1.5.4 Final thoughts

Chapter 8 considers the findings of the previous data chapters with reference to both their limitations and the potential impact for all healthcare organisations in the future.

Aims

This thesis aims, principally, to examine whether metrics (such as the *Healthcare-OH* survey) can be used to understand the mechanisms that drive organisational health, accepting the internal and external factors within different healthcare settings.

This will be addressed systematically in the empirical chapters which follow, each attempting to answer a different research question:

SECTION I considers whether existing theories and measures of organisational health can be applied within a healthcare context – with particular focus on the application, reliability and validity of these metrics (*Chapter 2* and *Chapter 3*).

This section begins with Chapter 2: ‘Organisational health and the acute healthcare sector – assessment of the factorial validity and reliability of the Healthcare-OH survey’ which aims to answer **RESEARCH QUESTION ONE: *What are the underlying themes of organisational health in the context of healthcare organisations?***

Chapter 3: ‘Organisational health and the *Healthcare-OH* survey – external (criterion-referenced) validity and comparison with existing performance metrics’ then considers **RESEARCH QUESTION 2: *Can organisational health be reliably measured in acute sector healthcare organisations?***

SECTION II extends application of organisational health to new healthcare sectors (*Chapter 4, Chapter 5 and Chapter 6*). Intuitively, the application of organisational health, as a concept, should also be possible within other healthcare contexts and this body of work considers organisational health across a broad range of different healthcare settings to attempt to demonstrate an extended exploration of its application. It is uncertain as to whether other healthcare settings might be better described by different definitions of organisational health.

Chapter 4: 'Organisational health and independent sector organisations' addresses ***RESEARCH QUESTION 4: Can organisational health be measured in independent sector healthcare organisations?*** In this chapter measurement invariance analysis is used to examine whether existing models of organisational health in healthcare can be extended to this sector.

Chapter 5: 'Defining a healthy organisation in primary care: a qualitative interview study' considers ***RESEARCH QUESTION 5: What are the elements of organisational health in primary care sector healthcare organisations?*** and generates a new definition of organisational health in this very different healthcare setting.

Chapter 6: 'The GP-OH survey: the development and validation of a novel instrument to measure organisational health in general practice' then uses this definition to design a new metric for measuring organisational health in primary care and so answers ***RESEARCH QUESTION 6: Can organisational health be measured in primary care sector healthcare organisations?***

SECTION III attempts to identify events or programmes which can positively impact organisational health within healthcare organisations (*Chapter 7*).

In 'Chapter 7: A year in the life of a 'healthy' organisation: a mixed methods exploratory study with a quarterly repeated-measure cross-sectional design', organisational health measurements are considered at multiple time points alongside both internal and external events at an acute NHS trust. This chapter thereby considers ***RESEARCH QUESTION 3: Does organisational health vary with time, driven by events within and around an organisation?***

SECTION I

ORGANISATIONAL HEALTH WITHIN ACUTE SECTOR

HEALTHCARE ORGANISATIONS

Chapter 2 Organisational health and the acute healthcare sector – assessment of the factorial validity and reliability of the *Healthcare-OH* survey

Chapter 3 Organisational health and the *Healthcare-OH* survey – external (criterion-referenced) validity and comparison with existing performance metrics

Chapter 2: Organisational health in the acute healthcare sector – assessment of the factorial validity and reliability of the *Healthcare-OH* survey

2.1 Introduction

To the best of our knowledge there exists only one tool to measure organisational health specifically within healthcare organisations: the *Healthcare-OH* survey.³⁸ This is a 112-item instrument that measures organisational health within the context of acute sector healthcare organisations (and can be found, in full, in *Appendix Ai*). The survey itself comprises eight sub-scales, ranging from eleven to eighteen items in length named as *Strategy*, *Resilience*, *Leadership & Management*, *Staff Wellbeing*, *Finance & Investment*, *Patient Safety*, *Efficiency* and *Communication*.³⁸ Each of these sub-scales maps to a particular theme of organisational health which emerged from a qualitative study using grounded theory methodology to define this construct in the setting of acute sector healthcare. These themes, and their component sub-themes, can be seen in *Figure 2-1*.

In this chapter we aim to revisit the dimensionality of the *Healthcare-OH* survey using confirmatory factor analysis (CFA), a form of latent trait measurement modelling. CFA is theory driven analysis where the researcher hypothesises the relationship between observed variables (the survey items) and unobserved variables (the dimensions, latent constructs or factors of organisational health) *a priori*, based on existing theory, and then tests the fit of this model using a variety of inferential statistical markers. The relationship considered, principally, is the covariance between survey items, with the understanding that two items

representing the same latent construct will show more covariance than two items representing different latent constructs.

Strategy	• Alignment • Direction	• Patients first • Teamwork
Resilience	• Staff attraction • Future survival	• Adversity coping
Leadership & Management	• Effective management • Effective senior management	• Effective leadership
Staff Wellbeing	• Staff satisfaction • Staff appointment • Training and workload	• Patient interaction • Temporary staff
Finance & Investment	• Efficient use of funds	• Investment
Patient Safety	• Presenteeism • Error reporting	• Staffing levels • Safety culture
Efficiency	• Planning and processes • Patient delays	• Data collection • Bureaucracy
Communication	• Information flow • Staff communication • Patient communication	• Information feedback • Openness

Figure 2-1 – Organisational health within acute sector healthcare organisations, as defined by Nicolay *et al.* (Development and validation of the Healthcare-OH survey to measure the organisational health of acute sector healthcare organisations. Nicolay CR, Williams SP, Brkic M, Purkayastha S, Chaturvedi S, Phillips N, Darzi A. *International Journal of Healthcare Management* 2019;5:1-13³⁸)

It is crucial, in ongoing survey development, for a consensus factor structure to permit the robust comparison of findings if this survey is to be used by other groups or in other settings in its existing format. It also remains unclear, from work to date, whether these themes (as listed in *Figure 2-1*) capture all the facets of a healthy healthcare organisation with any degree of accuracy, reliability and, crucially, repeatability. This chapter examines the relationship between organisational health and its composite themes and aims to answer **RESEARCH QUESTION ONE: What are the underlying themes of organisational health in the context of healthcare organisations?**

In order to meet this aim, the objectives of this chapter are to:

- 1 – replicate and test the existing factor structure of the *Healthcare-OH* survey
- 2 – test a series of competing factor structures based on existing theoretical frameworks of organisational health
- 3 – consider the internal consistency of the factors within each model
- 4 – present detailed psychometric data of the survey at use in its targeted population
- 5 – formalise dimensional constructs for use in criterion (external) validity testing - which follows in the next chapter

2.2 Methods

2.2.1 Sample

All acute sector NHS trusts in England were approached for participation through email communication with senior members of staff, namely the Chief Executive and Director of Human Resources/Organisational Development (or equivalent). Trusts were also invited through emails sent on the research team's behalf from other bodies who had agreed to support the project (NHS London and NHS Providers). Within enrolled trusts, all members of staff were invited to participate in the study. Research Ethics Committee review was not required as only staff were involved (and on a voluntary basis) and since the study is classified as a 'service evaluation' under the National Research Ethics Service (NRES) guidelines. Neither participating trusts nor the staff who took part in the study were offered incentives to complete the survey and trusts were promised they would not be identified by name in any publications which followed from the study (unless they explicitly wished for their results to be made public). Trusts were sent a copy of their survey results with the inclusion of anonymised benchmarking data from the other participating trusts.

2.2.2 Healthcare-OH survey

The *Healthcare-OH* survey is a 112-item instrument that measures organisational health within acute sector healthcare organisations.³⁸ The survey is structured with all items answered through a fixed-response seven-point Likert-like agreement scale with responses ranging from '*strongly disagree*' to '*strongly agree*', with '*neither agree nor disagree*' in the centre. An option to select '*does not apply*' is also included if a participant feels a particular question is not relevant to them for any particular reason.

The *Healthcare-OH* survey is housed within a dedicated web-based application (WebApp) accessed through the URL <http://healthy-hospitals.org/>. The WebApp is multi-platform compatible and invitations to complete the survey are sent out via email or SMS. A screen shot of the survey can be seen in *Figure 2-2*. The WebApp has been built to include a page allowing collection of basic demographics: gender, age, length of employment at trust, job role and department. All data collected is anonymised and held on secure servers.

The screenshot displays the 'Organisational Health' survey interface. At the top, it says 'Progress: 9 sets remaining'. Below this, a green header indicates 'SET 1: INDIVIDUAL PERFORMANCE'. The instructions state: 'With regards to your organisation, please rate your agreement with the following statements from 'Strongly disagree' to 'Strongly agree' or choose N/A if not applicable.'.

The rating scale is as follows:

	Strongly Disagree	Neither agree nor disagree					Strongly Agree	
	N/A	1	2	3	4	5	6	7
I find my work challenging	☐	☐	☐	☐	☒	☐	☐	☐
I am bored at work	☐	☐	☐	☐	☒	☐	☐	☐
I am unhappy with my work	☐	☐	☐	☐	☒	☐	☐	☐
I lack sufficient appraisal or feedback meetings to review my performance	☐	☐	☐	☐	☐	☒	☐	☐
The right staff are in the right place	☐	☐	☒	☐	☐	☐	☐	☐
The right people are appointed rather than someone to fill a post	☐	☐	☐	☐	☐	☐	☒	☐
People are appointed because they really want to do that job	☐	☐	☐	☒	☐	☐	☐	☐
People act in a professional manner	☐	☐	☐	☐	☐	☐	☒	☐
It is difficult to get time off to attend training / education courses	☒	☐	☐	☐	☐	☐	☐	☐

Figure 2-2 – Screenshot from Healthcare-OH survey accessed using WebApp on a desktop computer

2.2.3 Statistical analyses

During its development phase, the *Healthcare-OH* survey was evaluated as a series of subscales (*Strategy*, *Resilience*, etc.) with dimensionality considered to represent the sub-themes of each subscale - as outlined in *Figure 2-1*. This previous work, from a pilot survey of 1,017 respondents, reported good-fitting factor structures for each of the eight subscales.³⁸

This factor structure was re-evaluated with the current dataset and path diagrams for these models are found in *Figure 2-3*.

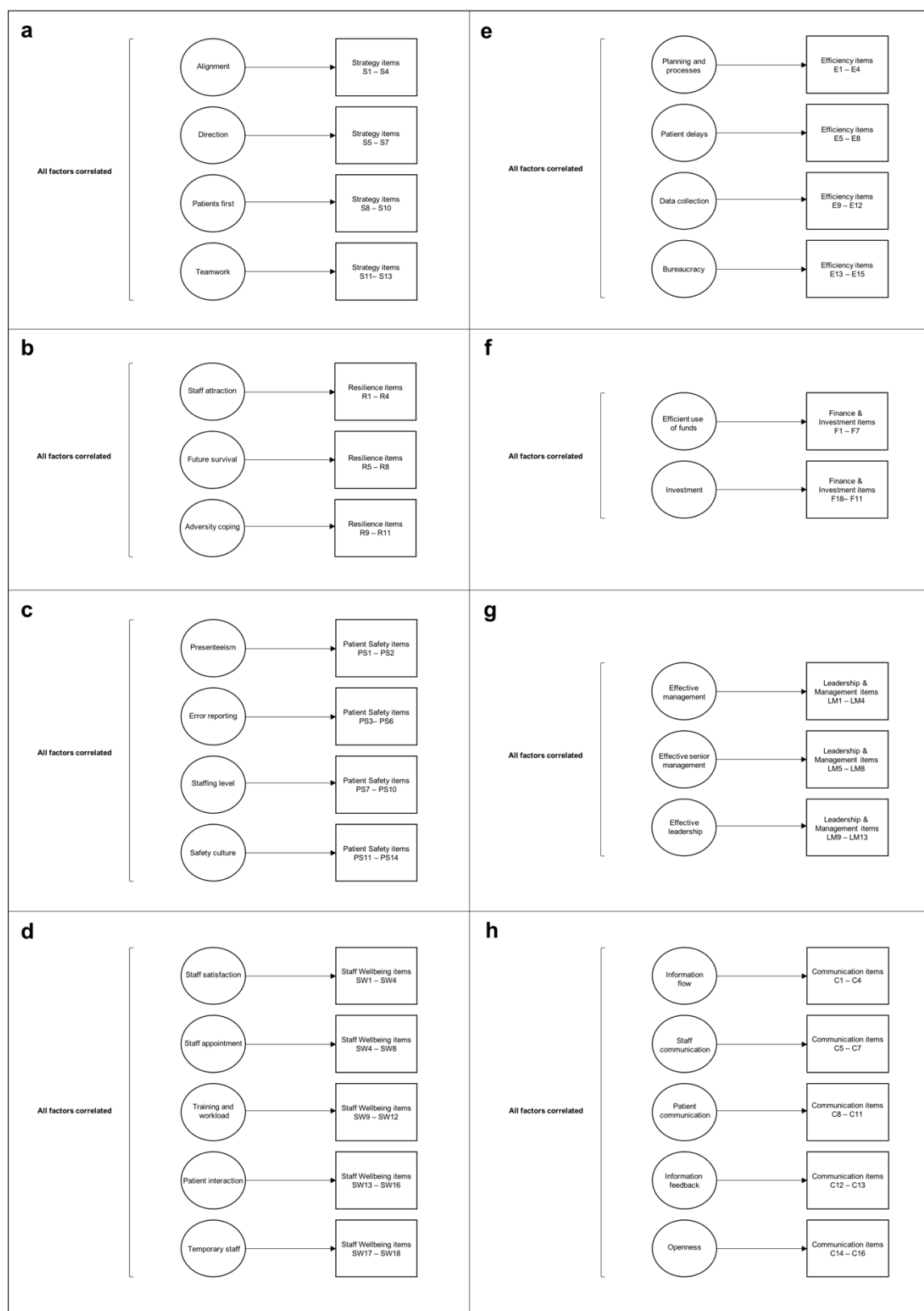


Figure 2-3 – Composite image of hypothesised models for Healthcare-OH subscales: (a) Strategy; (b) Resilience; (c) Patient Safety; (d) Staff Wellbeing; (e)Efficiency; (f) Finance & Investment; (g) Leadership & Management; (h) Communication

CFA was also used to consider whether the *Healthcare-OH* survey can be considered as a single entity, rather than as distinct subscales. The dataset was therefore fitted to models based on the eight main themes of *Strategy, Resilience, Leadership & Management, Staff Wellbeing, Finance & Investment, Patient Safety, Efficiency* and *Communication*. The path diagram for this model is found in *Figure 2-4*.

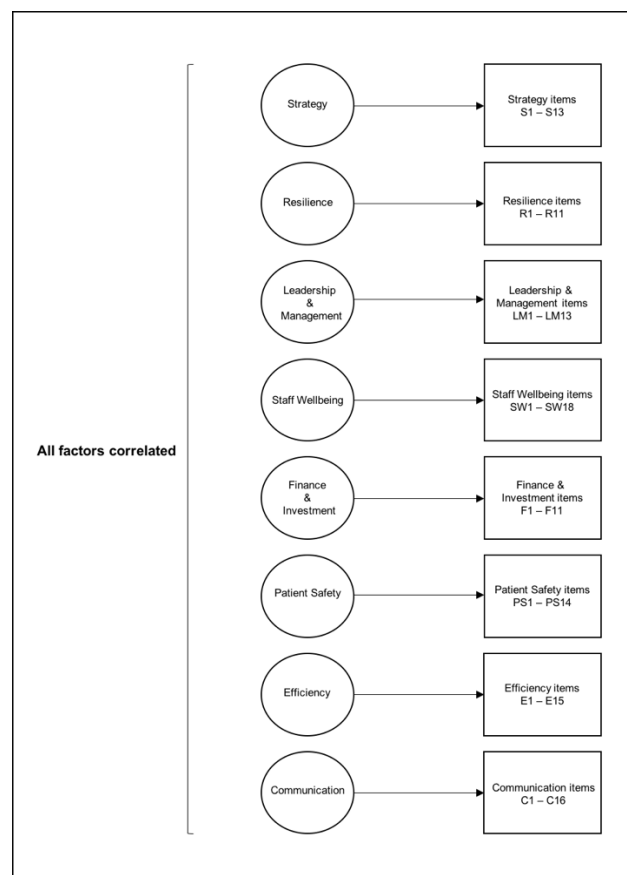


Figure 2-4 – Hypothesised eight factor model for Healthcare-OH survey

All models were analysed in Mplus (version 7.4 for Mac, Muthén and Muthén, 1998-2015). MLR estimation (maximum likelihood with robust standard errors) was used since it is robust to both non-normality and missing data – both of which were expected when analysing survey data such as this.⁶³

Model fit was assessed using commonly reported goodness-of-fit indices: root mean square error of approximation (RMSEA), comparative fit index (CFI) and standardised root mean square residual (SRMR).⁶⁴ “Good fit” for these indices was taken at $RMSEA \leq 0.05$, $CFI \geq 0.90$ and $SRMR \leq 0.08$.^{65,66} When evaluating competing models, differences in fit were evaluated using chi-squared change ($\Delta\chi^2$) using the Satorra-Bentler scaling correction for MLR.⁶⁷ Factor reliability was assessed using model-based Omega (ω), which considers both the factor loadings and residual variances of all items for a given factor.^{68,69}

2.3 Results

2.3.1 Sample description

Fifteen acute NHS trusts were recruited to the study. Whilst nearly half of the trusts enrolled were based in London, there was representation from the majority of regions in the country with two trusts from the Northwest, two from the Southeast, one from East Anglia, one from the Southwest and one from the West Midlands (see *Figure 2-5*). Data was collected from March through September 2016 inclusively. 5,412 participants completed the survey during this time frame with a trust participation rate of 3-19%.



Figure 2-5 – Nationwide distribution of participating acute NHS trusts: London=7, Northwest=2, Southeast=2, East Anglia=1, Southwest=1, West Midlands=1

Participant characteristics are found in the table in *Figure 2-6*. In an attempt to preserve participant anonymity, demographic questions were optional on completion of the survey. As such, the raw numbers shown in each subsection of this figure do not sum for the total sample size. Inspection of *Figure 2-6* reveals that participants represent a spread of different ages.

The majority of participants were female (76.4%) in gender and Nurses in job role (33.6%). This reflects the characteristics of NHS staff recorded elsewhere.⁷⁰

Figure 2-7 presents descriptive statistics for each item in the *Healthcare-OH* survey. Negatively worded items (e.g. item *S11: There is friction or confrontation within my team*) have been reverse scored prior to inclusion in this table and all further analysis thereafter.

2.3.2 Missing data

Figure 2-7 also shows that, for the 5,412 participants, item skip rate ranged from 9.6-12.9%. Item skip rate increased as participants proceeded through the survey, suggesting survey fatigue was a contributory factor. Responses entered as 'not applicable' ranged considerably, from broad general items such as *SW1: I find my work challenging* (0.1%) to more department specific items such as *E5: There are frequent cancellations in the operating theatres* (24.1%).

Figure 2-6 – Participant demographics for nationwide survey of acute NHS trusts

Age	n	%
16-20 years	17	0.6
21-30 years	448	15.5
31-40 years	654	22.6
41-50 years	899	31.1
51-60 years	741	25.6
61-70 years	134	4.6
Total	2893	100.0
Length of employment at trust	n	%
Less than 1 year	294	10.1
1-2 years	465	16.0
3-5 years	506	17.4
6-10 years	468	16.1
11-20 years	723	24.9
More than 20 years	453	15.6
Total	2909	100.0
Department	n	%
Medicine	842	24.7
Surgery	539	15.8
Anaesthetics	188	5.5
Corporate (Finance/HR)	430	12.6
Dentistry	7	0.2
Domestic	3	0.1
Dietetics	30	0.9
Emergency Department	120	3.5
ICT	119	3.5
Paediatrics	198	5.8
Labs	75	2.2
Medical records	10	0.3
Obstetrics and Gynaecology	194	5.7
Occupational Therapy	31	0.9
Orthodontics	2	0.1
Outpatient Department	131	3.8
Pathology	54	1.6
Pharmacy	95	2.8
Physiotherapy	102	3.0
Mental health	7	0.2
Radiology	160	4.7
Speech and Language Therapy	10	0.3

Support (e.g. security/porters/estates)	65	1.9
Total	3412	100.0
Job Role	n	%
Foundation Year Training	27	0.8
Registrar	58	1.7
Staff Grade/Associate Specialist	23	0.7
Consultant	220	6.5
Research Fellow	10	0.3
Midwife	109	3.2
Matron/Nurse Consultant	48	1.4
Research Nurse	54	1.6
Staff Nurse	456	13.5
Sister/Nurse Specialist	468	13.9
Chiropodist/Podiatrist	2	0.1
Dietician	27	0.8
Occupational Therapist	34	1.0
Operating Department Practitioner	31	0.9
Orthoptist	4	0.1
Pharmacist	67	2.0
Physiotherapist	121	3.6
Psychologist/Psychotherapist	11	0.3
Radiographer	102	3.0
Speech and Language Therapist	7	0.2
Health Care Assistant	189	5.6
Healthcare Scientist	114	3.4
Middle Management (Band 5-7)	274	8.1
Senior Management (Band 8+)	220	6.5
Very Senior Management/Director	16	0.5
Administration (e.g. Secretary/PA/Clerk)	379	11.2
Clinical Support Staff (e.g. Phlebotomist/Social Worker)	43	1.3
Corporate services (eg Finance/HR)	105	3.1
Domestic (e.g. Catering/Housekeeper)	6	0.2
Estates	11	0.3
Support (e.g. Security/Porters)	23	0.7
Dentist	3	0.1
ICT/Health Informatics	114	3.4
Total	3376	100.0

Figure 2-7 – Descriptive statistics for nationwide survey of acute NHS trusts

Ref	Item	Mean	Median	Mode	SD	n	skipped	N/A
S1	Everyone is committed to a common goal	4.67	5	6	1.69	4867	528	17
S2	Management and clinical teams work closely together	4.05	4	5	1.75	4814	523	75
S3	Management and clinical teams have the same aims	3.9	4	5	1.8	4812	525	75
S4	Everyone has the shared value of delivering high quality care	5	6	6	1.73	4854	534	24
S5	The strategic direction of this organisation is not clear	4.5	5	6	1.85	4814	530	68
S6	The strategic direction of this organisation is not realistic	4.47	4	4	1.74	4789	528	95
S7	I am frequently reminded of the mission / vision statement	4.14	4	6	1.86	4809	528	75
S8	Where I work, people put the patients first	5.66	6	7	1.5	4777	524	111
S9	Where I work, people understand why we are here	5.45	6	6	1.56	4861	532	19
S10	I put the needs of the patients above everything else	6.19	6	7	1.07	4709	517	186
S11	There is friction or confrontation within my team	4.48	5	7	2.09	4730	519	163
S12	There is friction or confrontation with other departments or teams	3.87	4	3	1.87	4762	524	126
S13	We have different aims from the other departments or teams we work with	4.09	4	4	1.88	4754	521	137
R1	It attracts the best quality nurses	4.25	4	4	1.55	4591	554	267
R2	It attracts the best quality doctors	4.61	5	4	1.51	4617	557	238
R3	It attracts the best quality clerical and secretarial staff	4.06	4	4	1.54	4710	570	132
R4	It has a good reputation for administration and management	3.81	4	4	1.68	4742	575	95
R5	It lacks a long term strategic plan	4.58	5	4	1.78	4745	575	92
R6	It lacks a long term financial plan	4.6	5	4	1.8	4715	570	127
R7	It is not very innovative	4.87	5	6	1.78	4751	576	85
R8	It rarely puts new things in place to improve quality	5	5	7	1.8	4746	577	89
R9	If there was a sudden unforeseen incident e.g. fire, deep snowfall or power cut, it would cope very well	4.68	5	6	1.71	4776	579	57
R10	If there as a sudden major medical incident e.g. multiple casualties or influenza pandemic, it would cope very well	4.74	5	6	1.69	4740	575	97
R11	If there was a sudden change in legislation e.g. a cut in funding, it would cope very well	3.1	3	1	1.75	4728	573	111
LM1	I feel well supported by my manager*	4.85	6	6	2.02	4779	603	30
LM2	I feel motivated by my manager*	4.61	5	6	2.06	4777	603	32
LM3	My manager* praises good work	4.82	6	6	2.01	4778	604	30

LM4	My manager* sets clearly defined objectives	4.59	5	6	1.98	4775	605	32
LM5	I trust the senior managers to make the right decisions	3.97	4	5	1.94	4787	605	20
LM6	The senior managers are approachable	4.33	5	6	2	4790	605	17
LM7	The senior managers drive staff motivation	3.68	4	1	1.98	4782	605	25
LM8	The senior managers have had little experience of patient care	4.4	4	7	1.94	4665	590	157
LM9	Leaders in this organisation have a vision	4.5	5	6	1.66	4756	603	53
LM10	Leaders appreciate staff	3.97	4	6	1.91	4762	603	47
LM11	Leaders are committed to innovation	4.31	4	5	1.71	4767	603	42
LM12	Leaders create a positive environment	3.92	4	5	1.88	4766	607	39
LM13	Clinical staff are involved in leadership	4.41	5	6	1.73	4637	588	187
SW1	I find my work challenging	5.14	6	6	1.61	4769	635	8
SW2	I am bored at work	5.62	6	7	1.74	4686	624	102
SW3	I am unhappy with my work	5.19	6	7	1.87	4710	628	74
SW4	I lack sufficient appraisal or feedback meetings to review my performance	5	6	7	1.97	4722	629	61
SW5	The right staff are in the right place	3.69	4	4	1.77	4741	631	40
SW6	The right people are appointed rather than someone to fill a post	3.71	4	1	1.89	4727	631	54
SW7	People are appointed because they really want to do that job	4.02	4	4	1.73	4722	629	61
SW8	People act in a professional manner	4.84	5	6	1.64	4762	634	16
SW9	It is difficult to get time off to attend training / education courses	4.37	5	6	2.05	4696	625	91
SW10	Training and education is a low priority	4.69	5	7	2.01	4731	634	47
SW11	My daily workload is not achievable	4.37	4	7	1.95	4732	629	51
SW12	I feel overly stressed	4.43	5	7	2.01	4716	625	71
SW13	Patients here are treated with dignity	5.74	6	6	1.37	4616	622	174
SW14	Patients have faith in this organisation	5.14	5	6	1.47	4619	617	176
SW15	People here lack the right attitude to work with patients	5.33	6	7	1.76	4580	622	210
SW16	If a close family member / friend needed medical care I would bring them here	5.18	6	6	1.77	4728	635	49
SW17	There is too great a reliance on agency / locum staff	3.61	4	4	1.86	4541	611	260
SW18	There is too great a reliance on bank staff	3.56	3	4	1.8	4481	611	320
F1	Money is wasted	3.49	3	4	1.81	4686	637	89
F2	Money is used in the wrong areas	3.42	3	4	1.75	4667	639	106

F3	People who manage the budget lack contact with clinical areas	3.43	3	4	1.78	4586	622	204
F4	People here are compensated adequately for the job they do	3.15	3	1	1.71	4671	656	85
F5	There is enough money invested in computer systems and technology	3.58	4	1	1.9	4699	638	75
F6	There is enough money invested in patient care and clinical equipment	3.51	3	2	1.76	4608	628	176
F7	There is enough money invested in buildings and renovations	3.47	3	4	1.8	4659	635	118
F8	There is money available for innovation or new ideas	3.49	4	4	1.59	4633	632	147
F9	People understand the cost of the equipment or tests they use	3.12	3	1	1.78	4631	631	150
F10	All changes made are to cut costs	3.84	4	4	1.85	4678	638	96
F11	Money saving ideas are not listened to	4.53	5	4	1.71	4607	630	175
PS1	Absenteeism is a problem in this organisation	3.91	4	4	1.73	4667	654	91
PS2	People take lots of sick leave where I work	4.4	5	7	1.95	4701	659	52
PS3	Mistakes / critical incidents are reported here	5.53	6	6	1.46	4631	643	138
PS4	Mistakes / critical incidents are learned from here	5.21	6	6	1.58	4629	651	132
PS5	It is encouraged to report mistakes / critical incidents	5.7	6	6	1.4	4669	658	85
PS6	Changes are made as a result of mistakes / critical incidents happening	5.21	6	6	1.56	4640	652	120
PS7	There are sufficient nurses to look after patients out of hours (nights & weekends)	3.3	3	1	1.75	4015	564	833
PS8	There are sufficient doctors to look after patients out of hours (nights & weekends)	3.38	3	4	1.71	4010	562	840
PS9	There are sufficient nurses to look after patients during weekdays	3.66	4	4	1.78	4179	588	645
PS10	There are sufficient doctors to look after patients during weekdays	3.92	4	4	1.73	4158	585	669
PS11	There is a weak safety culture here	5.19	6	7	1.71	4554	640	218
PS12	We lack regular meetings to discuss the mistakes / critical incidents reported	4.6	5	7	1.96	4512	634	266
PS13	Patient safety is prioritised by management	4.95	5	6	1.69	4574	641	197
PS14	There is a 'no blame' culture here	3.98	4	4	1.9	4630	655	127
E1	It is haphazard and things work out by chance rather than by proper planning	4.8	5	6	1.73	4618	674	120
E2	There are often last minute changes to staffing	3.62	4	4	1.83	4471	654	287
E3	This organisation is efficient	3.94	4	4	1.66	4679	685	48
E4	The processes in place are archaic and based on historical changes	4.35	4	4	1.67	4551	669	192
E5	There are frequent cancellations in the operating theatres	3.9	4	4	1.55	3582	524	1306
E6	Patients wait a long time for emergency surgery	4.46	4	4	1.58	3593	525	1294
E7	There are delays in discharging patients	3.08	3	2	1.66	3936	575	901

E8	Patient notes are often unavailable	4.3	4	4	1.87	4087	598	727
E9	Decisions are made based on patient care data collected	4.39	4	4	1.42	4047	596	769
E10	Quality of patient care data collected is fed back to staff	4.05	4	4	1.72	4182	607	623
E11	There is accurate data collected to assess the quality of patient care	4.19	4	4	1.6	4157	610	645
E12	Innovations to help patients e.g. text messaging are embraced	4.38	4	6	1.69	4238	626	548
E13	There are too many senior managers	3.35	3	1	1.86	4603	675	134
E14	There are too many junior / middle managers	3.74	4	4	1.84	4583	675	154
E15	There is too much bureaucracy to get something done	2.88	2	1	1.76	4622	680	110
C1	Information flows from frontline staff up to Board level	3.4	3	4	1.73	4595	685	132
C2	Information flows from the Board to all levels of the organisation	4.07	4	4	1.76	4622	690	100
C3	There is transparency so it is easy to see what is being planned by the organisation	3.58	4	4	1.76	4646	694	72
C4	Senior staff communicate with their teams in person	4.02	4	6	1.94	4653	698	61
C5	Communication between nurses and doctors is poor	5.1	5	6	1.61	4077	608	727
C6	Communication between medical staff and patients is poor	5.15	6	6	1.6	4163	622	627
C7	Communication between medical staff and management staff is poor	4.35	4	4	1.66	4159	623	630
C8	Patients with communication challenges e.g. deafness or non-native speaking are well catered for	4.6	5	6	1.64	4261	641	510
C9	People here are polite to patients	5.64	6	6	1.33	4534	683	195
C10	People here ignore patients	6.03	7	7	1.39	4445	667	300
C11	People here talk in their own languages excluding others	4.81	5	7	1.96	4473	674	265
C12	Patient complaint information is regularly fed back to staff	4.51	5	6	1.86	4432	671	309
C13	Thank you or praise from patients is regularly fed back to staff	4.87	5	6	1.82	4471	672	269
C14	There are inconsistent messages from senior levels	3.99	4	4	1.79	4567	694	151
C15	Decisions are made behind closed doors	3.31	3	1	1.81	4608	697	107
C16	Information is out of date by the time I get it	4.52	5	4	1.77	4590	694	128
*manager means your line manager of nurse manager, or Consultant if you are a doctor								

2.3.3 Healthcare-OH dimensionality

2.3.3.1 CFA of individual subscales

The results of the subscale CFA models, testing models previously fitted to pilot results during the survey's initial development, are tabulated in *Appendix A2* and illustrated in *Figure 2-8* (panes *a-h*). As is commonplace when reporting CFA results, the table found in *Appendix A2* includes both the unstandardised solution (with factor loadings labelled as *B*) and the standardised solution (labelled as β).⁷¹ Whilst standardised values (β) are best reviewed when comparing items within a solution, analysis is based on unstandardised values (*B*) so they are included for completion. The explained variance of an item due to its corresponding factor is denoted as R^2 , such that 74% of the variance of item *S1: Everyone is committed to a common goal*, is explained by the factor *Alignment*.

Goodness-of-fit indices for each model are shown in *Figure 2-9*. Considering first the seven domains of *Strategy, Resilience, Leadership & Management, Staff Wellbeing, Patient Safety, Efficiency* and *Communication*, CFI ranged from 0.94-0.99, RMSEA 0.04-0.05 and SRMR 0.02-0.06 – all of which signify well fitted models.

Poor fit was found for the subscale of *Finance & Investment* however with CFI 0.81, RMSEA 0.11, SRMR 0.09 (labelled '*Finance subscale (i)*' in *Figure 2-9*). Before making amendments to this model, exploratory factor analysis was run for the items within this subscale using SPSS version 24 (IBM, Armonk, NY) and the results of this are found in *Figure 2-10* and *Figure 2-11*. Having demonstrated that the correlation matrix of items F1-F11 was not an identity matrix (Bartlett's test of sphericity χ^2 6323.44, df 55, $p < 0.01$) and was of satisfactory sampling adequacy (Kaiser-Meyer-Olkin 0.8), the dataset was factorised as per principal axis factoring.

Given items populate a subscale representing a theme of organisational health, and so items are related to one another by design, the factor solution was rotated obliquely with Promax (with Kaiser normalisation) and the kappa level varied until the simplest solution emerged. *Figure 2-11* shows the pattern matrix of this solution suggesting that items F1-F4 might be better modelled under the factor of *Efficient use of funds* with items F5-F11 modelled under the factor of *Investment*. This revised model was then tested by way of CFA, labelled as '*Finance subscale (ii)*' in *Figure 2-9*. Whilst there was improvement in the goodness-of-fit indices for this revised model, they do not meet the conventionally accepted levels specified in the *Methods* section, suggesting ongoing issues with model fit (CFI 0.88, RMSEA 0.09, SRMR 0.09).

Figure 2-12 displays the determinants and reliability assessments (Omega; ω) for the latent factors within each model. Unacceptable levels of reliability ($\omega < 0.70$) were found for latent factors within the *Strategy* subscale (Direction $\omega = 0.40$), *Finance & Investment* subscale (*Investment* $\omega = 0.44$ (CFAi), $\omega = 0.68$ (CFAii)), *Patient Safety* subscale (*Safety culture* $\omega = 0.59$), *Efficiency* subscale (*Planning and procedures* $\omega = 0.69$; *Patient delays* $\omega = 0.68$) and *Communication* subscale (*Patient communication* $\omega = 0.84$).

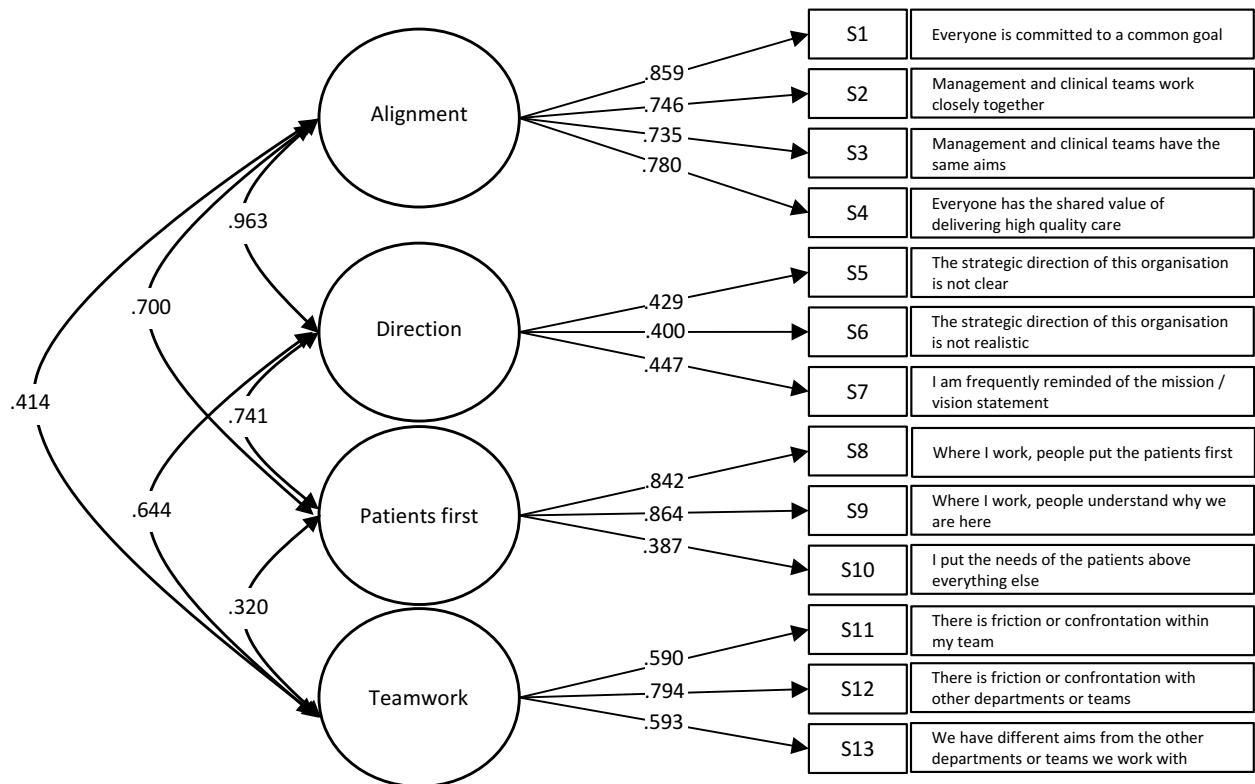


Figure 2-8a – CFA for *Strategy* subscale models (standardised factor loading (β) denoted by unidirectional arrow, correlation between factors denoted with bidirectional arrow)

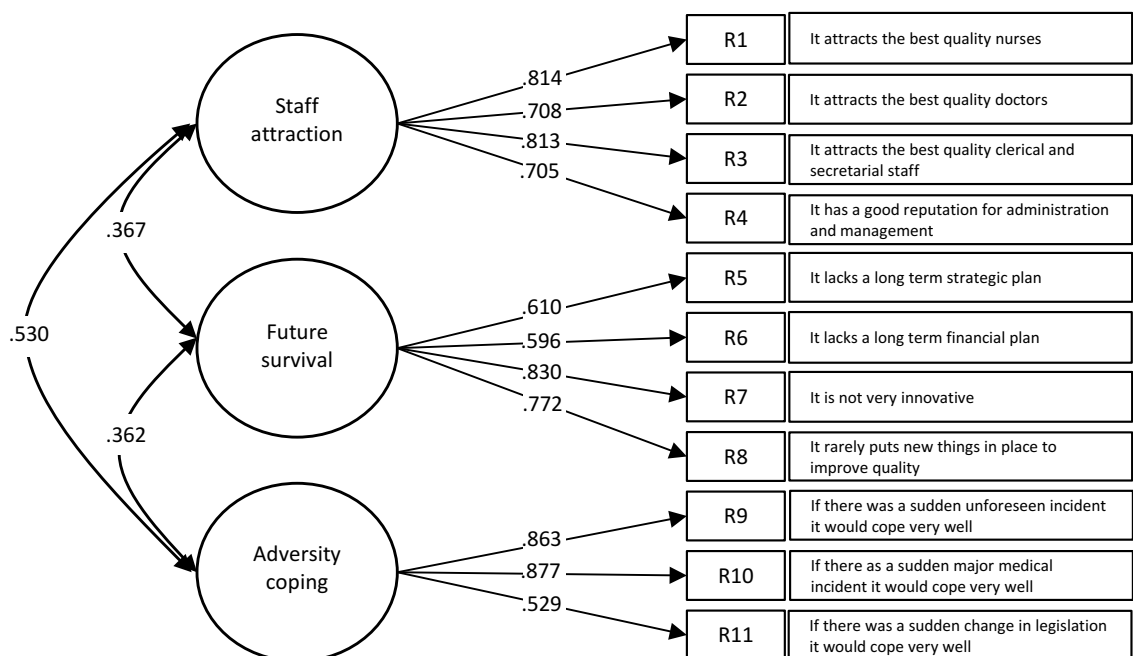


Figure 2-8b – CFA for *Resilience* subscale models (standardised factor loading (β) denoted by unidirectional arrow, correlation between factors denoted with bidirectional arrow)

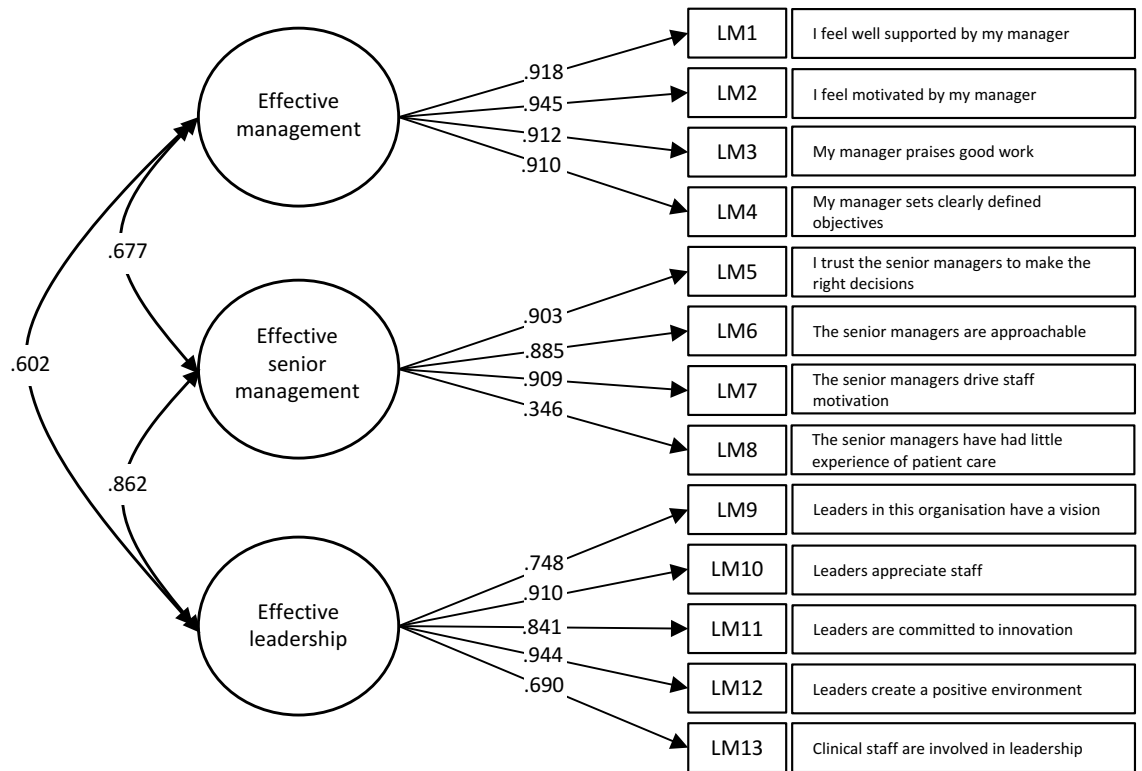


Figure 2-8c – CFA for *Leadership & Management* subscale models (standardised factor loading (β) denoted by unidirectional arrow, correlation between factors denoted with bidirectional arrow)

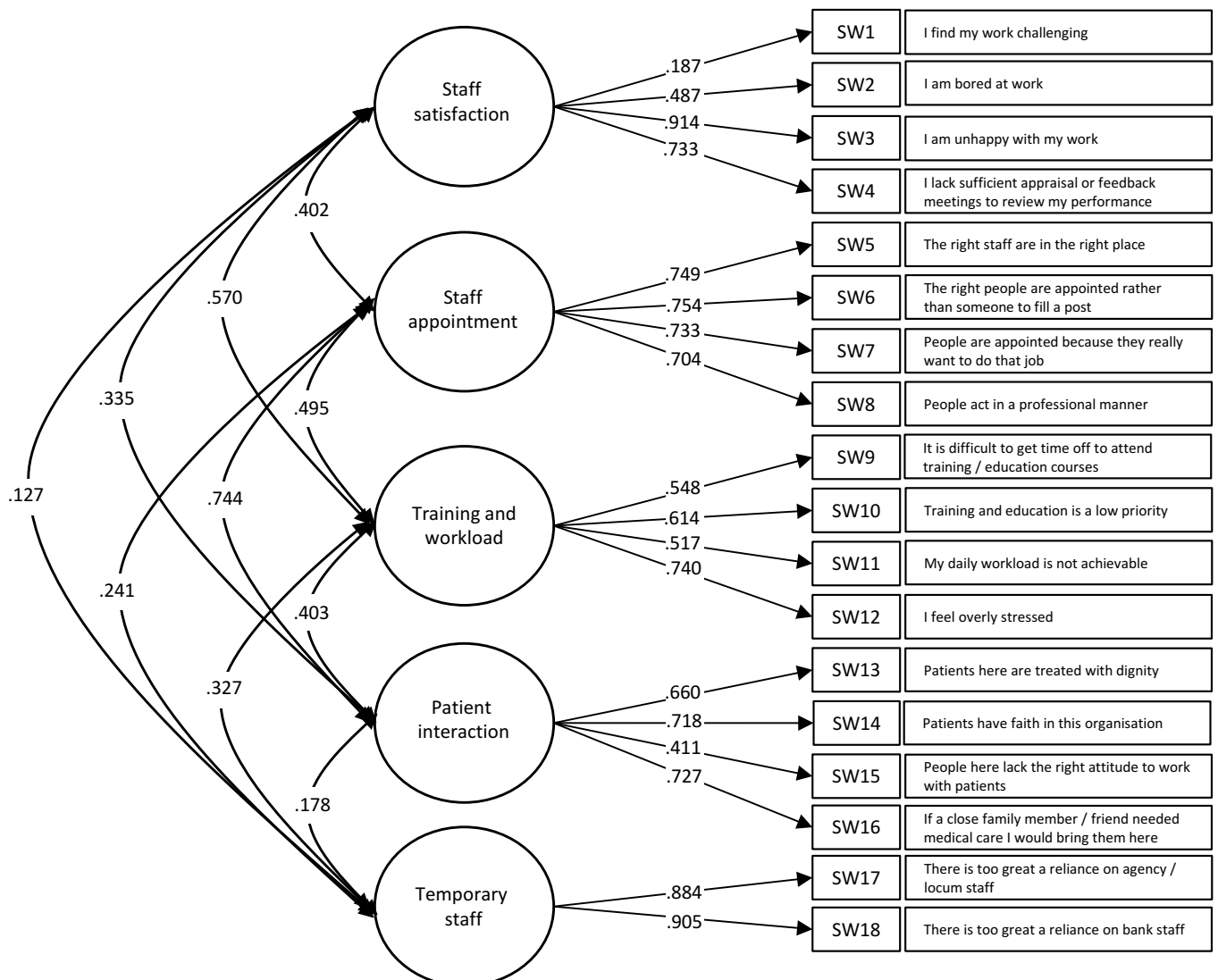


Figure 2-8d – CFA for *Staff Wellbeing* subscale models (standardised factor loading (β) denoted by unidirectional arrow, correlation between factors denoted with bidirectional arrow)

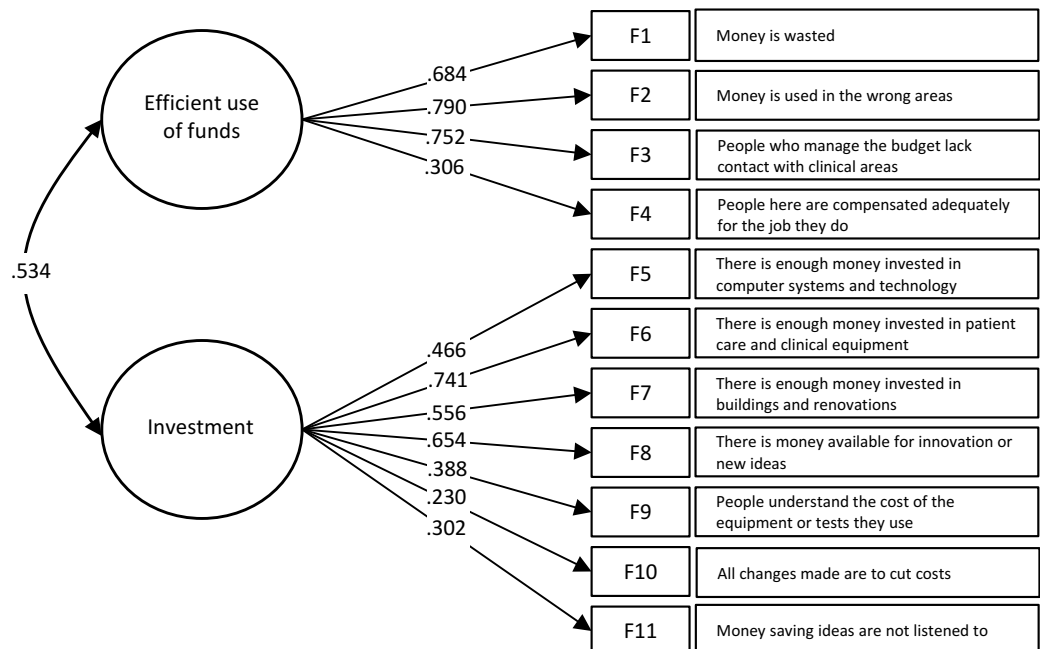


Figure 2-8e – CFA for *Finance & Investment* subscale models (standardised factor loading (β) denoted by unidirectional arrow, correlation between factors denoted with bidirectional arrow)

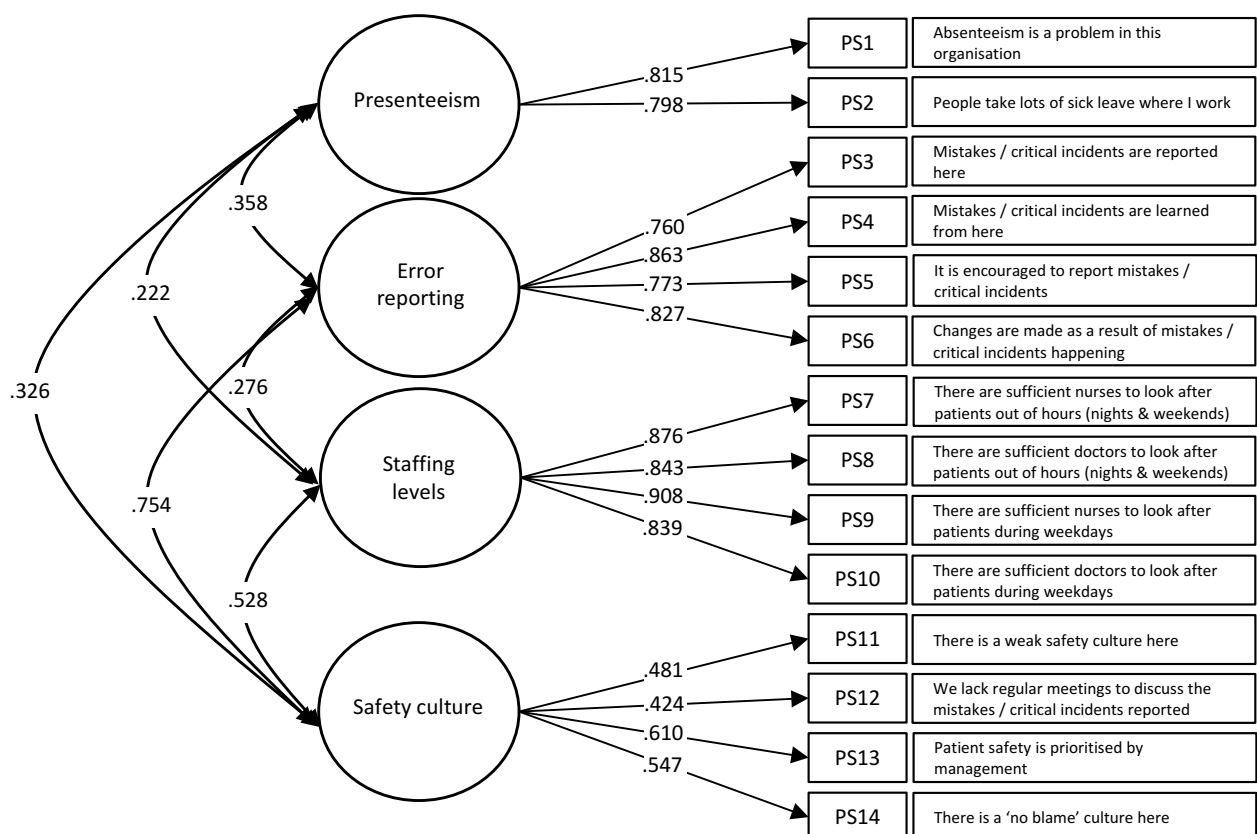


Figure 2-8f – CFA for *Patient Safety* subscale models (standardised factor loading (β) denoted by unidirectional arrow, correlation between factors denoted with bidirectional arrow)

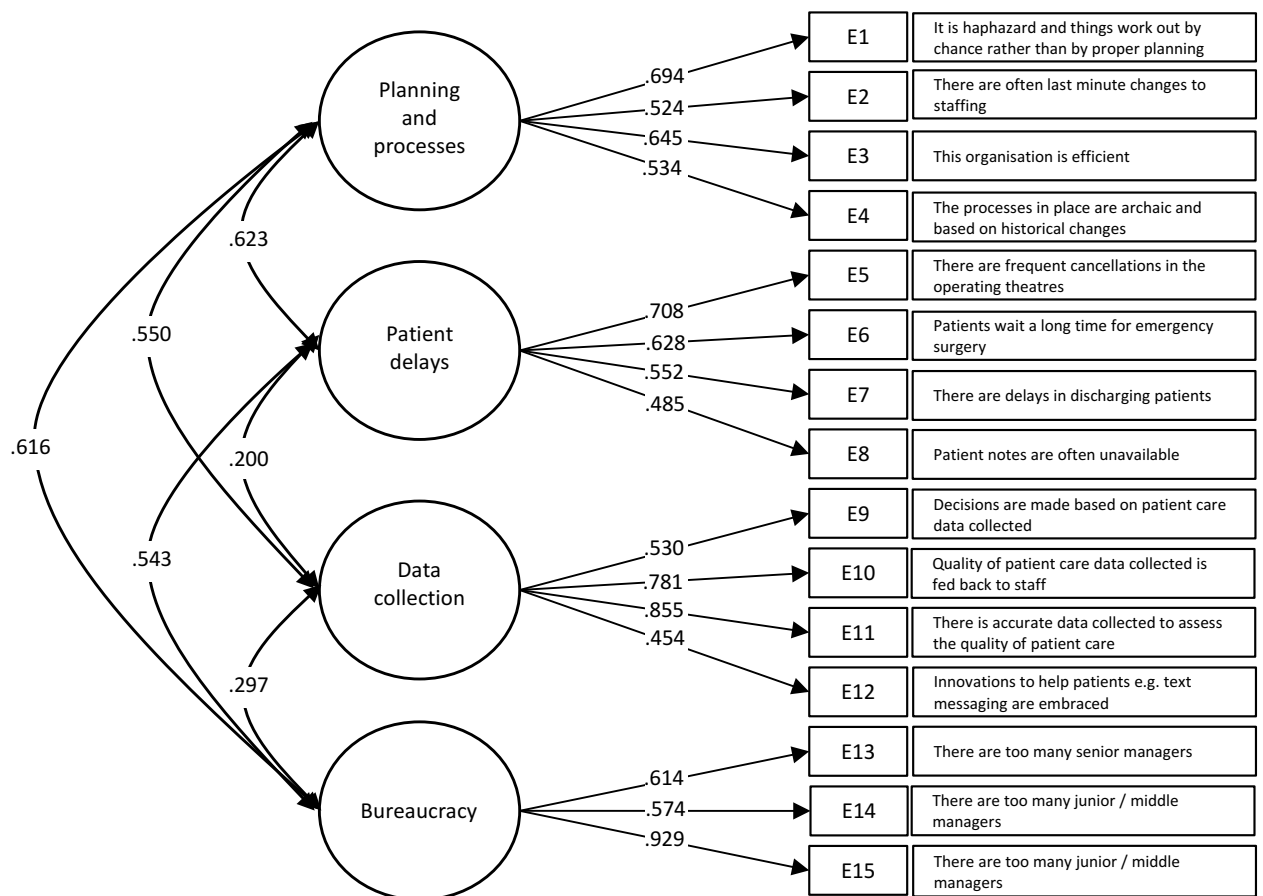


Figure 2-8g – CFA for *Efficiency* subscale models (standardised factor loading (β) denoted by unidirectional arrow, correlation between factors denoted with bidirectional arrow)

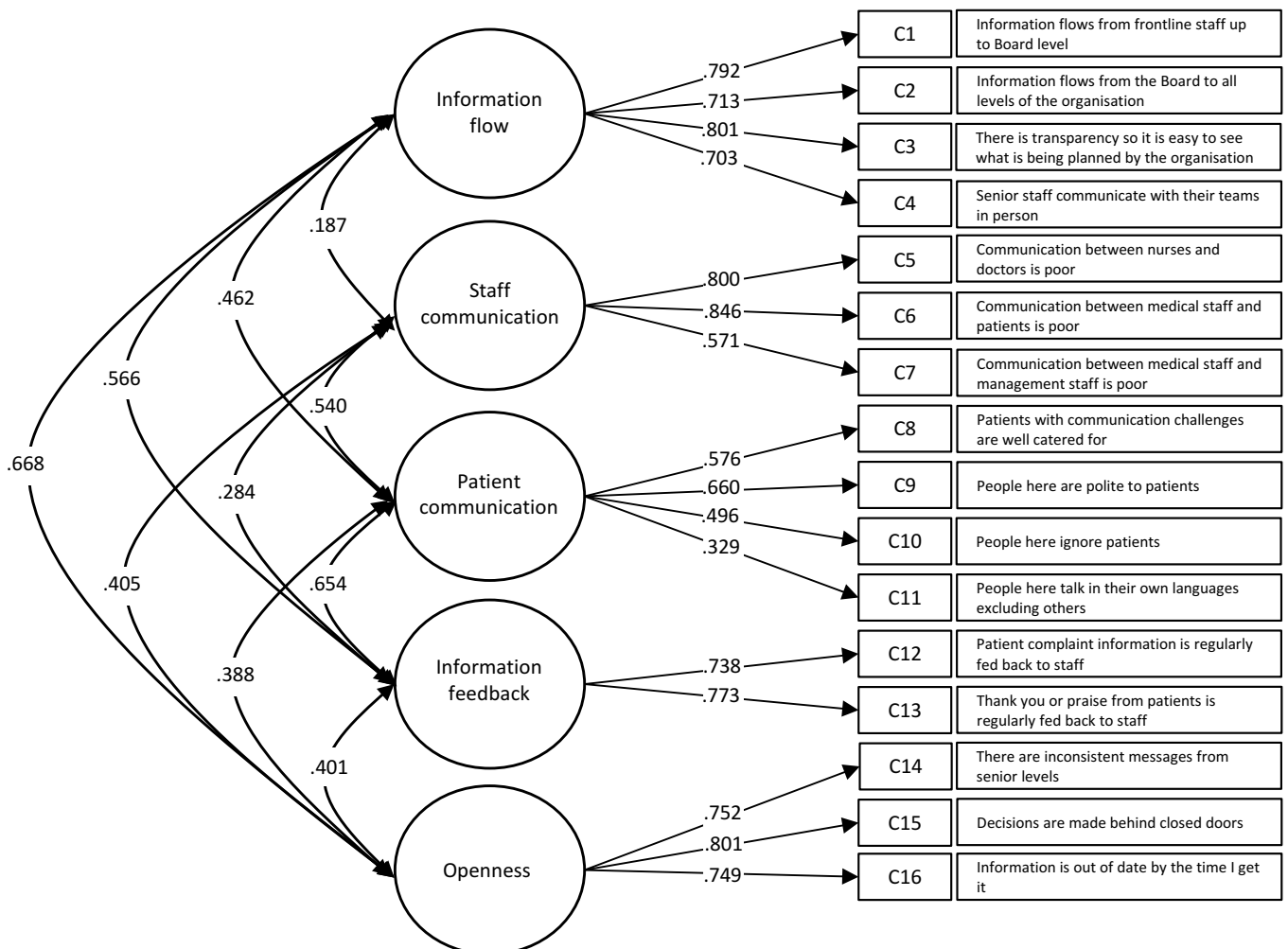


Figure 2-8h – CFA for *Communication* subscale models (standardised factor loading (β) denoted by unidirectional arrow, correlation between factors denoted with bidirectional arrow)

Model description	χ^2		RMSEA			CFI	SRMR
	Estimate	df	Estimate	CI	Probability <0.05		
Strategy subscale	458.21	56	0.050	(0.046-0.055)	0.42	0.96	0.04
Resilience subscale	240.29	36	0.047	(0.042-0.053)	0.79	0.98	0.04
Leadership subscale	259.13	60	0.037	(0.032-0.041)	1.00	0.99	0.02
Staff Wellbeing subscale	799.37	116	0.050	(0.047-0.053)	0.47	0.94	0.05
Finance subscale (i)	1070.64	38	0.109	(0.103-0.114)	0.00	0.81	0.09
Finance subscale (ii)	673.75	37	0.087	(0.081-0.092)	0.00	0.88	0.09
Patient Safety subscale	283.94	65	0.039	(0.034-0.043)	1.00	0.98	0.03
Efficiency subscale	448.34	83	0.045	(0.041-0.049)	0.98	0.94	0.05
Communication subscale	570.96	91	0.050	(0.046-0.054)	0.52	0.95	0.06

Figure 2-9 – Fit indices for subscale CFA models (χ^2 = chi-squared, df = degrees of freedom, RMSEA = root mean square error approximation, CI = confidence interval, CFI = comparative fit index, SRMR = standardised root mean square residual)

Kaiser-Meyer-Olkin measure of sampling adequacy		0.80
Bartlett's test of sphericity	Approx. Chi-Square	6323.44
	df	55
	Sig.	<0.01

Figure 2-10 – Exploratory factor analysis of *Finance & Investment* subscale: suitability assessments (Kaiser-Meyer-Olkin measure of sampling adequacy. Bartlett's test of sphericity)

Pattern Matrix			
Item ref	Item	Factor	
		Efficient use of funds	Investment
F1	Money is wasted	0.806	
F2	Money is used in the wrong areas	0.891	
F3	People who manage the budget lack contact with clinical areas	0.683	
F4	People here are compensated adequately for the job they do	0.322	
F5	There is enough money invested in computer systems and technology		0.569
F6	There is enough money invested in patient care and clinical equipment		0.693
F7	There is enough money invested in buildings and renovations		0.674
F8	There is money available for innovation or new ideas		0.683
F9	People understand the cost of the equipment or tests they use		0.527
F10	All changes made are to cut costs		0.374
F11	Money saving ideas are not listened to		0.317

Figure 2-11 – Exploratory factor analysis of *Finance & Investment* subscale: Pattern matrix (Principal axis factoring. Promax rotation with Kaiser normalisation. Kappa level 4. Coefficients <0.300 suppressed for clarity)

Sub-scale	Latent construct	Determinant	ω	SE
Strategy	Alignment	0.94	0.86	0.01
	Direction	0.95	0.40	0.03
	Patients first	0.93	0.80	0.01
	Teamwork	0.87	0.70	0.01
Resilience	Staff attraction	0.91	0.85	0.01
	Future survival	0.90	0.80	0.01
	Adversity coping	0.94	0.81	0.01
Leadership	Effective management	0.98	0.96	0.00
	Effective senior management	0.97	0.87	0.00
	Effective leadership	0.98	0.92	0.00
Staff Wellbeing	Staff satisfaction	0.99	0.76	0.02
	Staff appointment	0.91	0.83	0.01
	Training and workload	0.88	0.70	0.02
	Patient interaction	0.89	0.72	0.01
	Temporary staff	0.94	0.89	0.01
Finance (i)	Efficient use of funds	0.89	0.70	0.01
	Investment	0.89	0.44	0.02
Finance (ii)	Efficient use of funds	0.88	0.74	0.01
	Investment	0.87	0.68	0.01
Patient Safety	Presenteeism	0.89	0.79	0.01
	Error reporting and feedback	0.96	0.88	0.01
	Staffing levels	0.97	0.92	0.01
	Safety culture	0.88	0.59	0.02
Efficiency	Planning and processes	0.89	0.69	0.01
	Patient delays	0.86	0.68	0.02
	Data collection	0.92	0.76	0.01
	Bureaucracy	0.94	0.75	0.01
Communication	Information flow	0.93	0.84	0.01
	Staff communication	0.92	0.79	0.01
	Patient communication	0.84	0.57	0.02
	Information feedback	0.88	0.73	0.02
	Openness	0.92	0.81	0.01

Figure 2-12 – Reliability of factors within subscale models (ω = omega, SE = standard error)

2.3.3.2 CFA of survey as a whole

The results of the CFA models, fitting an eight-factor model based on the themes of organisational health as outlined in *Figure 2-4*, are listed in *Appendix A3* and illustrated in *Figure 2-13*. For clarity, correlations between factors are omitted from *Figure 2-13* and, instead, tabulated in *Figure 2-14*. Fit indices suggest good fit for both RMSEA and SRMR (0.03 and 0.06 respectively) and acceptable fit for CFI (0.87).

Inspection of *Figure 2-14* shows high correlations between each of the eight factors (0.63-0.92) and suggest higher order modelling and/or bifactor modelling might be appropriate. These models are outlined in *Figure 2-15*. The higher order model (left hand pane of *Figure 2-15*) shows all eight first order factors loading onto a single higher order factor named *Organisational Health*. The bifactor model (right hand pane of *Figure 2-15*) shows the residual of each item loading onto a single general factor, also labelled as *Organisational Health*. The bifactor model did not converge but the higher order model did and the results of this model are found in *Appendix A4* and are illustrated in *Figure 2-16* (with item loadings omitted for clarity). Fit indices for both of these two prospective models are shown in *Figure 2-17*. Scaled chi-squared comparison of the single order and higher order models show the original single order model to be a significantly better fit to the data than the higher order model (Satorra-Bentler rescaled $\Delta\chi^2$ 154.25, Δdf 20, $p < 0.01$). Whilst this is often the case when considering a fully saturated model, and whilst still noting that the solution tabulated in *Appendix A4* shows high item loadings, inspection of reliability estimates (seen for both single order and higher order models in *Figure 2-18*) shows unacceptable omega values within the higher order model for the factors of *Strategy* ($\omega=0.55$), *Resilience* ($\omega=0.49$), *Staff Wellbeing* ($\omega=0.34$), *Finance & Investment* ($\omega=0.55$), *Patient Safety* ($\omega=0.48$), *Efficiency* ($\omega=0.37$) and *Communication*

($\omega=0.33$). This contrasts with the single order model, with acceptable omega values for all factors (ω 0.76-0.93; *Figure 2-18*), further underscoring its superiority to the higher order model.

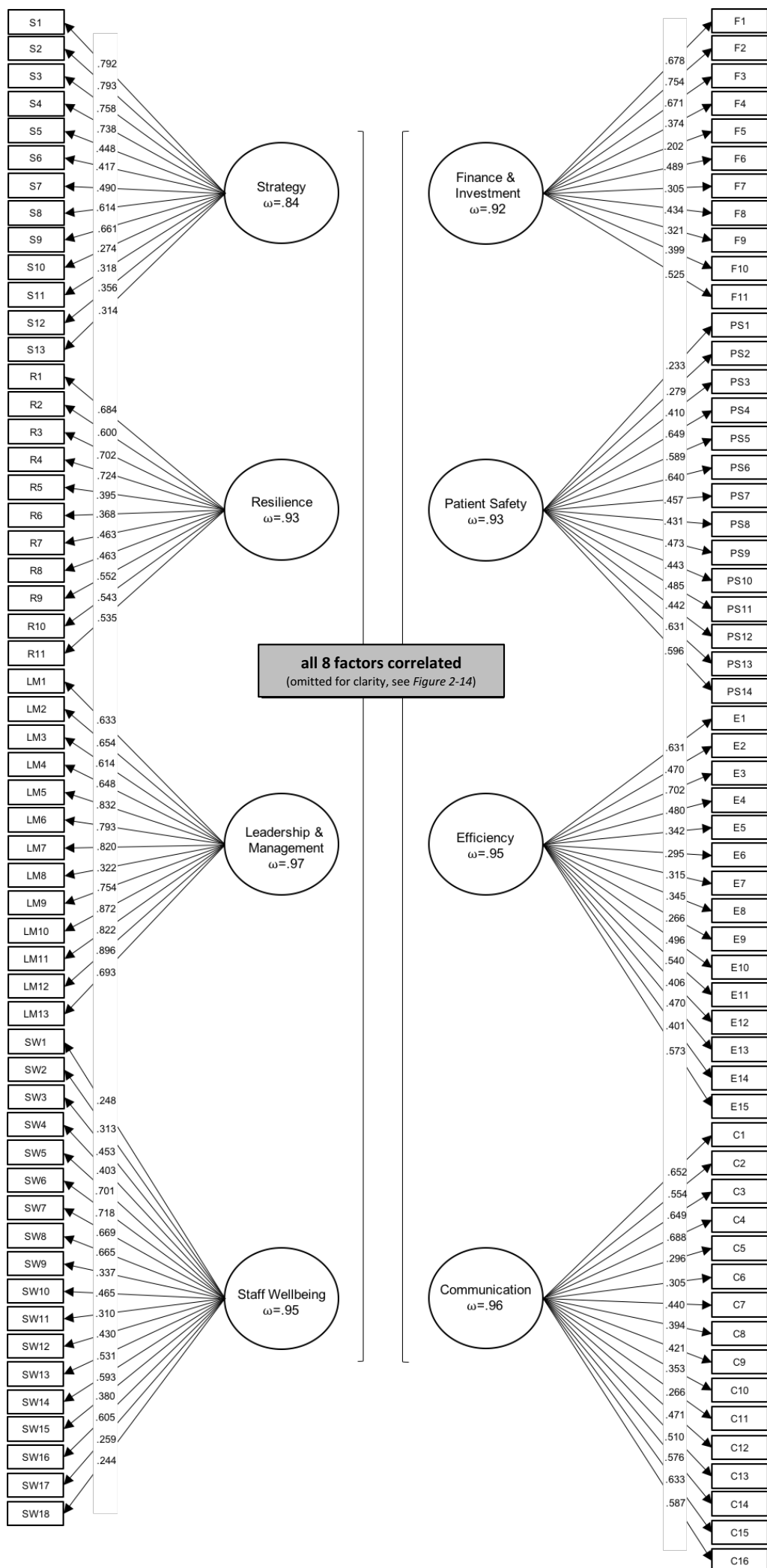


Figure 2-13 – CFA for eight factor model (Items denoted by Ref, standardised factor loading (β) denoted by unidirectional arrow, ω = omega)

Latent construct	Strategy	Resilience	Leadership & Management	Staff Wellbeing	Finance & Investment	Patient Safety	Efficiency
Strategy							
Resilience	0.84 (0.01)						
Leadership & Management	0.81 (0.01)	0.80 (0.02)					
Staff Wellbeing	0.84 (0.01)	0.84 (0.02)	0.86 (0.01)				
Finance & Investment	0.63 (0.02)	0.68 (0.02)	0.68 (0.02)	0.71 (0.02)			
Patient Safety	0.79 (0.02)	0.76 (0.02)	0.75 (0.02)	0.85 (0.02)	0.64 (0.03)		
Efficiency	0.77 (0.02)	0.81 (0.02)	0.77 (0.02)	0.85 (0.01)	0.85 (0.02)	0.83 (0.02)	
Communication	0.80 (0.02)	0.80 (0.02)	0.86 (0.01)	0.88 (0.01)	0.77 (0.02)	0.87 (0.02)	0.92 (0.01)

Figure 2-14 – CFA for eight factor model: correlations between factors (standard error in parenthesis; all

$p < 0.01$)

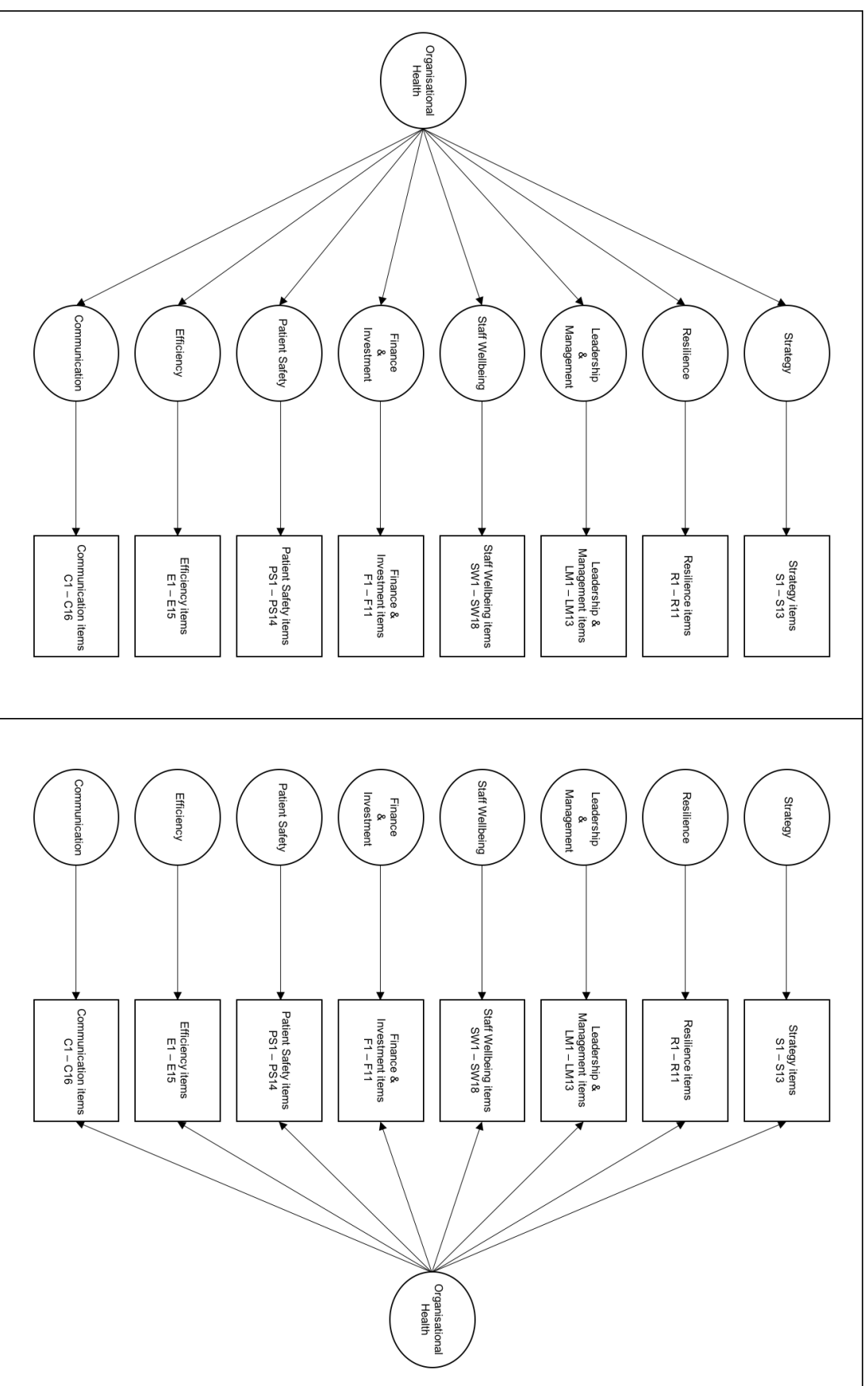


Figure 2-15 – Hypothesised higher order model (*left hand pane*) and bifactor model (*right hand pane*) for organisational health within acute NHS trusts



Figure 2-16 – CFA for higher order model (higher order standardised factor loading (β) denoted by unidirectional arrow, ω = omega)

Model description	AIC	BIC	MLR scaling factor	χ^2		RMSEA			CFI	SRMR	Satorra-Bentler		
				Estimate	df	Estimate	CI	Probability <0.05			rescaled $\Delta\chi^2$ [vs 8 factor model]	p-value	Δdf
8 factor model	858140.00	861053.67	1.15	21072.58	5837	0.030	(0.030-0.031)	1.00	0.87	0.06		n/a	
Higher order model	858527.46	861322.20	1.16	21434.81	5857	0.031	(0.030-0.031)	1.00	0.87	0.06	154.25	<0.01	20
Bifactor model	Non-convergent												

Figure 2-17 – Fit indices for eight factor single order and higher order models (AIC = Akaike information criterion, BIC = Bayesian information criterion, MLR = robust maximum likelihood estimation, χ^2 = chi-squared, df = degrees of freedom, RMSEA = root mean square error approximation, CI = confidence interval, CFI = comparative fit index, SRMR = standardised root mean square residual)

Model description	Latent construct	Determinant	ω	SE
8 factor model	Strategy	0.96	0.84	0.01
	Resilience	0.93	0.82	0.01
	Leadership	0.97	0.93	0.00
	Staff Wellbeing	0.95	0.83	0.01
	Finance	0.92	0.76	0.01
	Patient Safety	0.93	0.81	0.01
	Efficiency	0.95	0.80	0.01
	Communication	0.96	0.84	0.01
Higher order model	Strategy	0.95	0.55	0.02
	Resilience	0.93	0.49	0.03
	Leadership	0.97	0.74	0.01
	Staff Wellbeing	0.95	0.34	0.03
	Finance	0.91	0.55	0.02
	Patient Safety	0.93	0.48	0.03
	Efficiency	0.94	0.37	0.03
	Communication	0.95	0.33	0.04
	Organisational Health	0.97	0.88	0.00

Figure 2-18 – Reliability of factors within single order and higher order models (ω = omega, SE = standard error)

2.4 Discussion

2.4.1 Summary of main findings

The *Healthcare-OH* survey is the only healthcare-specific organisational health measure currently in use and if this concept is to be truly applied in a healthcare context then reliable and valid measurement is essential. Thus, the primary focus of this study is to determine the dimensionality, reliability and so the construct validity of the *Healthcare-OH* survey, as applied to its target demographic: staff from acute NHS trusts in the UK.

This was done using CFA which allows the analysis of relationships amongst survey items, and amongst subscales. Modelling in this way provides comparability across persons, items and occasions. Each model tested within a CFA attempts to explain covariance between items – with the presupposed factor the rationale for why items were correlated in the first place. The factors pre-specified represent testable models of dimensionality. The internal consistency of each dimension (factor) within the measure was assessed using omega, superior to alpha in this setting in that it does not assume tau equivalence between items - it does not assume that all items are equally ‘good’.⁶⁹ This has permitted for the re-examination of both the reliability of the survey and also any assumptions made if one is later to consider sum scores derived from the survey.

The *Healthcare-OH* survey has previously been considered as individual subscales, each with its own dimensionality (as seen in *Figure 2-3*).³⁸ This study began by attempting to replicate this work but noted poor fit indices for the *Finance & Investment* subscale model (*Figure 2-9*). Exploratory factor analysis favoured repositioning of items within a two factor model but fit indices continued to be unfavourable (RMSEA 0.09; SRMR 0.09) (*Figure 2-9, Figure 2-10*,

Figure 2-11). Furthermore, unacceptable reliability estimates ($\omega < 0.7$) were found for latent factors within the *Strategy, Finance & Investment, Patient Safety, Efficiency* and *Communication* subscales (Figure 2-12).

An eight factor model, representing the entire 112-item survey, was then devised, with each domain of organisational health denoted as a separate factor (Figure 2-4). This demonstrated adequate fit indices and was superior to a higher-order model in terms of both fit (rescaled Satorra-Bentler re-scaled chi-squared; $\Delta\chi^2$) and reliability (omega; ω) (Figure 2-17).

2.4.2 Comparison with previous studies

Results presented here support an eight factor model for organisational health in acute NHS trusts. These factors each represent a subscale of the survey and correspond to previous theoretical work, defining organisational health as eight sub-constructs of *Strategy, Resilience, Leadership & Management, Staff Wellbeing, Finance & Investment, Patient Safety, Efficiency* and *Communication*.³⁸

Previous published factor analyses of the *Healthcare-OH* survey consider it as a series of subscales and run individual CFAs for each.³⁸ This structure was replicated but these models did not fit adequately for the data analysed in this study (Figure 2-9). There are many reasons why this might be the case but it should be noted that previous work considered data taken from a single NHS trust, while the data analysed here is collected from fifteen different UK trusts. It could therefore be posited that the eight factor model (as supported by the results here) is more reflective of organisational health when measured, as a concept, on a broader nationwide scale and therefore more indicative of its true dimensionality.

Within the best fitting model (the eight factor solution), a number of the items had low levels of loading on to their relevant factors. Whilst there exist a number of ‘rules-of-thumb’ regarding acceptance and/or modification of models based on factor loading values,⁷² other schools of thought are less prescriptive, provided that overall model fit is adequate and that all items load on their relevant factors significantly.⁷³ As such, models were not modified unless factor loadings were insignificant ($p>0.05$). This was not true for the CFAs for the subscale models (*Appendix A2*), the CFA for the eight factor model (*Appendix A3*) nor the CFA for the higher order model (*Appendix A4*), with all factor loadings within all models significant at $p<0.01$. By retaining all available items, the dataset is theoretically richer, capturing the full breadth of each construct.

Inspection of *Figure 2-14* shows high levels of correlations between latent factors in the eight factor model. It is generally perceived that a value in excess of 0.85 raises concerns around discriminative validity within a factor solution and this can be seen to be true between a number of factors within this model.⁷⁴ Whilst this presents issues with multicollinearity within the solution, *Figure 2-14* also shows standard error to be acceptably low throughout (<0.05 for all). It should also be noted that attempts to account for these high correlations resulted in non-convergent or poorer fitting models (*Figure 2-17* shows worse fit for higher order model and non-convergent bifactor model; attempts to collapse potentially collinear models (e.g. *Communication* and *Efficiency*) resulted in worse model fit – results omitted for brevity). The high correlations between latent factors support strong associations between the composite themes of organisational health and underpins the role of *Communication* in *Leadership & Management* (correlation 0.86), *Staff Wellbeing* (0.88), *Patient Safety* (0.87) and overall *Efficiency* (0.92). A strong link is also noted between *Efficiency* and *Finance &*

Investment (0.85). Theoretically, strong correlations are expected between these factors since they represent interlinked areas which are vital for long term high performance in healthcare. Indeed, the strong associations between themes which emerged from this study are supported by a broad body of existing literature, given other authors have also noted that communication underpins much of leadership,⁷⁵ staff wellbeing,⁷⁶ patient safety,⁷⁷ and efficiency.⁷⁸

2.4.3 Limitations

Whilst analyses were performed with a large sample (n=5412), it is difficult to be certain that the demographics of the sample (*Figure 2-6*) are truly reflective of the population of interest and so results are open to potential coverage error. To allow participants an additional level of anonymity (specifically considering those within smaller departments or job roles), demographics were left as optional. Indeed, only 63% of participants gave information on their department and this fell to 62% for job role and 54% for length of employment and age. Within the present WebApp configuration questions on demographic are at the end of the survey so these numbers could well be affected by user fatigue.

Considering those who did complete demographic questions it is apparent that doctors in training (those selecting *Foundation Year Training* or *Registrar* for their job role) are an underrepresented cohort in this sample. Data was collected during 2016 and the events of this year, and its impact on the morale of junior doctors, are well documented elsewhere.⁷⁹ Current NHS workforce statistics suggest junior doctors represent around 5% of total NHS employees yet within this sample they comprise only 2.5%,⁸⁰ and it is unfortunate that the voices of this demographic are not maximised in this sample. Other contemporary surveys

have noted similar issues with low response rates from this demographic and have suggested a link between low morale and failure to engage.⁸¹ This may well be true but could also reflect how participants were contacted by trusts enrolled in the study, since junior doctors are usually transient members of staff (often rotating through different trusts during a calendar year) and may not receive emails otherwise sent out on an organisation-wide basis. Similarly, as transient members of staff it could also be argued that they do not identify with the organisation (or perhaps believe their experience of working within the organisation has been too brief) to feel able to complete a survey relating to it.

It should also be noted that this study contained many of the researchers involved in initial survey development.³⁸ Ideally, the eight factor structure which emerged from this work would need to be re-examined by another group of researchers for it to be seen as truly stable.

2.4.4 Conclusion

In this study, the validity of the *Healthcare-OH* survey was examined by exploring its internal structure. If this instrument truly measures organisational health, then its results should also hold true with core definitions of this concept which state

‘...healthy organisations are not only ones which get results now, but which are positioned for sustainable success.’³⁷

It would therefore be prudent to compare organisational health scores with existing performance metrics to examine the external (criterion-referenced) validity of the instrument and this is the purpose of *Chapter 3*.

Chapter 3: Organisational health and the *Healthcare-OH* survey - external (criterion-referenced) validity and comparison with existing performance metrics

3.1 Introduction

Following on directly from the previous chapter, the aim of this present study was to answer

RESEARCH QUESTION 2: Can organisational health be reliably measured in acute sector healthcare organisations?

This chapter examined the applicability of organisational health measurement in acute NHS trusts in England, through exploring the correlations between the dimensional constructs of the *Healthcare-OH* survey (as determined in *Chapter 2*) and a wide series of existing healthcare performance metrics. By attempting to match each element of organisational health to a proxy measure of healthcare performance this study set out to submit the *Healthcare-OH* survey to extended external validity testing.

The objectives of this chapter were:

- 1 – Using the nationwide acute sector healthcare database (from *Chapter 2*), plot the organisational health scores of participating healthcare organisations at trust level
- 2 – Identify suitable existing performance metrics, contemporaneous to this database, to represent related measures of healthcare performance
- 3 – Analyse these two datasets in tandem to attempt to identify associations to serve as an external (criterion-referenced) validity assessment

3.2 Methods

3.2.1 Organisational health measurement

Organisational health was measured using the *Healthcare-OH* survey. This is a 112-item survey that measures organisational health within the context of acute sector healthcare organisations.³⁸ Item responses are uniformly answered using a fixed response seven-point Likert-like agreement scale with response anchors as listed in the top two rows of *Figure 3-1*. Responses are scored from 1-7, as listed in the bottom row of *Figure 3-1*. Negatively phrased questions are reverse scored.

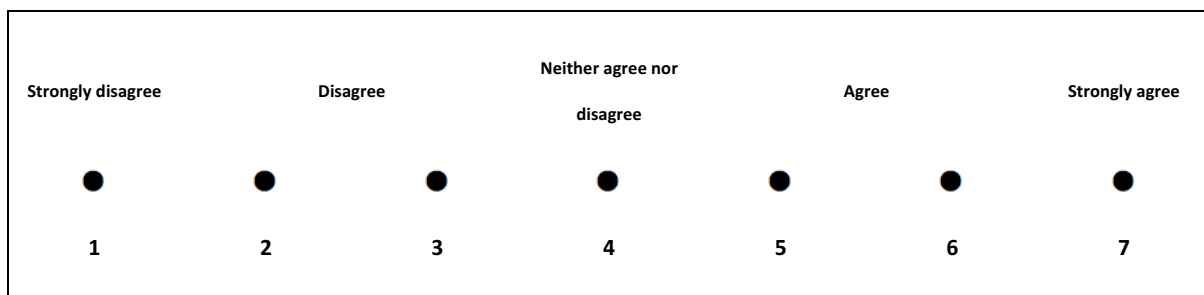


Figure 3-1 – Fixed response format for Healthcare-OH survey, using a seven-point Likert-like agreement scale. Bottom row denotes scoring system for responses (for positively phrased items).

Data was collected from fifteen acute NHS trusts between March and September 2016, inclusively. Trusts were approached and enrolled into the study through discussions with senior staff members in a process outlined in the previous Chapter. As with previous work, Research Ethics Committee review was not required since only staff were involved (and on a voluntary basis) and since the study itself is considered a *service evaluation* project under National Research Ethics Service (NRES) guidelines. Trusts participated in the study under the proviso that their results would be kept anonymised in any reports or publications.

In accordance with recommended practice,⁸² attempts were made to boost survey responses by way of:

- a pre-drafted invitation attempting to persuade participants that their response will be of use
- assurances of anonymity for respondents (including keeping the entry of any demographic information, which could risk identifying certain individuals, optional)
- the use of reminder emails
- the inclusion of the weblink to directly access the survey in each email
- the extended availability of the survey (although the survey window was fixed at March – September 2016 to provide a level of contemporaneity between responses)

Whilst there are many who support the use of incentives to increase response rates,⁸² they were not used in this study.

Adequacy of sample size is routinely calculated as per the algorithm listed in Dillman (2007) allowing for the calculation of sampling error for a specified level of confidence in the result.⁸³

When sample size and population size are known, margin of error is calculated as:

$$B = C \sqrt{\frac{p(1-p)}{n} - \frac{p(1-p)}{N}}$$

where:

B = level of sampling error

C = z-statistic associated with specified confidence interval (1.96 = 95% confidence interval)

p = proportion expected to answer in a particular direction (conservatively taken at 0.5)

n = completed sample size needed

N = size of population

The confidence level was pre-specified at 95% and trusts were to be excluded if sampling error rate was >10%.

In the analysis which follows, organisational health measurements were considered as the sum scores of the subscales of the *Healthcare-OH* survey: *Strategy, Resilience, Leadership & Management, Staff Wellbeing, Finance & Investment, Patient Safety, Efficiency* and *Communication*. These subscales reflect the dimensionality of the measure, tested using confirmatory factor analysis in the previous chapter which suggested that organisational health, as measured by the *Healthcare-OH* survey, is best considered, not as a single entity, but as these eight interrelated constructs.

3.2.2 Existing performance metrics

Existing contemporaneous datasets were sourced to represent proxies or related measures of healthcare performance corresponding to the themes of organisational health outlined above. Hypothesised relationships were again pre-specified. The full list of metrics collated is listed below.

Summary Hospital Mortality Indicator

The *Summary Hospital-level Mortality Indicator* (SHMI), is a dataset collated by NHS Digital and published on an annual basis. It is in the public domain and considers mortality data at trust level. SHMI compares the actual number of patients who die following inpatient admission at a trust with the number that would be expected to die (given the characteristics of the patients treated there and calculated using best available average figures).⁸⁴ SHMI also

includes deaths which occur within 30 days of discharge and is calculated by linking Hospital Episode Statistics (HES) data to death registrations data from the Office for National Statistics.

The most up to date SHMI publication available was used for analysis, representing data for the twelve-month period from July 2015 – June 2016. NHS Digital describe SHMI data as an indicator of mortality outcomes compared to a national baseline. This suggests it could well have a direct relationship, as a clinical outcome, with the theme of *Patient Safety*. NHS Digital also note that SHMI will likely be affected by the '*organisation of services*' and the '*provision of resources*'.⁸⁵ Therefore, it was also considered that it could reflect the overall *Strategy* of a trust, or exist as a function of the level of *Efficiency* or the financial position of a trust (and so its *Finance & Investment* score).

National Staff Satisfaction survey

Owned by NHS England, and operated by Picker Institute Europe, the *National Staff Satisfaction* survey (NSSS) has run on an annual basis since 2003 – though it does undergo sequential changes with the effect that it is not always comparable year on year.⁸⁶ Staff are invited to complete the survey on a voluntary basis and results are collated at the trust level. The survey is populated by two types of fixed response items. The first are binary forced choice questions, which are answered as *Yes* or *No* with results expressed as the percentage of participants replying either of these responses. The second is Likert-type items with the responses *Strongly disagree*, *Disagree*, *Neither agree nor disagree*, *agree* and *strongly agree* and scored one through five respectively.

Output is given in the form of 32 data points referred to as ‘key findings’ (see *Figure 3-2*) and is freely available in the public domain.⁸⁶ Some of these data points represent single items (e.g. *Key Finding 21: Percentage believing that organisation provides equal opportunities for career progression or promotion*) whilst others represent the sum score of a series of related items (e.g. *Key Finding 13: Quality of non-mandatory training, learning or development* is the mean of four individual Likert-scored survey items). An *Overall Engagement* score is also provided, representing a combination of items from a variety of key findings.

Data from 2016 was used, since it is contemporaneous to the *Healthcare-OH* dataset. Data points in the NSSS vary considerably in topic and were felt to correspond to aspects of each of the themes of organisational health. In particular, *Key findings 1, 4-6, 8-27* and *Overall Engagement* were judged to represent aspects of *Staff Wellbeing*, whilst *Key findings 5-7* and *10-12* were mapped to *Leadership & Management*. Additional relationships were hypothesised between *Key findings 1-3* and *32* and the *Strategy* of the trust, *Key findings 14* and *Finance & Investment*, *Key findings 6* and *9* and *Communication*, *Key findings 28-31* and *Patient Safety*, *Key findings 1, 2* and *9* and *Efficiency* and *Key findings 1-3* and *organisational Resilience*.

NHS National Staff Satisfaction Survey⁸⁶
Key finding 1: Staff recommendation of the organisation as a place to work or receive treatment
Key finding 2: Staff satisfaction with the quality of work and care they are able to deliver
Key finding 3: Percentage of staff agreeing that their role makes a difference to patients / service users
Key finding 4: Staff motivation at work
Key finding 5: Recognition and value of staff by managers and the organisation
Key finding 6: Percentage of staff reporting good communication between senior management and staff
Key finding 7: Percentage of staff able to contribute towards improvements at work
Key finding 8: Staff satisfaction with level of responsibility and involvement
Key finding 9: Effective team working
Key finding 10: Support from immediate managers
Key finding 11: Percentage of staff appraised in last 12 months
Key finding 12: Quality of appraisals
Key finding 13: Quality of non-mandatory training, learning or development
Key finding 14: Staff satisfaction with resourcing and support
Key finding 15: Percentage of staff satisfied with the opportunities for flexible working patterns
Key finding 16: Percentage of staff working extra hours
Key finding 17: Percentage of staff suffering work related stress in last 12 months
Key finding 18: Percentage of staff feeling pressure in the last 3 months to attend work when feeling unwell
Key finding 19: Organisation and management interest in and action on health and wellbeing
Key finding 20: Percentage of staff experiencing discrimination at work in the last 12 months
Key finding 21: Percentage of staff believing that the organisation provides equal opportunities for career progression or promotion
Key finding 22: Percentage of staff experiencing physical violence from patients, relatives or the public in last 12 months
Key finding 23: Percentage of staff experiencing physical violence from staff in last 12 months
Key finding 24: Percentage of staff/colleagues reporting most recent experience of violence
Key finding 25: Percentage of staff experiencing harassment, bullying or abuse from patients, relatives or the public in last 12 months
Key finding 26: Percentage of staff experiencing harassment, bullying or abuse from staff in last 12 months
Key finding 27: Percentage of staff/colleagues reporting most recent experience of harassment, bullying or abuse
Key finding 28: Percentage of staff witnessing potentially harmful errors, near misses or incidents in last month
Key finding 29: Percentage of staff reporting errors, near misses or incidents witnessed in the last month
Key finding 30: Fairness and effectiveness of procedures for reporting errors, mistakes and near misses
Key finding 31: Staff confidence and security in reporting unsafe clinical practice
Key finding 32: Effective use of patient / service user feedback
Overall engagement score

Figure 3-2 – NHS National Staff Satisfaction Survey – key findings

Capital investment

The Estates Returns Information Collection is a mandatory requirement for all NHS trusts and collects information relating to the costs of providing, maintaining and servicing the estate used in the delivery of NHS care. It is published on an annual basis by the Health and Social Care Information Centre and is freely available in the public domain through NHS Digital.⁸⁷ It considers not only the *Total capital invested* but also the breakdown of this in terms of *Investment for new build*, *Investment for improving existing buildings* and *Investment for equipment*. The data used corresponds to the tax year 2015/16. As the only readily available metric of investment for NHS trusts, relationships were hypothesised between capital investment and the theme of *Finance & Investment*.

Financial performance

Having assumed the role previously performed by Monitor and the NHS Trust Development Authority, NHS Improvement collate and publish financial performance data for NHS providers on a quarterly basis. Data submission is mandatory for all NHS trusts and reports are freely available in the public domain. Data points of interest include *Control Total Basis surplus/deficit* (reflecting the trust's financial position and calculated as surplus (or deficit) before impairments, transfers, donated asset income, donated asset depreciation and gains (or losses) on asset disposals – against pre-agreed totals), *Forecast Outturn* (a forecast of the spend for each trust for the present financial year, calculated using the expected profile of expenditure for England) and *Sustainability & Transformation Fund* (an incentive fund to reward financially prudent trusts and so linked to achieving a set of agreed criteria regarding financial performance).⁸⁸

Contemporaneous data, from the quarter when the majority of *Healthcare-OH* data was collected, was considered.⁸⁹ A direct relationship was hypothesised between financial performance and the theme of *Finance & Investment*. Given many link the financial position of a trust with prudent governance, an indirect link was also considered with *Leadership & Management*.⁹⁰ A final association was supposed between financial performance metrics and the topic of *Resilience* as limited financial resources are often linked with inadequate arrangements for ensuring resilience in the face of changing circumstances.⁹¹

Care Quality Commission inspection

The Care Quality Commission (CQC) is the independent regulator of healthcare organisations in the UK. They inspect all NHS trusts against standards of quality and safety and publish categorical performance ratings. Trusts are rated as *Outstanding*, *Good*, *Satisfactory*, *Requires Improvement* or *Inadequate* and this rating is provided for a series of different domains (described as *five key questions* and as outlined in *Figure 3-3*).⁹²

Data on trust ratings following CQC inspections is displayed on trust websites and is freely searchable on the CQC webpage. The most recent CQC inspection was considered for each trust. CQC inspection ratings were hypothesised to relate to the *Strategy* of the trust, *Communication*, organisational *Resilience*, *Patient Safety* (particularly the question: *Are they safe?*), *Efficiency* (with a focus on the questions: *Are they effective?* and *Are they responsive to people's needs?*) and *Leadership & Management* (*Are they well-led?*).

Care Quality Commission: five key questions ⁹²
Are they safe?
Are they effective?
Are they caring?
Are they responsive to people's needs?
Are they well-led?
<i>An overall rating is also provided</i>

Figure 3-3 – Care Quality Commission inspection ratings: ‘five key questions’

Workforce statistics

To aid with workforce planning, all NHS trusts are required to complete and submit the workforce minimum data set on a yearly basis. This is freely available through NHS Digital and includes data on staff earnings and numbers, both in total and by specific job roles.⁹³ Workforce numbers are primarily determined by trust size and for this reason staff ratios (e.g. *number of doctors : number of nurses*) were considered, and calculated using the composite figures in each case. Links between workforce levels and *Efficiency* have been suggested by a number of different groups elsewhere.⁹⁴

Issues with communication in times of inadequate staffing has also been highlighted in much of the literature on human factors.^{95,96} As such, workforce figures were also hypothesised to relate to *Communication* within the organisation.

National Reporting and Learning System

The National Reporting and Learning System (NRLS) is the central database of patient safety incident reporting in the UK. It collates every incident report from every trust in the UK to enable analysis on a large scale.⁹⁷ As part of the NRLS Research and Development Programme, the NRLS database is held on secure servers within Imperial College London and analysed by

the NIHR Imperial PSTRC (*National Institute for Health Research; Patient Safety Translational Research Centre*). Access to this dataset was granted as the researchers operate under the auspices of the NIHR PSTRC. Consent for the use of data was not required since all records in the NRLS database were anonymised before release to the research team.

The most up to date cleaned data available on the NRLS database was for February 2016. As such, the twelve months from February 2015 up to this point was utilised as the NRLS data for this analysis. When incidents are added to the database, one must enter whether the incident in question led to patient harm and, if so, then specify the severity of this harm (*No harm, Low, Moderate, Severe, or Death*) – with harm, in this case, defined as any effect leading to morbidity, mortality and anything which increases total length of stay. Data considered were the percentage of these levels of harm, expressed as the percentage of total incidents reported by that trust (see *Figure 3-4*). NRLS data was used as an existing proxy measure of *Patient Safety*.

National Reporting and Learning System data
Patient actually harmed – No
Patient actually harmed – Yes
Patient actually harmed – Yes : Degree of harm/severity – Low
Patient actually harmed – Yes : Degree of harm/severity – Moderate
Patient actually harmed – Yes : Degree of harm/severity – Severe
Patient actually harmed – Yes : Degree of harm/severity – Death
<i>All expressed as % of incidents reported</i>

Figure 3-4 – National Reporting and Learning System – data points of interest

CQC adult inpatient survey

The CQC adult inpatient survey is coordinated by Picker Institute Europe and runs on an annual basis across all acute NHS trusts in England. It considers care quality from the patient perspective and consists of nine themes (listed in *Figure 3-5*), each representing the weighted sum score of a particular subset of fixed response items (on a scale from 0-10).⁹⁸

The 2016 survey sampled inpatients discharged from trusts during July 2016. This dataset was used as a performance metric of the patient perspective of organisational *Efficiency*, as well as aspects of *Patient Safety*. These are both stated by the CQC as specific aims of the survey.

CQC Adult Inpatient Survey – key themes ⁹⁸	
1.	Admission to hospital
2.	Accident and emergency department
3.	Planned admissions
4.	Hospital and ward
5.	Doctors and nurses
6.	Care and treatment
7.	Operations and procedures
8.	Leaving hospital
9.	Overall

Figure 3-5 – CQC Adult Inpatient Survey – key themes

Cancelled operations

NHS England collate data, published on a quarterly basis, when elective (or planned) operations are cancelled for non-clinical reasons. This data is freely available from the NHS England webpage and contemporaneous data, from the quarter when the majority of the *Healthcare-OH* data was collected, was considered.⁹⁹ One only has to turn on the television

to see healthcare organisations frequently castigated for apparent efficiency issues resulting in cancelled operations.¹⁰⁰ Non-clinical cancellations were used as a surrogate marker of *Efficiency*.

Bed occupancy

Data on mean bed occupancy is available from NHS England, on a quarterly basis since 2000/01. Occupancy rates introduce a measure of control for trust size and have been considered for both all inpatient beds and for those specifically in critical care settings. As above, there are innumerable instances of this metric being linked with conceptions of efficiency in healthcare organisations.¹⁰¹ Following on from this, contemporaneous data on bed occupancy was used as a marker of *Efficiency* within the trust.¹⁰²

Morbidity, both during and following inpatient stay

NHS Digital also hold data on *Complications of care*, occurring during inpatient stay, and *Readmission within twenty-eight days* following discharge. Both these figures are expressed as rate per hundred admissions, are determined primarily using HES data and are available for the same time frame as when the bulk of the *Healthcare-OH* data was collected.¹⁰³ These datasets were hypothesised to relate to theme of *Patient Safety* within the *Healthcare-OH* survey.

3.2.3 Data analysis

Datasets were cleaned and linked in a single Microsoft Excel file (Microsoft Excel for Mac 2016, Microsoft, Redmond, USA) before being imported into SPSS® (version 24, IBM, Chicago, Illinois, USA) for all data analysis.

Since *Healthcare-OH* data was to be analysed at trust-level, (and so was only available for 15 trusts), sample size did not permit the use of a formal regression or correlation analysis with any degree of power. Instead, existing performance metric datasets were grouped into tertiles, based on the theme of organisational health to which they correspond, as outlined above (e.g. trust scores on the financial metric *Forecast Outturn* were grouped into tertiles based on the sum score of *Finance & Investment*). These hypothesised relationships were then tested using inferential statistics, through comparison of means between upper and lower tertiles in each case (utilising t-tests for all metrics other than the categorical CQC inspection ratings, where the Mann-Whitney U test was used).

3.3 Results

3.3.1 Healthcare-OH dataset

Analysis is based on the dataset from *Chapter 2*, with a total of 5412 participants recruited to the survey across fifteen acute NHS trusts.

With consideration to response rates seen in previous work using this survey,⁴⁷ invitations were sent out to every member of staff within participating trusts, in a standardised format (containing a hyperlink to access the survey itself) found in *Appendix B*. Participating trusts were given the option to send this invitation out by email or SMS, as the WebApp housing the *Healthcare-OH* survey is multiplatform compatible.

Survey response rates are tabulated in *Figure 3-6*, presented alongside percentage sampling error (for a 95% level of confidence and making no assumptions as to participant responses).⁸³ To preserve the anonymity of participating trusts, they are denoted by letter, assigned A-Q (omitting I and O for clarity alongside numerical values).

Trust	n	Response rate (%)	% Sampling error (at 95% Confidence)
A	441	13.2	4.3
B	112	3.6	9.1
C	188	7.3	6.9
D	371	3.0	5.0
E	1021	11.4	2.9
F	309	12.3	5.2
G	224	7.5	6.3
H	869	6.9	3.2
J	192	1.9	7.0
K	681	17.7	3.4
L	113	2.3	9.1
M	166	6.4	6.2
N	233	4.4	6.3
P	295	4.8	5.6
Q	197	3.3	6.9

Figure 3-6 – Participants grouped by trust (denoted A-Q to preserve anonymity) showing response rate and associated level of sampling error

Healthcare-OH scores are considered as the sum score of eight dimensional constructs and presented, by trust (again denoted A-Q to preserve anonymity), in *Figure 3-7* complete with 95% confidence intervals superimposed.

Each pane (labelled *a-h*) represents the plotted sum score of a different theme of organisational health. What is most apparent when looking through these charts is that whilst the range of scores is relatively narrow for the fifteen participating trusts, confidence intervals do not all overlap suggesting significant statistical difference between trust scores in these domains. Indeed, if *post hoc* multiple comparison tests were undertaken, further differences may also be likely unearthed. However, whilst there are clearly statistically significant differences between the fifteen trusts in terms of their *Healthcare-OH* sum scores, this study

is, as stated in the *Methods* section, primarily concerned with examining the external validity of the measure - as we must consider whether any apparent statistically significant differences in organisational health confer practical significance, which we take as whether or not they map to external datasets (and so demonstrate criterion-referenced validity). As such, analysis then proceeded to test these hypothesised associations.

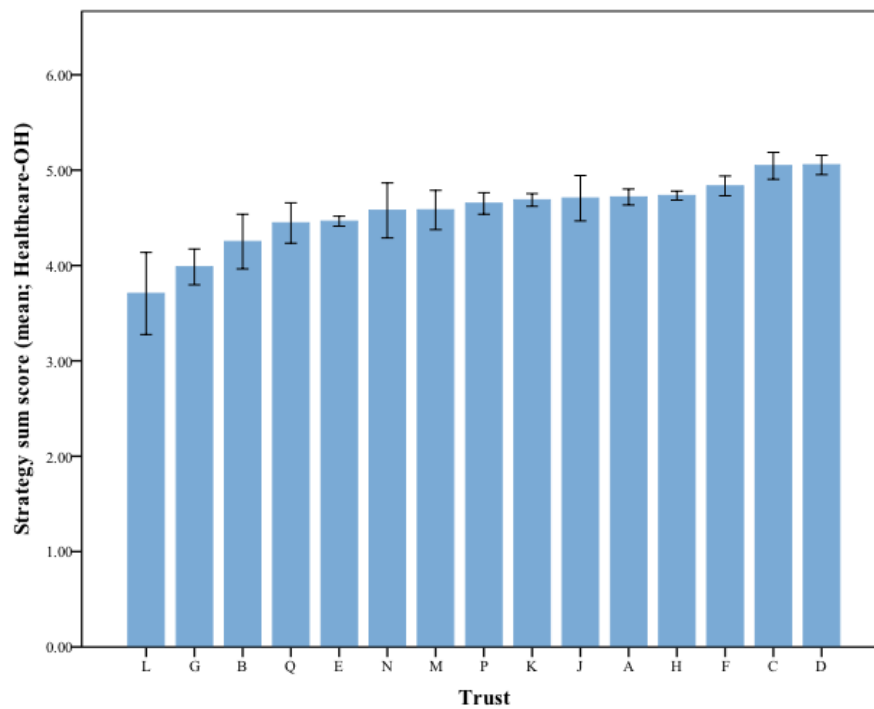


Figure 3-7a – *Healthcare-OH* subscale *Strategy* sum score (y-axis) for participating trusts (x-axis). Error bars represent 95% confidence interval of the mean for each trust.

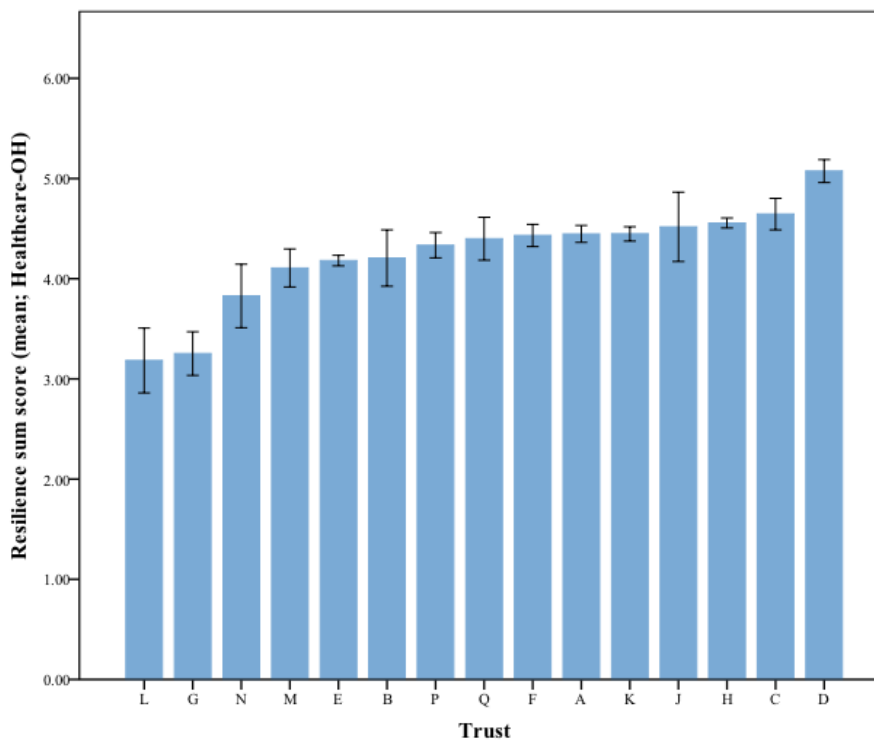


Figure 3-7b – *Healthcare-OH* subscale *Resilience* sum score (y-axis) for participating trusts (x-axis). Error bars represent 95% confidence interval of the mean for each trust.

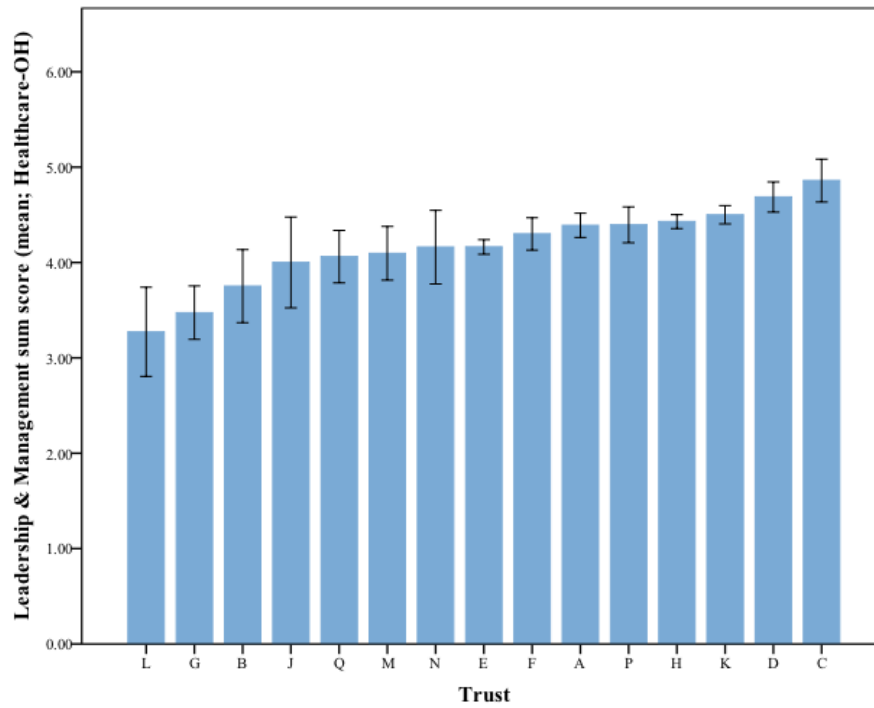


Figure 3-7c – Healthcare-OH subscale *Leadership & Management* sum score (y-axis) for participating trusts (x-axis). Error bars represent 95% confidence interval of the mean for each trust.

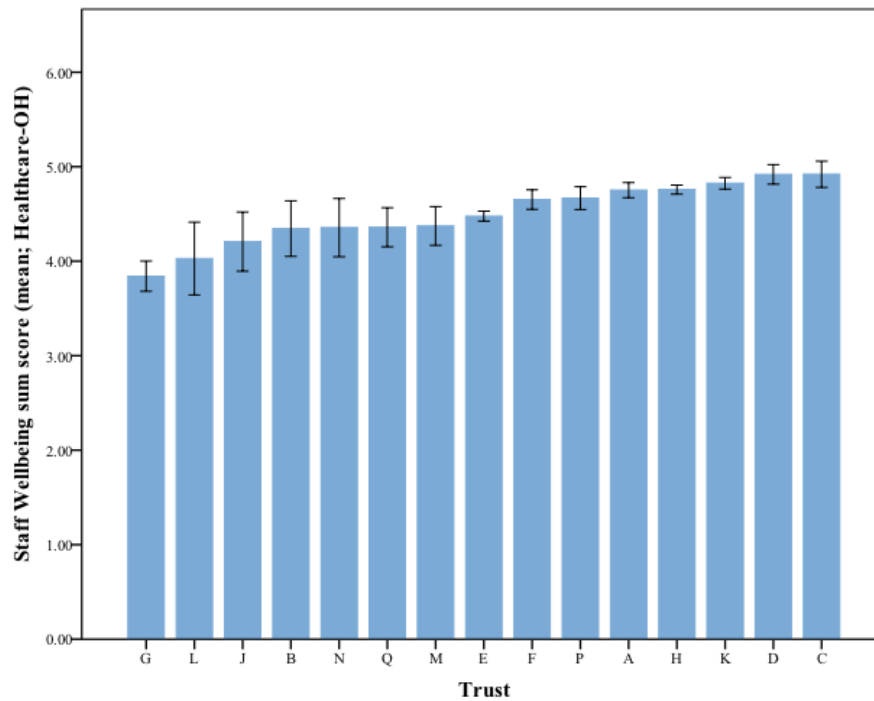


Figure 3-7d – Healthcare-OH subscale *Staff Wellbeing* sum score (y-axis) for participating trusts (x-axis). Error bars represent 95% confidence interval of the mean for each trust.

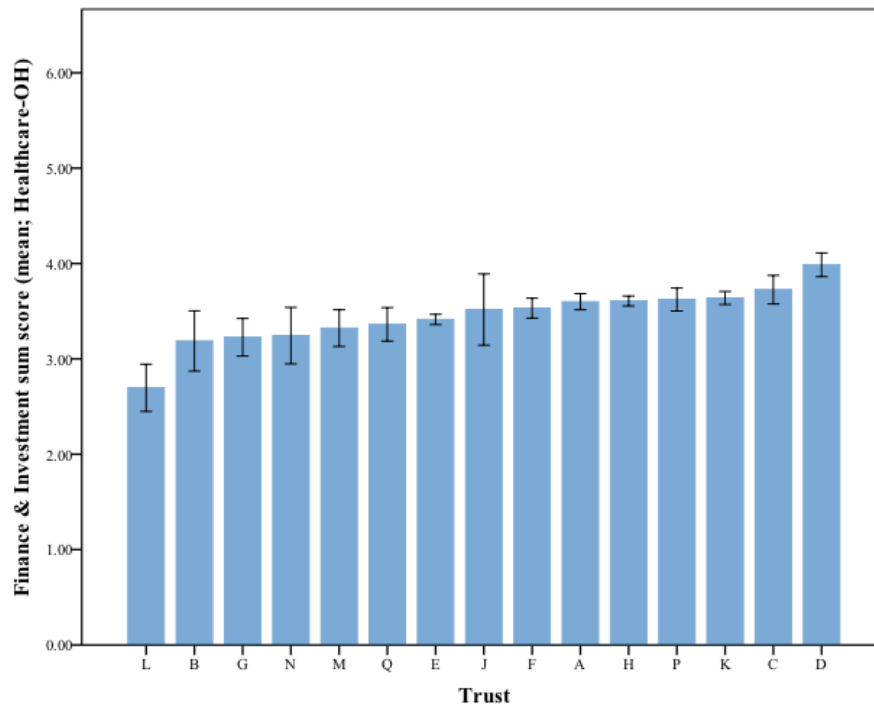


Figure 3-7e – *Healthcare-OH* subscale *Finance & Investment* sum score (y-axis) for participating trusts (x-axis). Error bars represent 95% confidence interval of the mean for each trust.

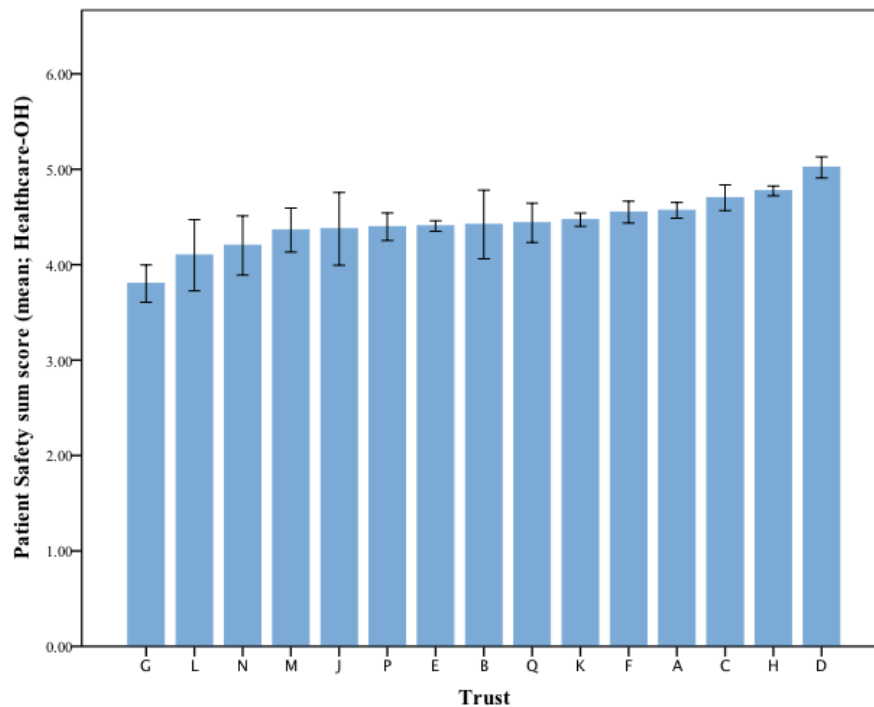


Figure 3-7f – *Healthcare-OH* subscale *Patient Safety* sum score (y-axis) for participating trusts (x-axis). Error bars represent 95% confidence interval of the mean for each trust.

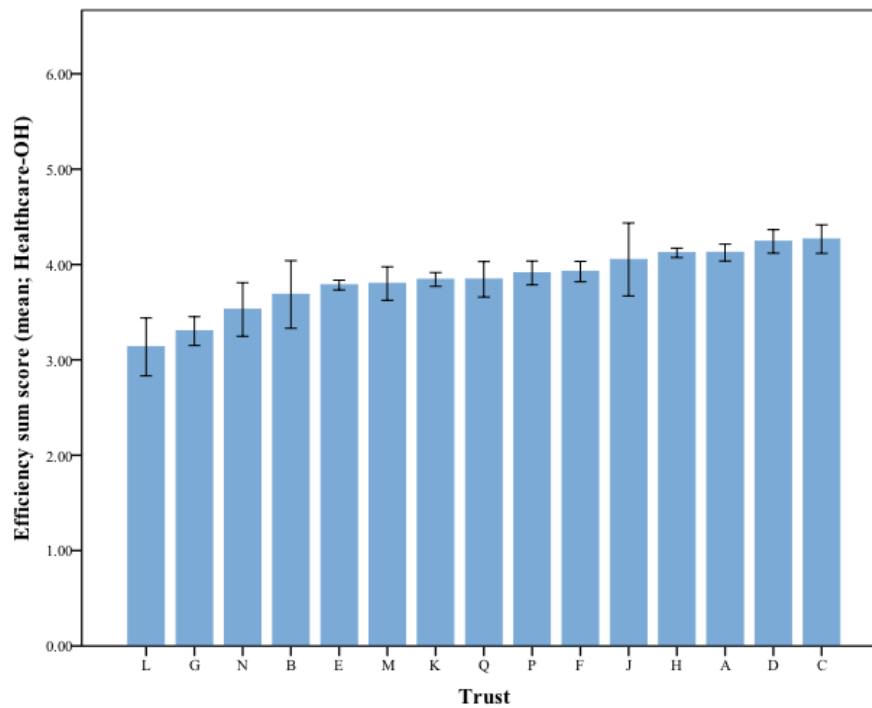


Figure 3-7g – *Healthcare-OH* subscale *Efficiency* sum score (y-axis) for participating trusts (x-axis). Error bars represent 95% confidence interval of the mean for each trust.

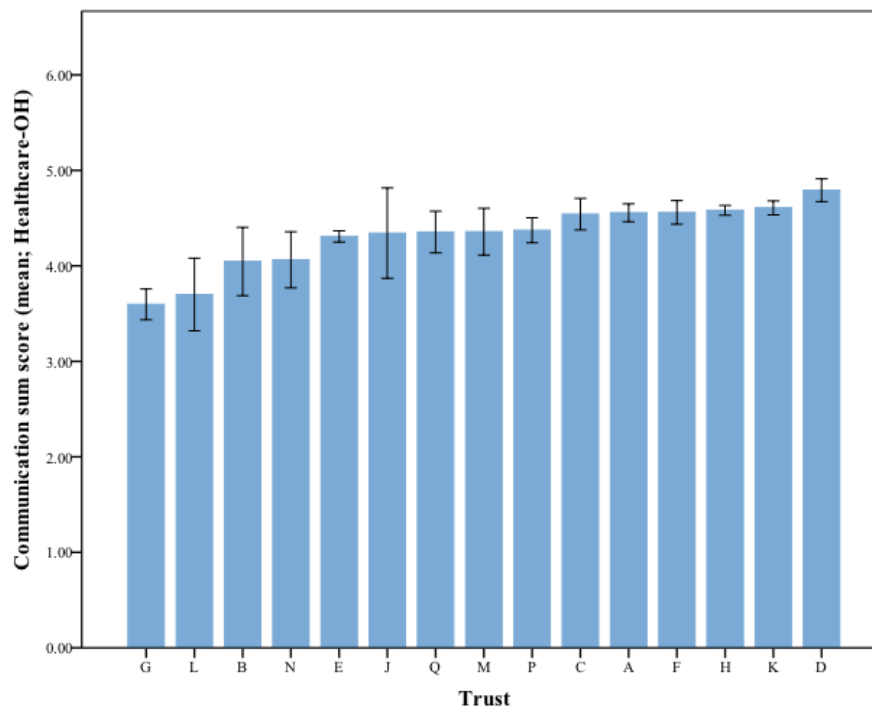


Figure 3-7h – *Healthcare-OH* subscale *Communication* sum score (y-axis) for participating trusts (x-axis). Error bars represent 95% confidence interval of the mean for each trust.

3.3.2 Existing performance metric datasets

Whilst the majority of the external datasets freely exist in the public domain, these metrics are not tabulated by trust in this manuscript since linking them to *Healthcare-OH* data in such an explicit manner would make the trusts enrolled in the study identifiable and so compromise anonymity agreements. As such, only consolidated figures are discussed below.

3.3.3 Correlation between Healthcare-OH percentile groups and existing performance metrics

As outlined above, in the *Methods* section, datasets were linked and grouped by the organisational health construct they were hypothesised to be related to. Results are tabulated within contingency tables in *Figures 3-8a–3-15a*, with data arranged by percentile (tertile) group of the relevant construct score from the *Healthcare-OH* survey in each case. Again, comparisons were made using t-tests for all metrics other than the categorical CQC inspection ratings (where the Mann-Whitney U test was used) and it is these tests to which any inferential statistics which follow relate to.

Finance & Investment

As shown in *Figure 3-8a*, and illustrated in *Figures 3-8b* and *3-8c*, the financial performance metrics *Control total basis* and *Forecast Outturn* were closely related to *Finance & Investment* score on the *Healthcare-OH* survey (such that the difference between upper and lower tertiles was significant at $p=0.04$ for both). The relationship between this score and a trust's score on the NSSS *Key finding: Staff satisfaction with resourcing and support* and the trust's *Sustaining and transformation fund* were tending towards significance ($p=0.07$ and $p=0.09$ respectively).

No significant relationship was found between *Finance & Investment* score and SHMI nor capital investment.

Staff Wellbeing

Inspection of *Figure 3-9a* shows that *Staff Wellbeing* was found to be significantly related to a number of different key findings within the NSSS, notably *Key Finding 14: Staff satisfaction with resources and support* ($p=0.04$; *Figure 3-9b*) and *Key finding 21: Percentage of staff believing that the organisation provides equal opportunities for career progression or promotion* ($p=0.02$; *Figure 3-9c*). Significant associations were also found between a trust's average score for this construct and *Key finding 11: Percentage of staff appraised in last 12 months*, *Key finding 15: Percentage of staff satisfied with the opportunities for flexible working patterns*, *Key finding 20: Percentage of staff experiencing discrimination at work in the last 12 months*, *Key finding 23: Percentage of staff experiencing physical violence from staff in the last 12 months* and *Key finding 26: Percentage of staff experiencing harassment, bullying or abuse from staff in the last 12 months* (all $p<0.05$).

Strategy

Figure 3-10b illustrates that whilst SHMI tends to increase with *Strategy* score, this relationship is not significant ($p=0.08$). A significant association was found between *Strategy* score and NSSS *Key finding 1: Staff recommendation of the organisation as a place to work or receive treatment* however (*Figure 3-10c*; $p<0.05$). No other significant associations were found between any of the other performance metrics considered (*Figure 3-10a*; $p>0.05$ for all).

Communication

Communication score was hypothesised to be closely associated with NSSS Key findings 6 (*Percentage of staff reporting good communication between senior management and staff*) and 9 (*Effective team working*) but *Figures 3-11b* and *3-11c* show no significant relationship between these metrics ($p>0.05$ for both). Inspection of *Figure 3-11a* does reveal a significant link between *Communication* within a trust and the ratio of Doctors to Nurses (with higher proportions of nurses, relative to doctors, in trusts scoring higher in *Communication* score; $p=0.04$).

Patient Safety

As shown in *Figures 3-12a* and *3-12b* the metric *Complications of care* is inversely related with *Patient Safety* score at $p=0.04$. *Figure 3-12c* illustrates that the percentage of incidents reporting patient harm on the NRLS database appear to decrease with increases in *Patient Safety*, but this relationship is non-significant ($p=0.06$). However, significant associations were found between the score for this construct and a trust's score on NSSS *Key finding 30: Fairness and effectiveness of procedures for reporting errors, mistake and near misses* and *Key finding 31: Staff confidence and security in reporting unsafe clinical practice* (*Figure 3-12a*; $p=0.01$ for both).

Efficiency

Figure 3-13a shows the only performance metric to appear to correlate with *Efficiency* score is the ratio of clinical staff to non-clinical staff (such that the proportion of clinical staff, relative to non-clinical staff, is higher in trusts with a higher score in this construct on the *Healthcare-OH* survey; $p=0.01$). *Figures 3-13b* and *3-13c* illustrate that whilst *Overall Score* on

the CQC Adult Inpatient Survey appears to increase and the number of non-clinical cancellations appears to decrease within trusts with higher *Efficiency* scores this relationship is non-significant ($p>0.05$).

Leadership & Management

Leadership & Management score had been hypothesised to be closely associated with NSSS *Key finding 10: Support from immediate managers*. Whilst initial inspection of *Figure 3-14b* suggests that these two constructs appear to be positively related, this is non-significant ($p=0.10$). However, *Figure 3-14c* does show that *Leadership & Management* score is significantly associated with financial performance data (*Control total basis surplus/deficit*; $p=0.04$) and *Figure 3-14a* shows similar relationships between this construct score and both NSSS *Key finding 11: Percentage of staff appraised in the last 12 months* ($p=0.00$) and the ratio of managers to clinical staff (such that there is a greater proportion of managers, relative to clinical staff, in trusts scoring higher on *Leadership & Management*; $p=0.04$).

Resilience

As shown in *Figure 3-15a*, and illustrated in *Figure 3-15b*, *Resilience* score on the *Healthcare-OH* survey is inversely related to *Twenty-eight day readmission rate* ($p=0.01$). A significant relationship is also seen between *Resilience* score and the long term financial position of a trust (*Sustainability and transformation fund*; *Figure 8c*; $p=0.02$). Furthermore, *Figure 3-15a* suggests a relationship between this construct score and NSSS *Key Finding 1: Staff recommendation of the organisation as a place to work or receive treatment* ($p=0.03$).

Finance & Investment

Figure 3-8a – Comparison of *Finance & Investment* sum score with proxy construct scores taken from the *National Staff Satisfaction* survey and financial accounts data from NHS Digital and NHS Improvement (considering mean score at trust level and grouping trusts into tertiles based on *Finance & Investment* sum score).

For t-test results: ns = not significant, $p < 0.10$ listed, $p < 0.05$ emboldened

Construct sum scores (averages)	Tertile			t-test (upper tertile Vs lower tertile) <i>p</i> -value
	1	2	3	
Finance & Investment (Healthcare-OH)	3.72	3.49	3.14	0.00
SHMI (Summary Hospital-level Mortality Indicator)	0.97	0.96	0.90	ns
NSS14 - Staff satisfaction with resourcing and support (National staff satisfaction survey)	3.40	3.32	3.26	0.07
Capital investment for new build (£M)	7.90	3.79	3.68	ns
Capital investment for improving existing buildings (£M)	9.24	8.64	6.09	ns
Capital investment for equipment (£M)	6.44	3.78	2.62	ns
ALL Capital Investment (£M)	23.59	16.22	12.39	ns
Control total basis surplus/deficit (year to date, actual; £M)	3.99	-8.05	-9.64	0.04
Forecast outturn (£M)	11.22	-4.25	-6.26	0.04
Sustainability and transformation fund (year to date, actual, £M)	6.58	5.48	3.15	0.09

Figure 3-8b – Trusts grouped into tertiles by *Finance & Investment* sum score. Significant difference between upper and lower tertiles in financial accounts data from NHS Improvements (control total basis surplus/deficit; $p=0.04$)

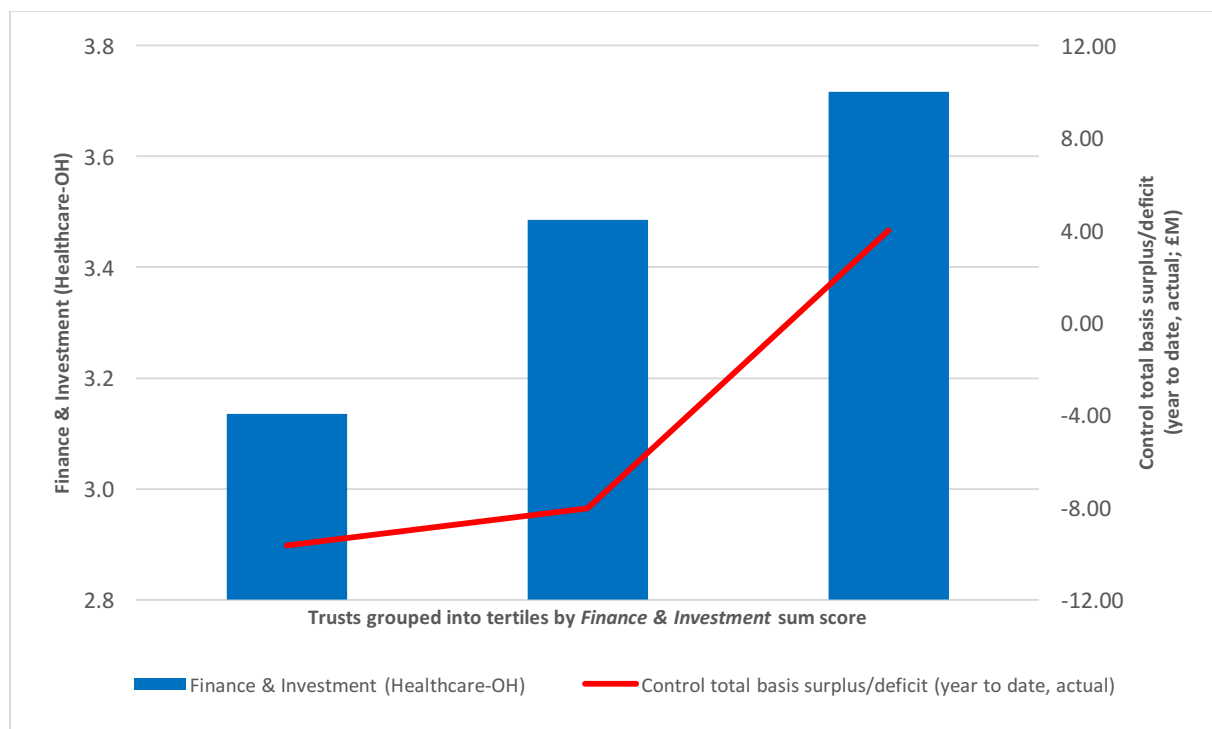
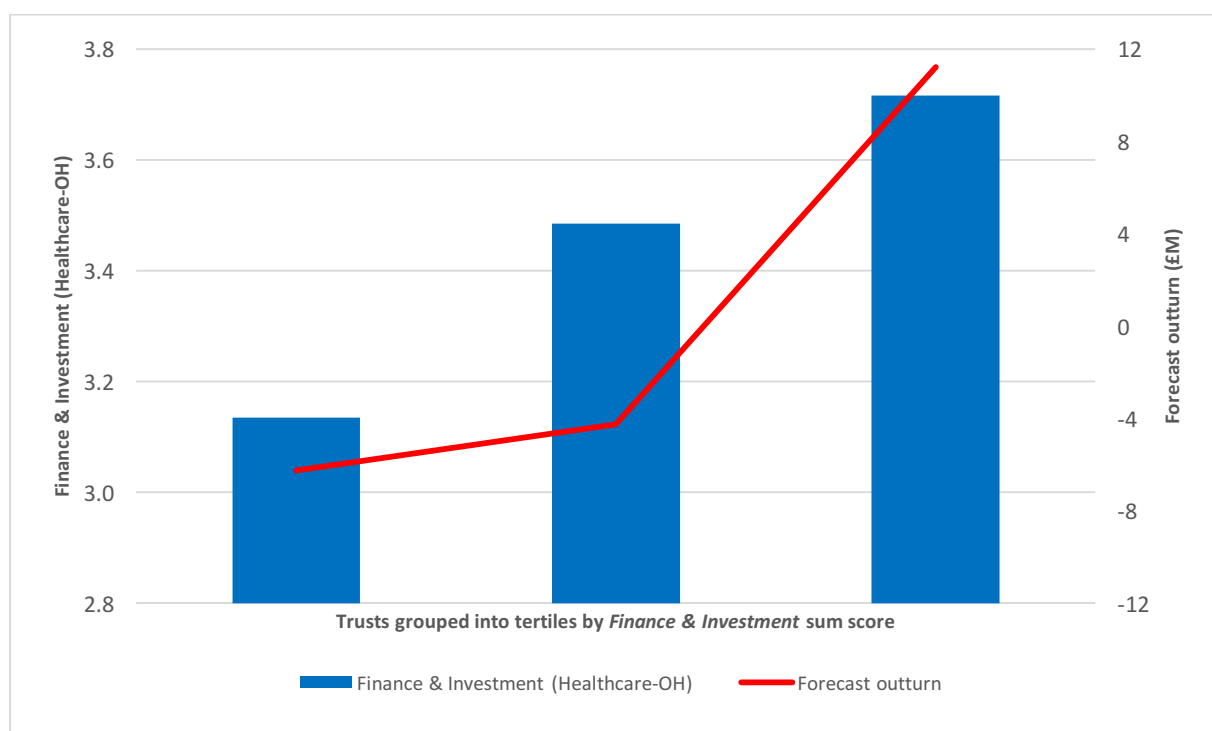


Figure 3-8c – Trusts grouped into tertiles by *Finance & Investment* sum score. Significant difference between upper and lower tertiles in financial accounts data from NHS Improvements (forecast outturn; $p=0.04$)



Staff Wellbeing

Figure 3-9a – Comparison of Staff Wellbeing sum score with proxy construct scores taken from the National Staff Satisfaction survey (considering mean score at trust level and grouping trusts into tertiles based on Staff Wellbeing sum score)
For t-test results: ns = not significant, $p < 0.10$ listed, $p < 0.05$ emboldened

Construct sum scores (averages)	Tertile			t-test (upper tertile Vs lower tertile) p-value
	1	2	3	
Staff Wellbeing (Healthcare-OH)	4.83	4.54	4.19	0.00
NSS1 - Staff recommendation of the organisation as a place to work or receive treatment (<i>National staff satisfaction survey</i>)	3.88	3.83	3.71	0.08
NSS4 - Staff motivation at work (<i>National staff satisfaction survey</i>)	3.93	4.00	3.94	ns
NSS5 - Recognition and value of staff by managers and the organisation (<i>National staff satisfaction survey</i>)	3.48	3.49	3.40	0.08
NSS6 - Percentage of staff reporting good communication between senior management and staff (<i>National staff satisfaction survey</i>)	34.25	35.08	29.77	ns
NSS8 - Staff satisfaction with level of responsibility and involvement (<i>National staff satisfaction survey</i>)	3.90	3.93	3.94	ns
NSS9 - Effective team working (<i>National staff satisfaction survey</i>)	3.76	3.74	3.71	0.09
NSS10 - Support from immediate managers (<i>National staff satisfaction survey</i>)	3.74	3.73	3.69	ns
NSS11 - Percentage of staff appraised in last 12 months (<i>National staff satisfaction survey</i>)	89.39	90.38	83.04	0.00
NSS12 - Quality of appraisals (<i>National staff satisfaction survey</i>)	3.12	3.13	3.08	ns
NSS13 - Quality of non-mandatory training, learning or development (<i>National staff satisfaction survey</i>)	4.03	4.03	4.06	ns
NSS14 - Staff satisfaction with resourcing and support (<i>National staff satisfaction survey</i>)	3.40	3.37	3.24	0.04
NSS15 - Percentage of staff satisfied with the opportunities for flexible working patterns (<i>National staff satisfaction survey</i>)	52.17	50.65	47.70	0.03
NSS16 - Percentage of staff working extra hours (<i>National staff satisfaction survey</i>)	72.91	70.78	74.92	ns
NSS17 - Percentage of staff suffering work related stress in last 12 months (<i>National staff satisfaction survey</i>)	35.49	34.04	38.37	ns
NSS18 - Percentage of staff feeling pressure in the last 3 months to attend work when feeling unwell (<i>National staff satisfaction survey</i>)	57.01	56.49	62.20	0.08
NSS19 - Organisation and management interest in and action on health and wellbeing (<i>National staff satisfaction survey</i>)	3.65	3.57	3.54	0.09
NSS20 - Percentage of staff experiencing discrimination at work in the last 12 months (<i>National staff satisfaction survey</i>)	10.80	13.55	14.93	0.04
NSS21 - Percentage of staff believing that the organisation provides equal opportunities for career progression or promotion (<i>National staff satisfaction survey</i>)	88.37	85.81	81.33	0.02

NSS22 - Percentage of staff experiencing physical violence from patients, relatives or the public in last 12 months (National staff satisfaction survey)	14.08	15.59	13.59	ns
NSS23 - Percentage of staff experiencing physical violence from staff in last 12 months (National staff satisfaction survey)	1.57	2.82	2.63	0.01
NSS24 - Percentage of staff/colleagues reporting most recent experience of violence (National staff satisfaction survey)	53.28	57.12	55.55	ns
NSS25 - Percentage of staff experiencing harassment, bullying or abuse from patients, relatives or the public in last 12 months (National staff satisfaction survey)	27.56	29.65	31.34	ns
NSS26 - Percentage of staff experiencing harassment, bullying or abuse from staff in last 12 months (National staff satisfaction survey)	24.14	25.34	29.54	0.03
NSS27 - Percentage of staff/colleagues reporting most recent experience of harassment, bullying or abuse (National staff satisfaction survey)	39.09	39.73	34.66	ns
NSSeng - Overall engagement score (National staff satisfaction survey)	3.85	3.85	3.78	ns

Figure 3-9b – Trusts grouped into tertiles by *Staff Wellbeing* sum score. Significant difference between upper and lower tertiles in data from *National Staff Satisfaction* survey (Staff satisfaction with resourcing and support; $p=0.04$)

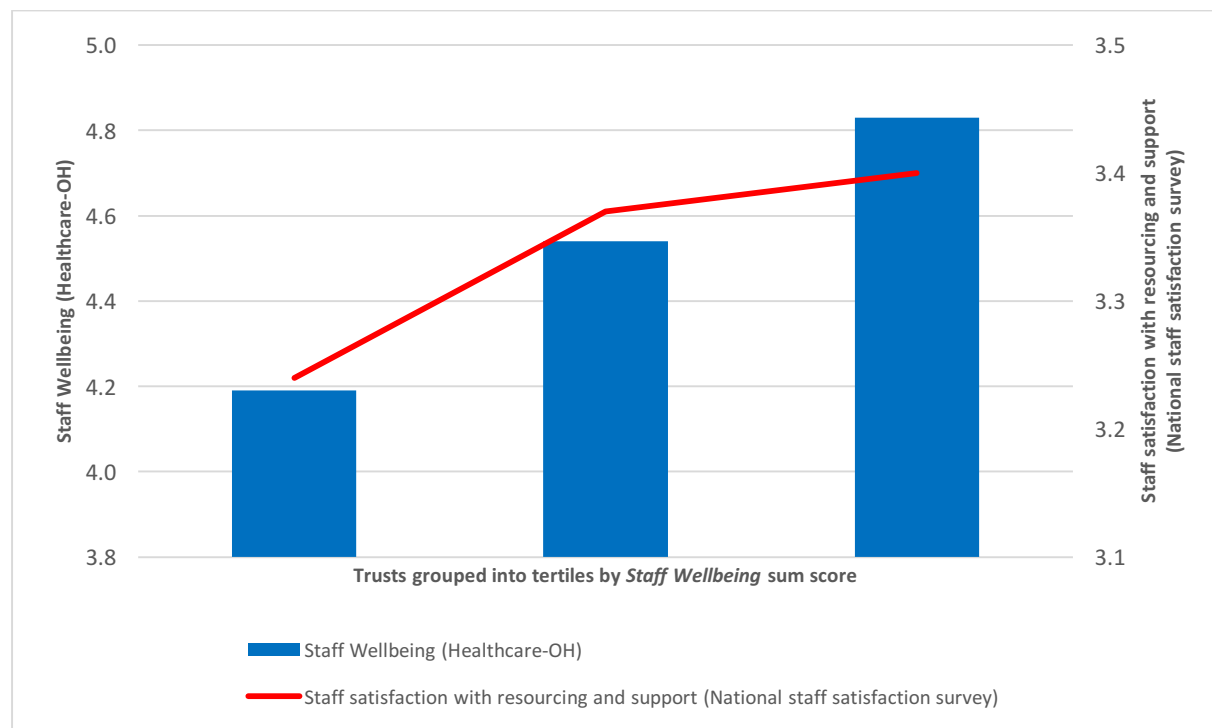
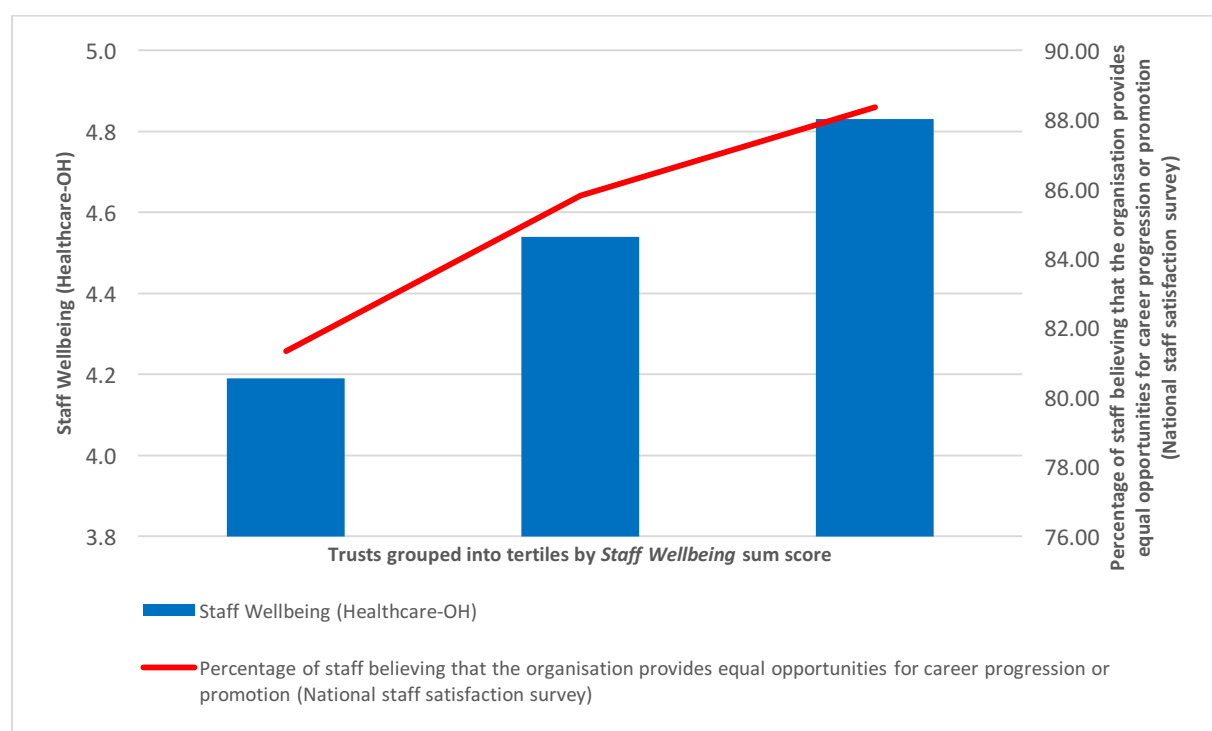


Figure 3-9c – Trusts grouped into tertiles by *Staff Wellbeing* sum score. Significant difference between upper and lower tertiles in data from *National Staff Satisfaction* survey (Percentage of staff believing that the organisation provides equal opportunities for career progression or promotion; $p=0.02$)



Strategy

Figure 3-10a – Comparison of *Strategy* sum score with proxy construct scores taken from the CQC inspection, *National Staff Satisfaction* survey and Standardised

Hospital Mortality Index (considering mean score at trust level and grouping trusts into tertiles based on *Strategy* sum score)

For t-test results: ns = not significant, $p < 0.10$ listed, $p < 0.05$ emboldened

Construct sum scores (averages)	Tertile			t-test (upper tertile Vs lower tertile)
	1	2	3	p-value
Strategy (Healthcare-OH)	4.88	4.61	4.17	0.00
Overall rating (CQC inspection)				ns*
Are services at this trust safe? (CQC inspection)				ns*
Are services at this trust effective? (CQC inspection)				ns*
Are services at this trust caring? (CQC inspection)				ns*
Are services at this trust responsive? (CQC inspection)				ns*
Are services at this trust well-led? (CQC inspection)				0.07*
SHMI (Summary Hospital-level Mortality Indicator)	0.98	0.96	0.88	0.08
NSSI - Staff recommendation of the organisation as a place to work or receive treatment (National staff satisfaction survey)	3.91	3.77	3.68	0.05
NSS2 - Staff satisfaction with the quality of work and care they are able to deliver (National staff satisfaction survey)	4.03	3.97	3.92	0.07
NSS3 - Percentage of staff agreeing that their roles makes a difference to patients / service users (National staff satisfaction survey)	90.93	90.70	90.10	ns
NSS32 - Effective use of patient / service user feedback (National staff satisfaction survey)	3.76	3.65	3.65	ns
NSSeng - Overall engagement score (National staff satisfaction survey)	3.87	3.82	3.78	0.09
*Mann-Whitney U test				

Figure 3-10b – Trusts grouped into tertiles by *Strategy* sum score. Non-significant difference between upper and lower tertiles SHMI (Summary Hospital-level Mortality Indicator; $p=0.08$)

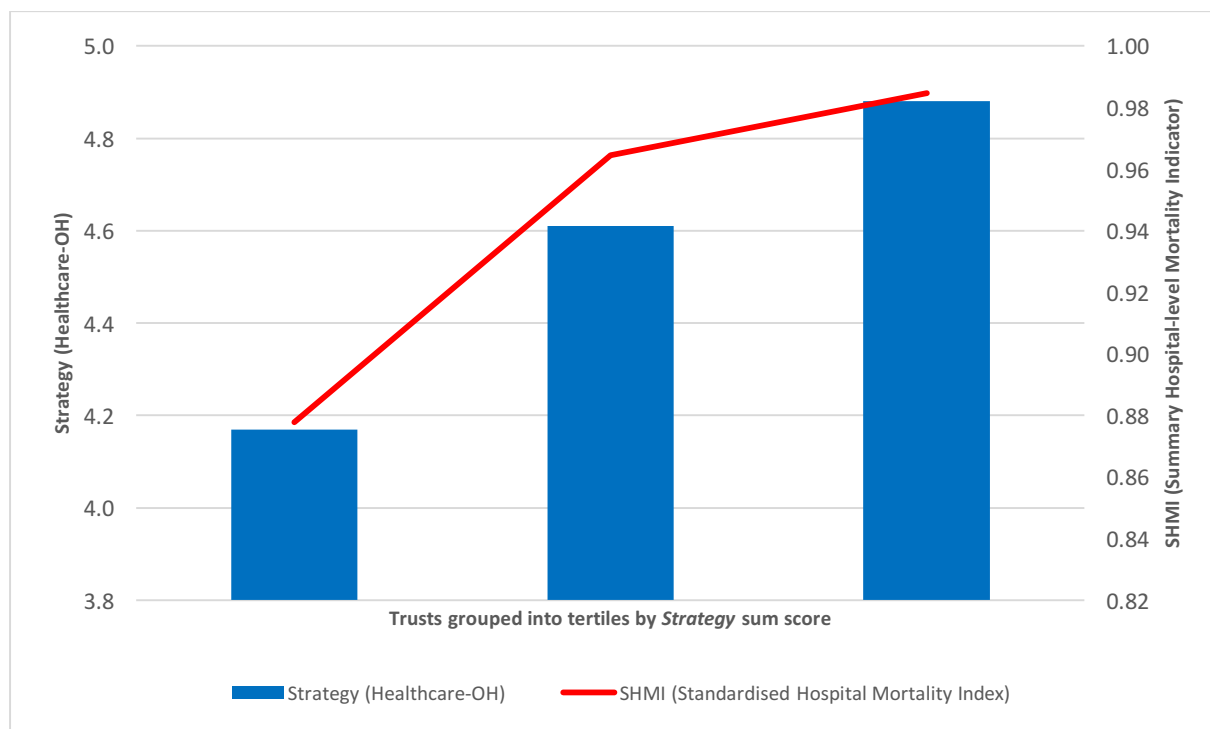
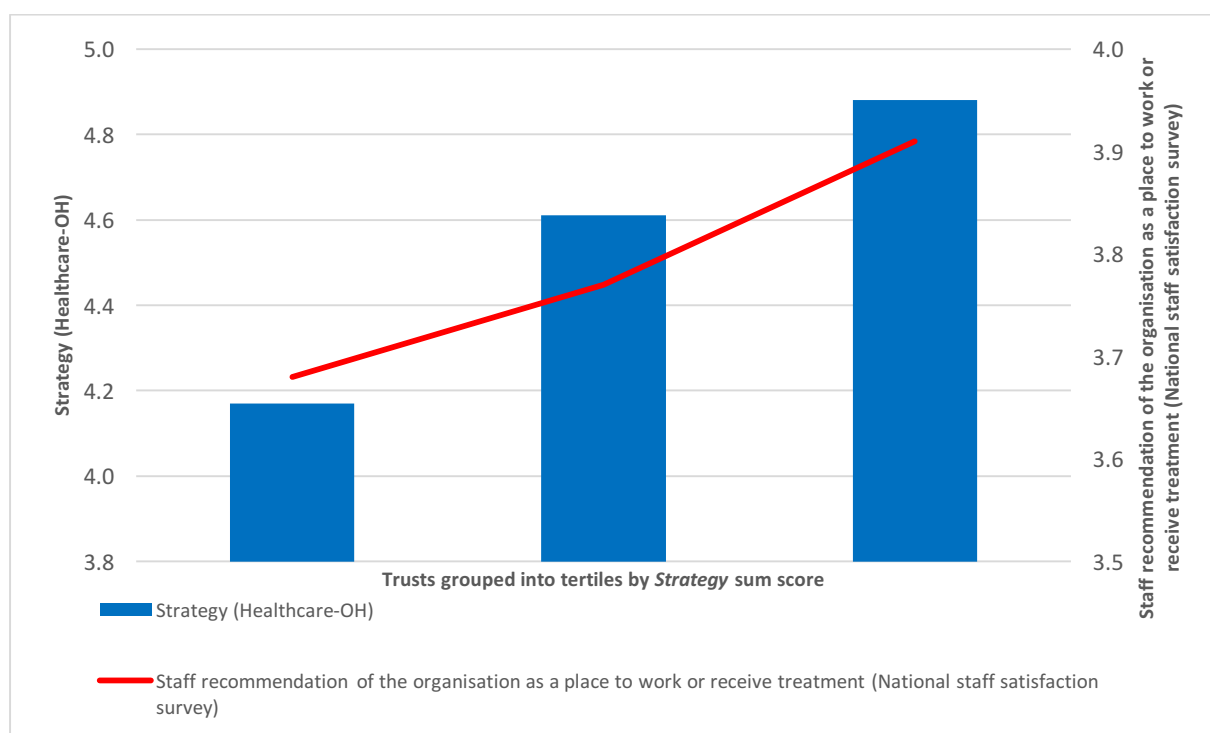


Figure 3-10c – Trusts grouped into tertiles by *Strategy* sum score. Significant difference between upper and lower tertiles in data from *National Staff Satisfaction* survey (Staff recommendation of the organisation as a place to work or receive treatment; $p<0.05$)



Communication

Figure 3-11a – Comparison of *Communication* sum score with proxy construct scores taken from the CQC inspection, *National Staff Satisfaction* survey and NHS Digital (considering mean score at trust level and grouping trusts into tertiles based on *Communication* sum score)

For t-test results: ns = not significant, $p < 0.10$ listed, $p < 0.05$ emboldened

Construct sum scores (averages)	Tertile			t-test (upper tertile Vs lower tertile)
	1	2	3	p-value
Communication (Healthcare-OH)	4.62	4.39	3.94	0.00
Overall rating (CQC inspection)				ns*
Are services at this trust safe? (CQC inspection)				ns*
Are services at this trust effective? (CQC inspection)				ns*
Are services at this trust caring? (CQC inspection)				0.06*
Are services at this trust responsive? (CQC inspection)				0.07*
Are services at this trust well-led? (CQC inspection)				0.07*
NSS6 - Percentage of staff reporting good communication between senior management and staff (National staff satisfaction survey)	33.10	34.35	29.58	ns
NSS9 - Effective team working (National staff satisfaction survey)	3.76	3.73	3.71	ns
Ratio of Doctors:Nurses (FTE)	0.40	0.44	0.46	0.04
Ratio of Consultants:Junior Doctors (FTE)	0.67	0.77	0.74	0.09
Ratio of Managers:Clinical Staff (FTE)	0.04	0.04	0.04	ns
*Mann-Whitney U test				

Figure 3-11b – Trusts grouped into tertiles by *Communication* sum score. No significant difference between upper and lower tertiles in data from *National Staff Satisfaction* survey (Percentage of staff reporting good communication between senior management and staff; $p=0.36$)

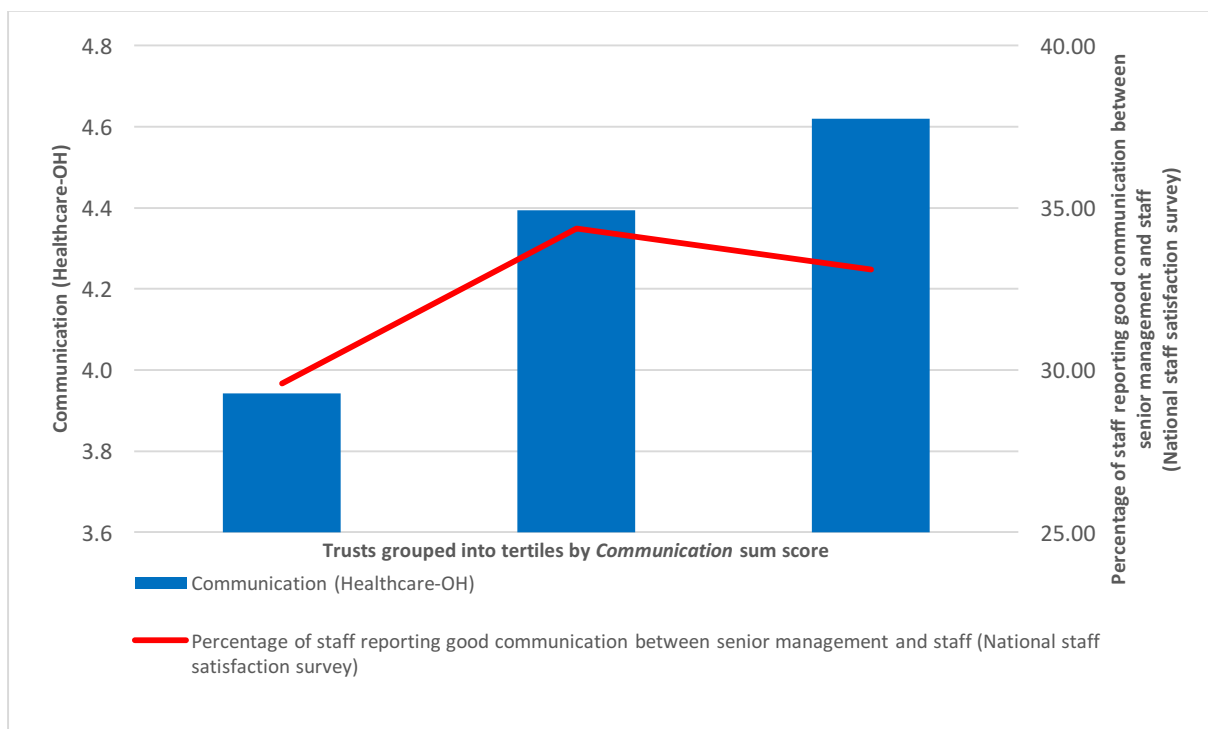
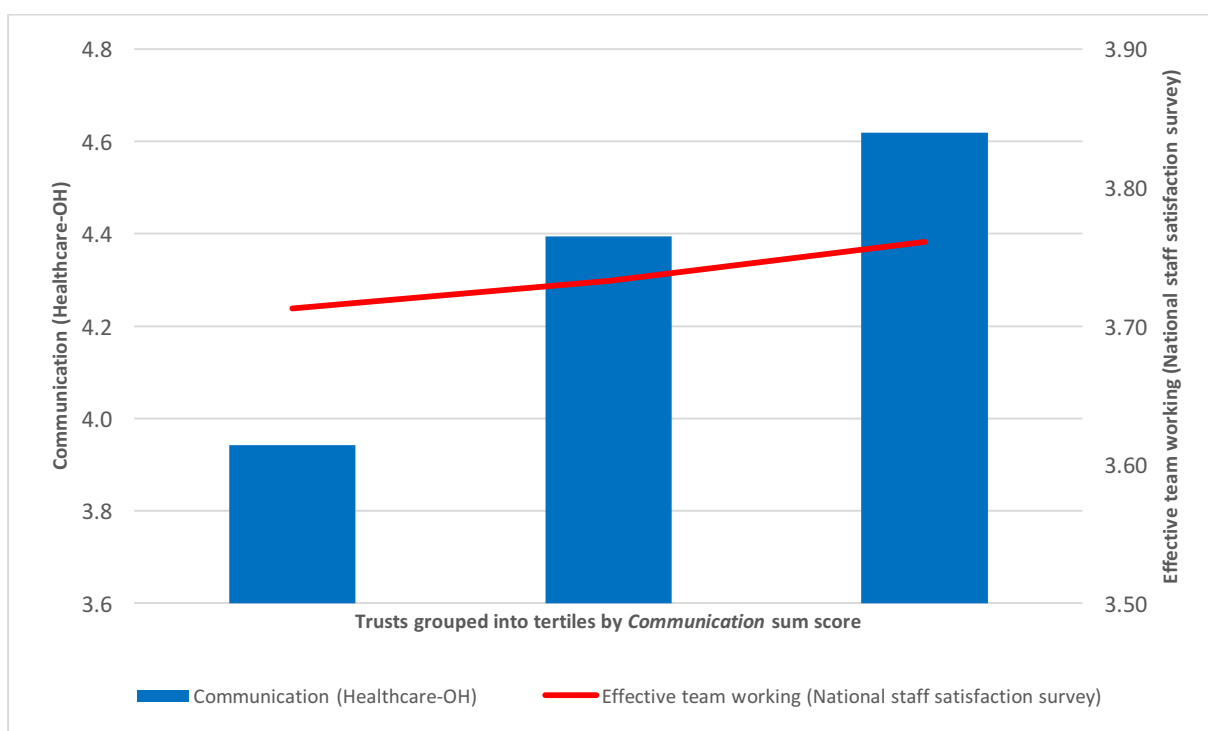


Figure 3-11c – Trusts grouped into tertiles by *Communication* sum score. No significant difference between upper and lower tertiles in data from *National Staff Satisfaction* survey (Effective team working; $p=0.12$)



Patient Safety

Figure 3-12a – Comparison of *Patient Safety* sum score with proxy construct scores taken from the CQC inspection, *National Staff Satisfaction* survey, NRLS database and Dr Foster (considering mean score at trust level and grouping trusts into tertiles based on *Patient Safety* sum score)

For t-test results: ns = not significant, $p < 0.10$ listed, $p < 0.05$ emboldened

Construct sum scores (averages)	Tertile			t-test (upper tertile Vs lower tertile)
	1	2	3	p-value
Patient Safety (Healthcare-OH)	4.72	4.44	4.17	0.00
Overall rating (CQC inspection)				ns*
Are services at this trust safer? (CQC inspection)				ns*
Overall score (CQC inpatient survey)	7.77	7.75	7.60	ns
Overall experience (CQC inpatient survey)	8.17	8.06	7.94	0.07
SHMI (Summary Hospital-level Mortality Indicator)	0.98	0.93	0.91	ns
NSS28 - Percentage of staff witnessing potentially harmful errors, near misses or incidents in last month (National staff satisfaction survey)	29.87	32.58	33.53	ns
NSS29 - Percentage of staff reporting errors, near misses or incidents witnessed in the last month (National staff satisfaction survey)	89.93	90.77	88.15	ns
NSS30 - Fairness and effectiveness of procedures for reporting errors, mistakes and near misses (National staff satisfaction survey)	3.77	3.70	3.63	0.01
NSS31 - Staff confidence and security in reporting unsafe clinical practice (National staff satisfaction survey)	3.69	3.60	3.57	0.01
NRLS16 - Degree of harm/severity – Death (% of incidents reported)	0.09	0.10	0.19	0.09
NRLS17 - Degree of harm/severity - Low (% of incidents reported)	16.51	18.53	23.26	0.08
NRLS18 - Degree of harm/severity - Moderate (% of incidents reported)	1.79	2.19	2.35	ns
NRLS19 - Degree of harm/severity – No harm (% of incidents reported)	81.43	79.00	73.95	0.06
NRLS20 - Degree of harm/severity - Severe (% of incidents reported)	0.18	0.19	0.25	0.06
NRLS21 - Patient actually harmed – No (% of incidents reported)	81.43	79.00	73.95	0.06
NRLS22 - Patient actually harmed - Yes (% of incidents reported)	18.57	21.00	26.05	0.06
Complications of care – crude rate	2.64	3.22	3.25	0.04
Twenty-eight day readmission rate – crude rate	7.67	8.08	8.17	ns
*Mann-Whitney U test				

Figure 3-12b – Trusts grouped into tertiles by *Patient Safety* sum score. Significant difference between upper and lower tertiles in data from NHS Digital (Complications of care; $p=0.04$)

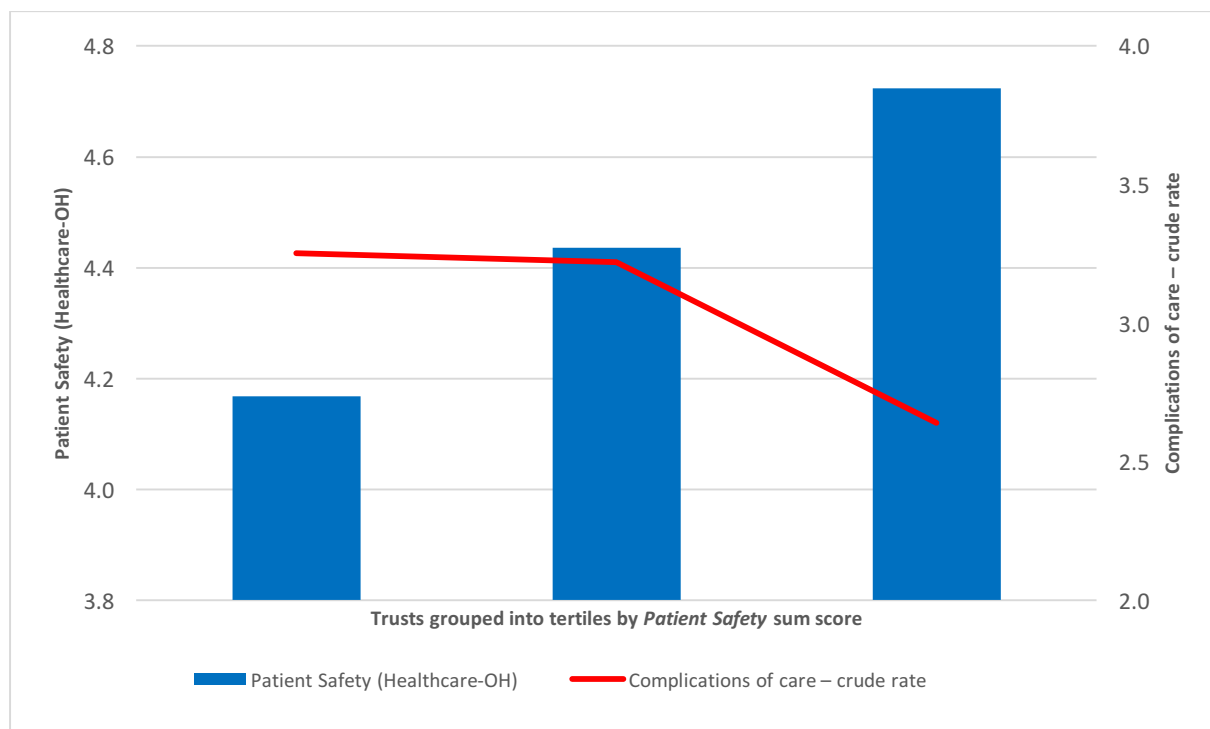
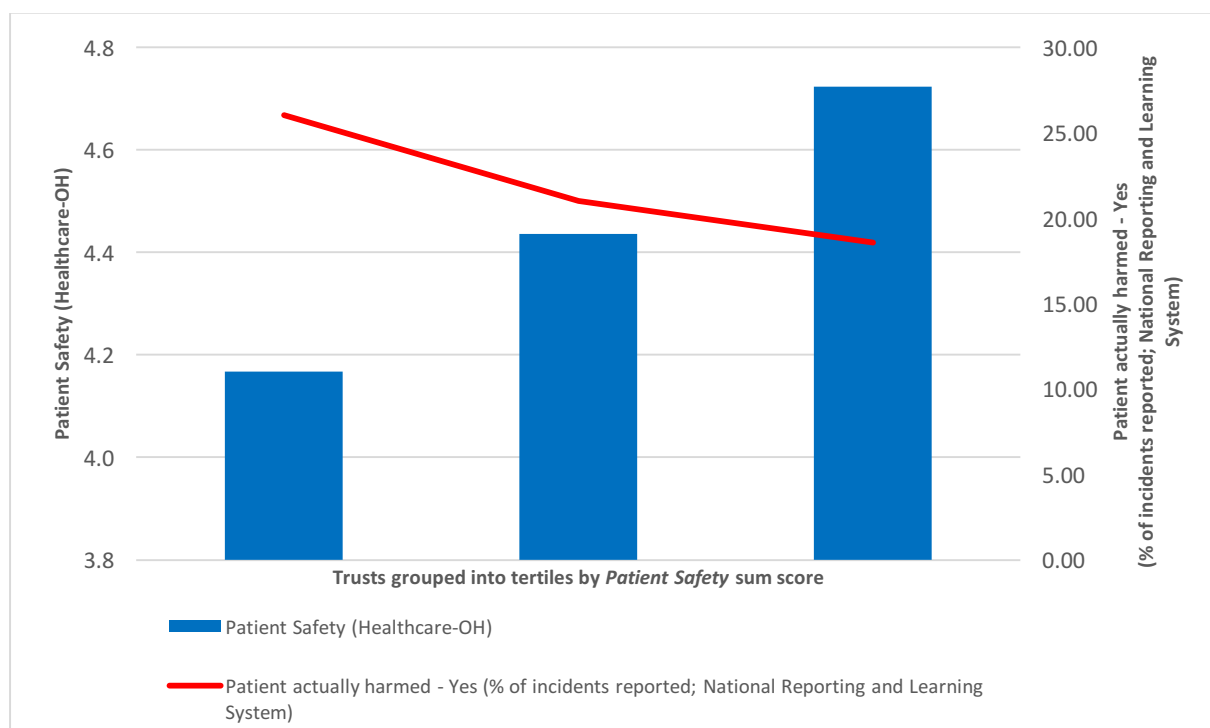


Figure 3-12c – Trusts grouped into tertiles by *Patient Safety* sum score. Non-significant difference between upper and lower tertiles in data from *National Reporting and Learning Service* database (Patient actually harmed; $p=0.06$)



Efficiency

Figure 3-13a – Comparison of *Efficiency* sum score with proxy construct scores taken from the CQC inspection, *National Staff Satisfaction* survey, Standardised Hospital Mortality Index, NHS Digital and CQC inpatient survey/ (considering mean score at trust level and grouping trusts into tertiles based on *Efficiency* sum score)
For t-test results: ns = not significant, $p < 0.10$ listed, $p < 0.05$ emboldened

Construct sum scores (averages)	Tertile			t-test (upper tertile Vs lower tertile)
	1	2	3	p-value
Efficiency (Healthcare-OH)	4.16	3.87	3.49	0.00
Overall rating (CQC inspection)				ns*
Are services at this trust effective? (CQC inspection)				ns*
Are services at this trust responsive? (CQC inspection)				0.07*
SHMI (Summary Hospital-level Mortality Indicator)	0.94	1.01	0.88	ns
NSSI - Staff recommendation of the organisation as a place to work or receive treatment (National staff satisfaction survey)	3.87	3.82	3.70	0.09
NSS2 - Staff satisfaction with the quality of work and care they are able to deliver (National staff satisfaction survey)	4.02	4.01	3.90	0.06
NSS9 - Effective team working (National staff satisfaction survey)	3.76	3.74	3.71	ns
Staffing - Ratio of Doctors:Nurses (FTE)	0.43	0.41	0.46	ns
Staffing - Ratio of Clinical Staff:non-Clinical Staff (FTE)	1.13	0.98	1.36	0.01
Staffing - Ratio of Consultants:Junior Doctors (FTE)	0.71	0.80	0.67	ns
Staffing - Ratio of Managers:Clinical Staff (FTE)	0.04	0.05	0.04	ns
Staffing - Ratio of Nurses:Bed (FTE)	2.59	1.86	2.41	ns
Staffing - Ratio of Doctors:Bed (FTE)	1.12	0.76	1.12	ns
Mean percentage bed occupancy	0.88	0.89	0.84	ns
Mean percentage critical care bed occupancy	0.87	0.85	0.88	ns
Overall score (CQC inpatient survey)	7.79	7.74	7.66	ns
Emergency department (CQC inpatient survey)	8.58	8.58	8.79	ns
Waiting list and planned admissions (CQC inpatient survey)	8.69	8.59	8.72	ns

Waiting to get a bed on a ward (CQC inpatient survey)	7.62	7.51	7.35	ns
The hospital and ward (CQC inpatient survey)	8.19	8.19	8.03	0.08
Doctors (CQC inpatient survey)	8.51	8.58	8.52	ns
Nurses (CQC inpatient survey)	8.34	8.40	8.24	ns
Care and treatment (CQC inpatient survey)	7.81	7.82	7.81	ns
Operations and procedures (CQC inpatient survey)	8.41	8.40	8.38	ns
Leaving Hospital (CQC inpatient survey)	7.06	7.08	6.93	ns
Overall view of care and services (CQC inpatient survey)	5.50	5.51	5.54	ns
Overall experience (CQC inpatient survey)	8.10	8.08	8.00	ns
Non-clinical cancellations	431.40	437.80	542.40	ns
*Mann-Whitney U test				

Figure 3-13b – Trusts grouped into tertiles by *Efficiency* sum score. No significant difference between upper and lower tertiles in data from CQC inpatient survey (p=0.45)

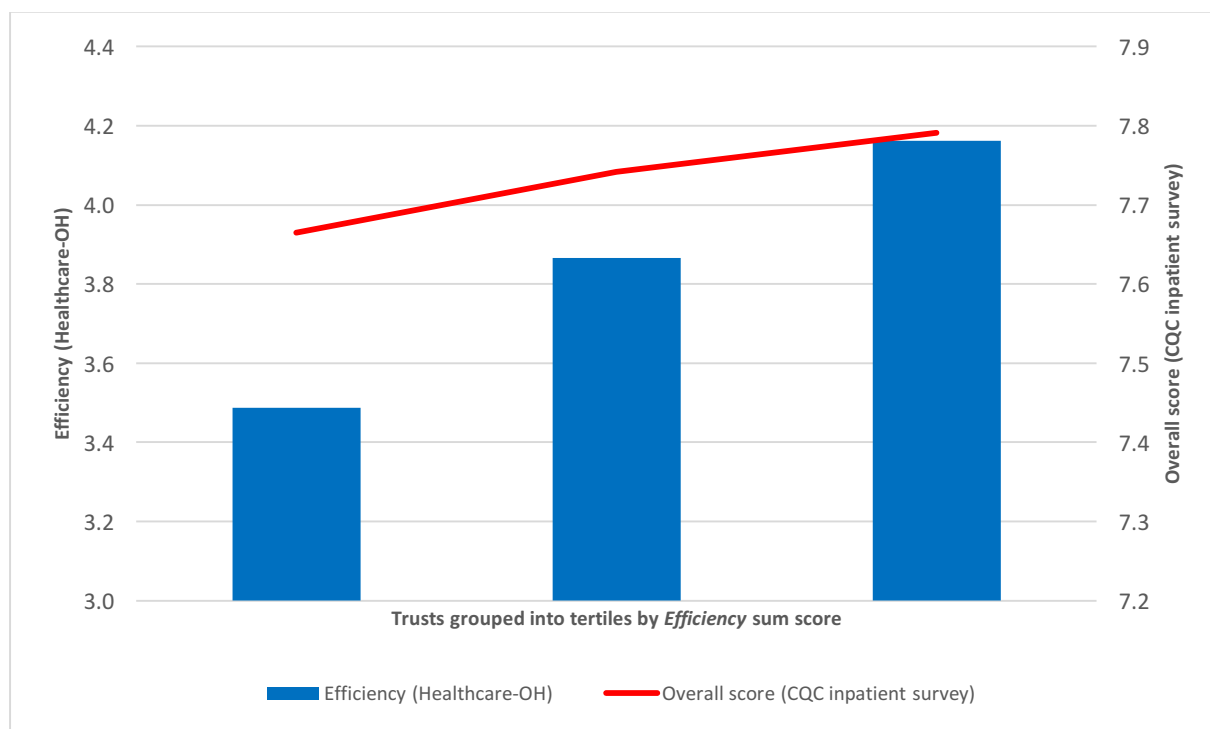
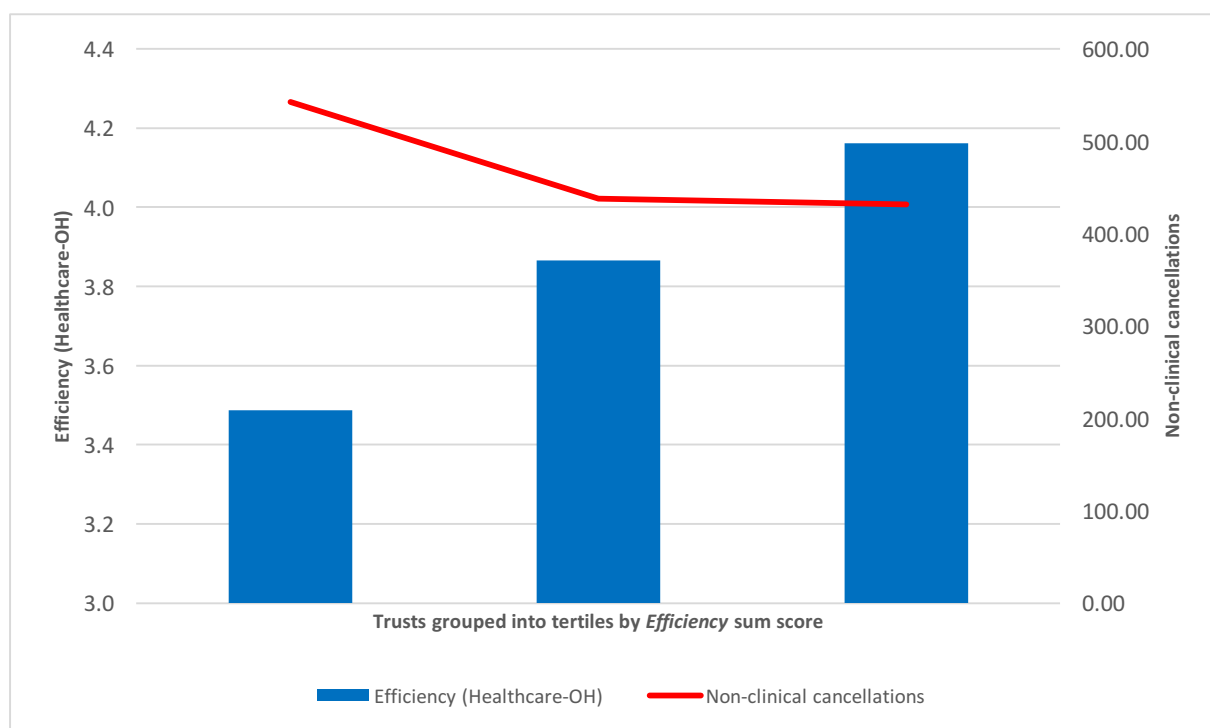


Figure 3-13c – Trusts grouped into tertiles by *Efficiency* sum score. No significant difference between upper and lower tertiles in data from NHS Digital (non-clinical cancellations; p=0.49)



Leadership & Management

Figure 3-14a – Comparison of *Leadership & Management* sum score with proxy construct scores taken from the CQC inspection, *National Staff Satisfaction* survey, NHS Digital and financial accounts data from NHS Improvement (considering mean score at trust level and grouping trusts into tertiles based on *Leadership & Management* sum score)

For t-test results: ns = not significant, $p < 0.10$ listed, $p < 0.05$ emboldened

Construct sum scores (averages)	Tertile			t-test (upper tertile Vs lower tertile) p-value
	1	2	3	
Leadership & Management (Healthcare-OH)	4.54	4.18	3.71	0.00
Are services at this trust well-led? (CQC inspection)				ns*
NSS5 - Recognition and value of staff by managers and the organisation (National staff satisfaction survey)	3.49	3.46	3.39	0.06
NSS6 - Percentage of staff reporting good communication between senior management and staff (National staff satisfaction survey)	34.55	32.35	30.69	ns
NSS7 - Percentage of staff able to contribute towards improvements at work (National staff satisfaction survey)	72.03	70.68	69.33	0.07
NSS10 - Support from immediate managers (National staff satisfaction survey)	3.75	3.71	3.69	ns
NSS11 - Percentage of staff appraised in last 12 months (National staff satisfaction survey)	89.86	88.65	82.58	0.00
NSS12 - Quality of appraisals (National staff satisfaction survey)	3.11	3.09	3.11	ns
Staffing - Ratio of Consultants:Junior Doctors (FTE)	0.73	0.71	0.74	ns
Staffing - Ratio of Managers:Clinical Staff (FTE)	0.05	0.05	0.03	0.04
Control total basis surplus/deficit (year to date, actual, £M)	2.54	-4.08	-13.49	0.04
Forecast outturn (£M)	8.03	-2.32	-9.08	ns
Sustainability and transformation fund (year to date, actual, £M)	6.03	5.16	3.83	0.09
*Mann-Whitney U test				

Figure 3-14b – Trusts grouped into tertiles by *Leadership & Management* sum score. No significant difference between upper and lower tertiles in data from *National Staff Satisfaction* survey (Support from immediate managers; $p=0.10$)

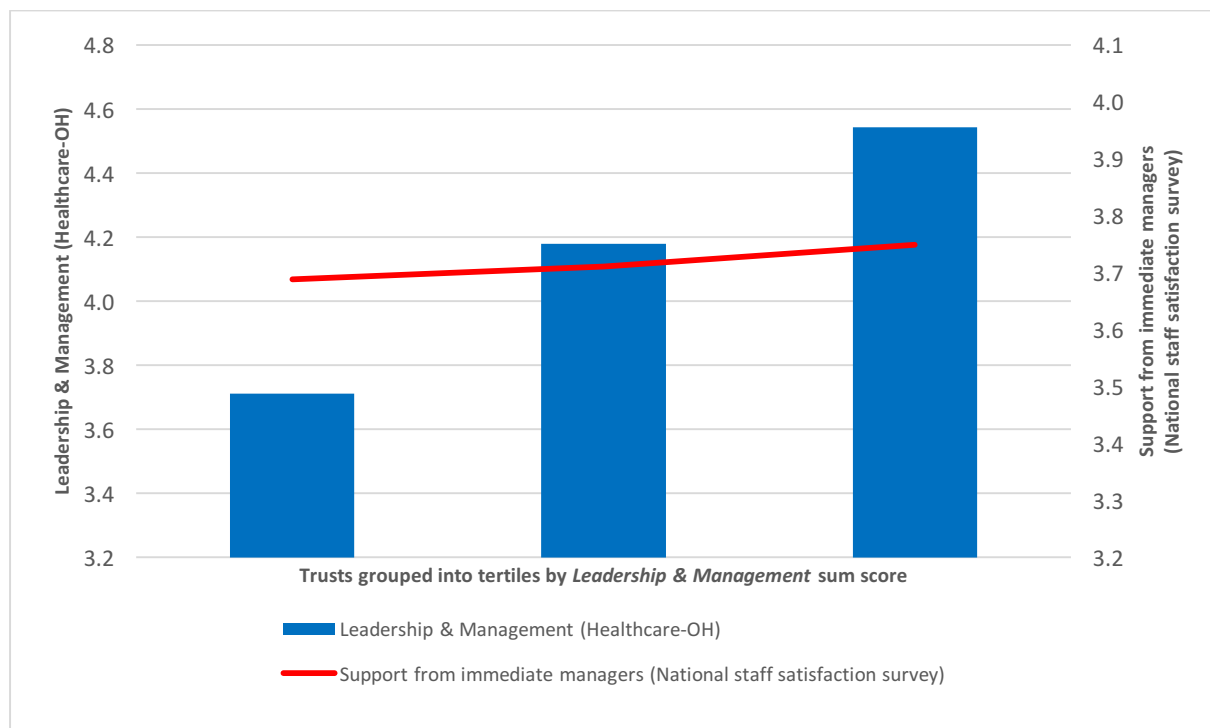
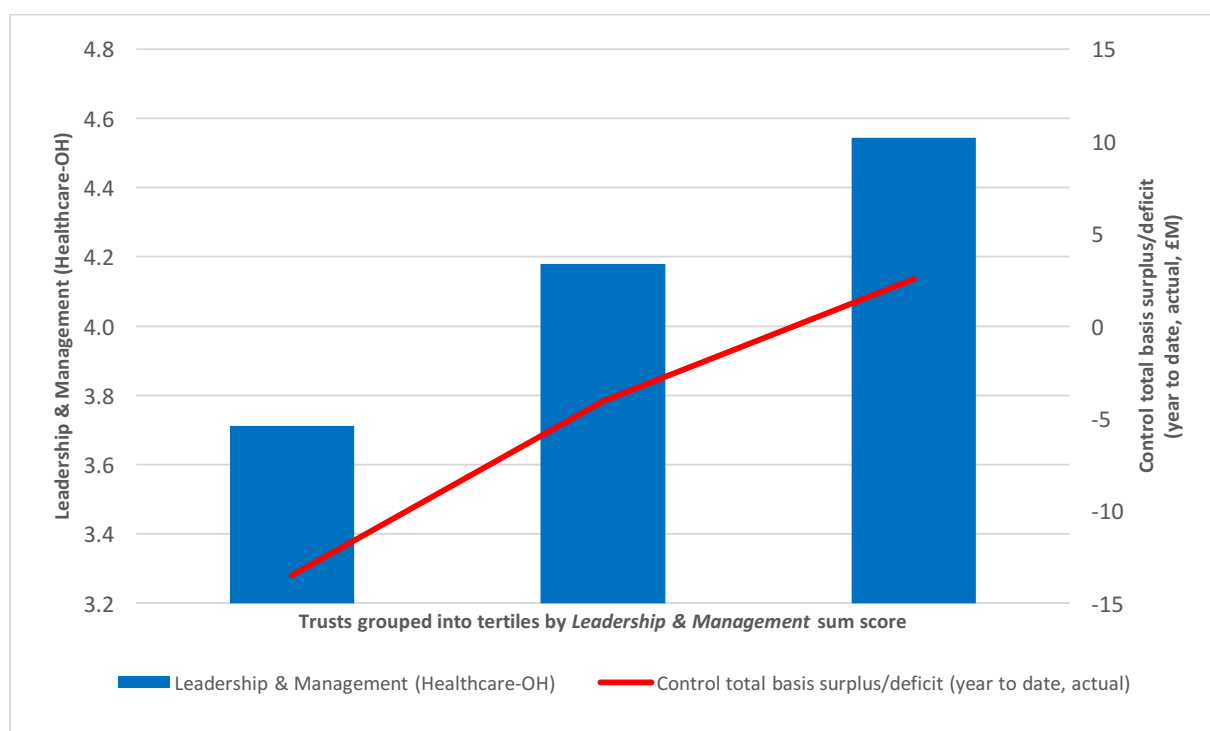


Figure 3-14c – Trusts grouped into tertiles by *Leadership & Management* sum score. Significant difference between upper and lower tertiles in financial accounts data from NHS Improvements (control total basis surplus/deficit; $p=0.04$)



Resilience

Figure 3-15a – Comparison of *Resilience* sum score with proxy construct scores taken from the CQC inspection, *National Staff Satisfaction* survey, NHS Digital and financial accounts data from NHS Improvement (considering mean score at trust level and grouping trusts into tertiles based on *Resilience* sum score)

For t-test results: ns = not significant, $p < 0.10$ listed, $p < 0.05$ emboldened

Construct sum scores (averages)	Tertile			t-test (upper tertile Vs lower tertile)
	1	2	3	p-value
Resilience (Healthcare-OH)	4.70	4.35	3.59	0.01
Overall rating (CQC inspection)				ns*
Are services at this trust safe? (CQC inspection)				ns*
Are services at this trust effective? (CQC inspection)				ns*
Are services at this trust caring? (CQC inspection)				ns*
Are services at this trust responsive? (CQC inspection)				ns*
Are services at this trust well-led? (CQC inspection)				ns*
NSS1 - Staff recommendation of the organisation as a place to work or receive treatment (National staff satisfaction survey)	3.94	3.78	3.68	0.03
NSS2 - Staff satisfaction with the quality of work and care they are able to deliver (National staff satisfaction survey)	4.03	3.96	3.93	0.08
NSS3 - Percentage of staff agreeing that their roles makes a difference to patients / service users (National staff satisfaction survey)	91.28	90.36	90.35	ns
Mean percentage bed occupancy	0.88	0.86	0.88	ns
Complications of care – crude rate	0.89	0.85	0.87	ns
Twenty-eight day readmission rate – crude rate	7.26	8.07	8.52	0.01
Control total basis surplus/deficit (year to date, actual; £M)	-3.21	-1.68	-10.97	ns
Forecast outturn (£M)	9.03	-9.79	-8.93	ns
Sustainability and transformation fund (year to date, actual; £M)	6.46	5.98	2.09	0.02
*Mann-Whitney U test				

Figure 3-15b – Trusts grouped into tertiles by *Resilience* sum score. Significant difference between upper and lower tertiles in clinical outcome data from NHS Digital (Twenty-eight day readmission rate; $p=0.01$)

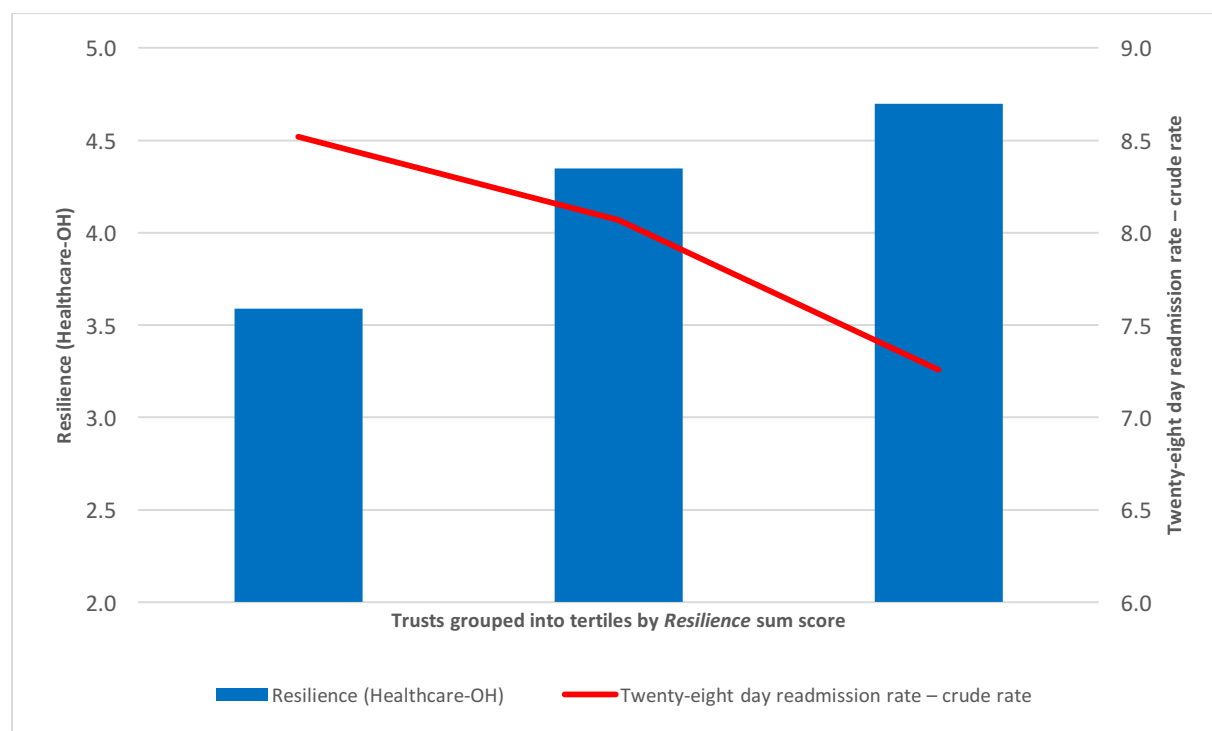
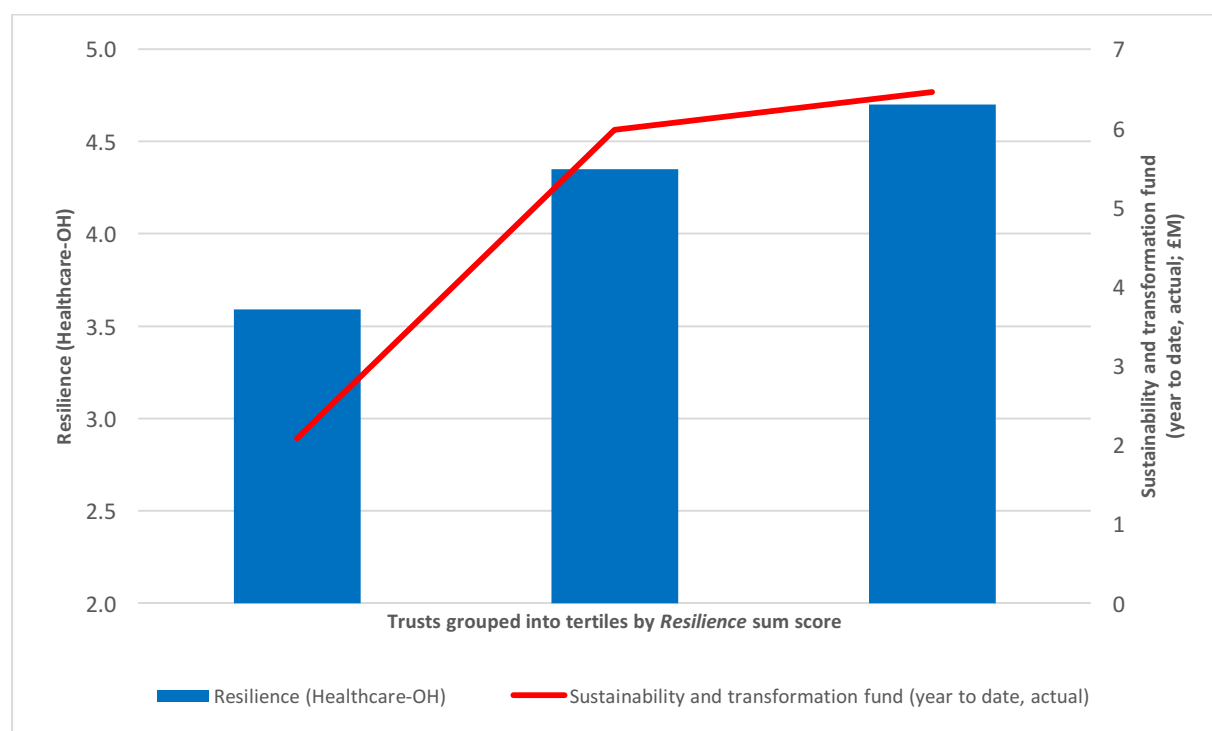


Figure 3-15c – Trusts grouped into tertiles by *Resilience* sum score. Significant difference between upper and lower tertiles in financial accounts data from NHS Improvements (sustainability and transformation fund; $p=0.02$)



3.4 Discussion

3.4.1 Summary of main findings

In this present study, organisational health scores (obtained through a nationwide study using the *Healthcare-OH* survey) were seen to vary significantly between participating trusts (*Figure 3-7*). Following on directly from analysis presented in the prior chapter, the validity of the *Healthcare-OH* survey was examined further through attempted correlation with existing performance metrics. This is an exercise in external (criterion-referenced) validity testing, since it is expected that scores obtained using the *Healthcare-OH* survey should hold with the underlying fundamental definitions of organisational health, such that '*healthy organisations are not only ones which get results now, but which are positioned for sustainable success*'.³⁷

A wide range of existing performance metrics was obtained, largely from databases within the public domain, and theorised to act as proxies for the construct scores from the *Healthcare-OH* survey. Examination of the tertile split contingency tables (seen in *Figures 3-8a – 3-15a*) does indeed proffer evidence for the external validation of the measure, given its sum scores are seen to correlate with a variety of different performance metrics.

This is particularly true for the topics of *Finance & Investment*, *Staff Wellbeing* and *Patient Safety*. *Finance & Investment* score was found to be significantly related to financial metrics from NHS Improvement (*Control total basis* and *Forecast outturn*; $p=0.04$ for both) as would be expected. Though, whilst an upward trend was noted for capital investment figures from NHS Digital, a similar level of significance was not found. *Staff Wellbeing*, as a theme, has extensive overlaps with a host of items within the NSSS. In keeping with this, a number of significant associations was observed between tertile groups for this construct (*Figure 3-9a*).

Patient Safety was significantly related to two comparable aspects of the NSSS (*Key finding 30: Fairness and effectiveness of procedures for reporting errors, mistakes and near misses* and *Key finding 31: Staff confidence and security in reporting unsafe clinical practice*, both at $p=0.01$; *Figure 3-12a*). A significant relationship was also found between this construct and *Complications of care*. Whilst relationships with NRLS data and readmission rates were not significant, they appeared to trend in the expected direction and so could be an artefact of sample size.

A limited number of relationships was observed when considering the themes of *Strategy* and *Leadership & Management*. Whilst *Strategy* was hypothesised to be related to a number of aspects measured through the NSSS, a significant relationship was only observed with *Key finding 1: Staff recommendation of the organisation as a place to work or receive treatment* ($p<0.05$), though this does support the notion that staff are aligned with their trust's output and direction. Whilst upward trends were seen in tertile groups of NSSS *Key findings 3, 32* and *Overall engagement*, and in SHMI, relationships were not statistically significant (at $p<0.05$). Similarly, *Leadership & Management* has been thought to be closely aligned with NSSS sub-scores but, although upward trends were noted for *Key findings 5-7* and *10*, it was only *Key finding 12 (Quality of appraisals)* that was statistically significant in association ($p=0.00$; *Figure 3-14a*). Though significant relationships were discovered between *Leadership & Management* score and trusts with a greater proportion of managerial staff and trusts with a stronger financial position (*Control total basis*) these metrics could be perceived more as related variables than proxies and so are of comparably lower value for validation purposes.

The strength of organisational health as a concept, and so of the *Healthcare-OH* survey as a measure, is that it considers the entire breadth of elements required for long-term high performance. It is this breadth which makes it impossible to consider *Healthcare-OH* results alongside a single existing performance metric, since, by definition, organisational health measurements should reflect the full range of performance measures. Whilst many of the external datasets used here represent theoretically 'good' proxies for the sub-dimensions of organisational health, this is not uniform throughout. It was particularly challenging to source metrics to match with the topics of *Resilience*, *Communication* and *Efficiency*, potentially due to their greater level of abstraction relative to other themes. There is little doubt that a strong provision of these elements is essential for the high performance of a healthcare organisation, none more so than in the current climate of financial austerity in the public sector within the UK, but how these constructs are best measured remains uncertain.

In this study, *Resilience* was seen to correlate logically with the long term financial position of a trust (represented by the *Sustainability and transformation fund*, which is awarded on the basis of trusts consistently meeting required financial targets). There was also significant association between *Resilience* and NSSS *Key finding 1: Staff recommendation of the organisation as a place to work or receive treatment*, suggesting that staff are intrinsically aware of the strength of their trust. Whether a particular clinical performance dataset is an accurate measure of *Resilience* is another matter. Links between bed occupancy and *Complications of care* were examined but were non-significant (*Figure 3-15a*). An association between twenty-eight day readmission and *Resilience* score was found ($p=0.01$) however.

Communication had been hypothesised to be related to NSSS Key finding 6 (*Percentage of staff reporting good communication between senior management and staff*) and Key finding 9 (*Effective team work*) but no significant associations were found (*Figure 3-11a*). Strong communication pathways are crucial within high functioning organisations and it could be argued that *Communication* is such a ubiquitous element that it is reflected in each and every output of an organisation. That being said, it is difficult to theorise as to other specific datasets with great clarity – though results from the CQC inspection were tending towards significance (*Are services at this trust caring?* $p=0.06$; *Are services at this trust responsive?* $p=0.07$; *Are services at this trust well-led?* $p=0.07$).

A raft of performance metrics was hypothesised as proxies for *Efficiency* but none showed significant associations (at $p<0.05$; *Figure 3-13a*). The reasons for this may be manifold and difficulties in the selection of measures to best reflect healthcare efficiency have been noted by others.¹⁰⁴ If one presumes that the metrics themselves are accurate gauges of *Efficiency*, then it could be argued that either the items presently in the *Healthcare-OH* survey do not encompass all aspects of this construct or that the size of the sample in this study limited the ability to detect any underlying relationships. Alternatively, it could be that given organisational health is concerned with long-term performance, comparison with a single year's metrics (in essence a 'snap-shot' of performance) is a methodologically flawed approach.

3.4.2 Comparison with existing literature

Khammarnia and colleagues developed an organisational health measure for use in Iranian hospitals based on the OHI-E survey (and its composite elements as listed in *Figure 1-6*) developed by Hoy *et al.* for use in schools.⁴² Little detail is given as to the items themselves or the internal structure of the survey but attempts were made to correlate survey results with existing performance markers for seven Iranian teaching hospitals. *Institutional integrity* was significantly correlated with both admission rate ($r=0.21$, $p=0.00$) and length of stay ($r=0.27$, $p=0.00$) but no significant correlations were noted with mortality figures or for any of the other elements of the survey.¹⁰⁵ It is difficult to comment on how the findings of Khammarnia *et al.* compare with those presented here, since the theme of *Institutional integrity* is not one which maps easily onto any of the dimensions of the *Healthcare-OH* survey as it is not particularly clear what it comprises.

Comparisons can be made between the results of this study and of previous work utilising the same survey in the same context, however. As discussed earlier, previous attempts at linking *Healthcare-OH* data with performance markers, for a sample of trusts surveyed in 2012, found that SHMI was associated with *Patient Safety*, such that trusts scoring in the top quartile for this dimension of organisational health had a significantly lower mortality figures than those scoring in the bottom quartile ($p=0.02$).⁴⁷ Considering the same two metrics for the 2016 data used in this study, such a strong association is not found ($p=0.13$). It is unclear why this association is not consistent across the 2012 and 2016 datasets. It may be an artefact of the sample size of both studies but could also potentially relate to the limitations of considering data from a single time point. Trends between organisational health scores and existing performance measures may be observed best when considering longitudinal data across a

period of time and such a view has been proposed by other researchers when faced with mixed patterns of association in schooling.¹⁰⁶

Previous work also compared trust scores for the domain of *Finance & Investment* with financial ratings (categorical in nature) from Monitor and the Audit Commission.⁴⁷ These two organisations now operate under the auspices of NHS Improvement and more detailed (continuous) financial metrics were used in this study.

Ultimately, it could be argued that mixed results are to be expected when linking different measures in healthcare since it has been suggested that there exists a mismatch between many existing performance metrics, either in the aspects of output they consider or in their intrinsic validity as measures of performance.^{107,108} Many have concerns over the de-contextualisation of some outcome datasets and the inherent dangers if financial incentives are to be coupled to them.¹⁰⁹ Indeed, the use of a range of performance metrics is often favoured, in which the relative weaknesses of each is accepted but their combined use allows for a form of triangulation when it comes to assessments of healthcare quality. It follows that failing to find an association between a particular organisational health domain and every proxy outcome metric tested does not necessarily imply that there is no correlation with the underlying construct.

3.4.3 Limitations

Whilst the number of individual participants in this study was large (n=5412), analysis was performed at the level of the organisation itself and, with only fifteen trusts enrolled. Unfortunately, whilst more than fifty trusts expressed initial interest in participating in the

study, it often proved challenging to gain approval from a trust's Chief Executive, Director of Human Resources/Organisational Development and Audit Department in each case. Many trusts withdrew due to concerns over either the timing of the study or their participation in others which also involved staff surveys. The limited number of trusts recruited had a major impact not only on the power of the study but of the armamentarium of statistical tests available. With a smaller sample size such as this there is always the risk of finding statistically significant results that are not meaningful. If future studies involved the majority of trusts in the UK, multivariate regression could be used to further explore the relationship between *Healthcare-OH* scores and existing markers of healthcare performance. Such a regression model was not tested in this study due to the sample size and concerns over multicollinearity.

All trusts enrolled in the study volunteered to be involved and it could be argued that results presented here reflect self-selected organisations confident in their score, and that a larger range of organisational health measurements would be found if every trust in the country were to be involved – unmasking potential relationships not found in this sample.

As with all datasets obtained through the use of surveys, the *Healthcare-OH* data on organisational health is open to a number of different sources of error:

- Measurement error – resulting from deficiencies with the survey itself limiting data capture
- Coverage error – resulting from part of the population not being sampled
- Sampling error – since smaller samples yield less precise population estimates

- Non-response error – essentially an extension of coverage and sampling error, when the response of the population not sampled differs to that of the sample¹¹⁰

Attempts were made to limit each and are discussed below.

Within participating trusts, staff were invited to complete the study through means outside the control of the study team. Trusts were encouraged to invite all staff and given an invitation message (which could be sent out by email or SMS; see *Appendix B*) for this purpose. It is impossible to be certain as to the robustness of the methodology employed by each trust. Even if one is to suppose that staff were invited through messages sent out to trust-wide email lists, there remain issues with transient staff, such as junior doctors rotating through the trust on fixed term contracts, who may not be part of these distribution lists or who might not be allocated a trust email account. Furthermore, given recent data suggests that 40% of acute trusts contract out their support services, who as non-trust employees would also likely fall into the above circumstances, this introduces a potential further source of coverage error.¹¹¹

Considering the interface of the *Healthcare-OH* survey itself, responses are inputted by way of a seven point Likert-type fixed response scale. This outcome space was chosen, and kept consistent for each item, for ease of participant response. Whilst the development of the survey involved a series of pilot phases, with cognitive walkthroughs and multiple opportunities for participant feedback in the construction of item responses, there remains room for a degree of measurement error since on the occasion that participants chose to

embellish a particular response with qualitative information (in a free-text box at the end of the survey), it was not possible to factor these responses into the quantitative analysis.

An online WebApp was developed to house the survey in an attempt to increase accessibility for participants. Conversely, by making the survey accessible only online it could be argued that this pre-selects the more electronically enabled members of staff or perhaps disproportionately increases response rates from those with predominantly desk based jobs who are more likely to be seated at computer.

Regarding the sample size at each trust, a variety of different conditions have been proposed as being considered “acceptable” for use in survey research, including a confidence level between 80-99% and a level of sampling error $\pm 3-10\%$.¹¹⁰ In this study, confidence level was set at 95% and sampling error level noted to be $<10\%$ in all. It should be noted that if more stringent criteria for sampling error had been set, say at $\leq 5\%$, the number of trusts with sufficient same size would decrease dramatically from fifteen to five.

Given the low response rates encountered in some participating trusts, results are open to potential non-response error. As discussed in the previous chapter, when referencing the summary demographic table in *Figure 2-6*, there are inconsistencies between the demographic data of the sample considered in this analysis and the true population in terms of job role representation. Deviation in this case is small and, as with all instances of survey sampling, of unknown significance since it is impossible to know how the proportion of the population who did not participate in the survey would have responded. When considering the risk of non-response error, one has the option to use weighting to adjust results based on

whole population demographics. The decision was taken not to weight results due to the high proportion of participants who chose not to leave demographics when completing the survey (38.9%). Weighting results by demographics would omit these participants from the study and overzealously reduce the sample size of the study.

Finally, limitations both in the choice of certain existing performance metrics as proxies and within these external datasets themselves are other potential confounding factors in the results presented here. When external datasets are linked to *Healthcare-OH* data, assumptions are made as to the validity of these datasets, yet it would be naïve to think any are without their own flaws. These include known weaknesses in figures such as SHMI, which is based on HES data known to be inaccurate,¹¹² and the fundamental validity of surveys such as the NSSS and CQC Adult Inpatient Survey, given data on their internal structure is either non-existent or not readily available in the public domain. When considering workforce mix data points considered were ratio of staff roles, in an attempt to control for trust size. This was a logical step taken by the research team but whilst personnel ratios are often considered in the management literature,¹¹³ their use in this context is not without potential criticism. Similarly, data points mined from the NRLS database were proportional in nature (as opposed to raw numbers) but evidence on reporting rates themselves being an accurate measure of patient safety remains elusive.^{114,115}

3.4.4 Conclusion

This study offers a broad and systematic approach to the external validation of the *Healthcare-OH* survey considered construct-by-construct. Whilst the majority of dimensions were found to be closely associated to existing markers of performance, results were mixed

and limited evidence was found to support the external validity of the themes of *Communication* and *Efficiency*, suggesting either the poor selection of external metrics or the possible need to revise survey items to increase their clinical utility. Yet it is this inability to directly match aspects of organisational health to existing performance markers that encapsulates the rationale for its measurement using the *Healthcare-OH* survey – since it affords trusts the ability to characterise crucial, yet until now, nebulous and somewhat intangible elements such as organisational resilience and communication. Whilst it could also be reasoned that failure to correlate all findings against existing outcome measures diminishes the clinical utility of *Healthcare-OH* measurements, this merely potentiates the present fixation on down-stream results and short term targets. In the future, organisational health measurements, particularly if performed serially and on a large scale, could provide invaluable information for trusts on their relative strengths (and indeed weaknesses) and unearth previously unseen opportunities for targeted organisational change.

Work presented in **Section I** (*Chapters 1-3*) has already discussed how organisational health within the healthcare sector consists of eight interlinking elements (*Strategy, Resilience, Leadership & Management, Staff Wellbeing, Finance & Investment, Patient Safety, Efficiency and Communication*) and has demonstrated that the measurement of organisational health within acute NHS trusts correlates with a host of existing performance metrics: with the ‘healthiest’ hospitals reporting significantly better patient outcomes.

Whilst this provides a body of evidence to support the application of organisational health within the acute sector, if the concept of organisational health is to be truly applied within healthcare organisations, work must extend to other healthcare settings. When changing

healthcare context, we must begin with a fundamental re-examination of definitions before considering measurement. This will be explored in **Section II**, beginning with the use of *Healthcare-OH* survey in the setting of private sector healthcare organisations.

SECTION II

ORGANISATIONAL HEALTH WITHIN NEW HEALTHCARE

CONTEXTS

Chapter 4 Organisational health and independent sector healthcare organisations

Chapter 5 Defining a healthy organisation in primary care: a qualitative interview study

Chapter 6 The *GP-OH* survey: the development and validation of a novel instrument to
measure organisational health in general practice

Chapter 4: Organisational health and independent sector healthcare organisations

4.1 Introduction

This chapter aims to measure organisational health in the setting of independent sector healthcare providers and so answer **RESEARCH QUESTION 4: Can organisational health be measured in independent sector healthcare organisations?**

In this study, as with the two chapters which have preceded it, the *Healthcare-OH* survey will be utilised. However, to date, all attempts at validity testing of this instrument have been confined to the context of acute NHS trusts. To this end, and importantly to permit the comparison of organisational health latent sum scores obtained using the *Healthcare-OH* survey from different healthcare contexts, the measurement invariance of the survey must be established – meaning it must be investigated as to whether scores obtained using *Healthcare-OH*, as a measure, are equivalent across both the independent and public sector.

This study sets out to measure organisational health within independent healthcare organisations in the UK and juxtapose this with contemporaneous data taken from NHS healthcare organisations. Comparative measurement and analysis in this way is novel and has the potential of opening up a two-way learning process for the ultimate benefit of both NHS and independent sector healthcare organisations.

The objectives of this study are therefore sequential, seeking to:

- 1 – replicate and test the existing factor structure of the *Healthcare-OH* survey in the context of independent sector healthcare organisations
- 2 – assess the measurement invariance of the *Healthcare-OH* survey in this context
- 3 – compare latent sum scores of organisational health between independent and public sector healthcare organisations in the UK

4.2 Methods

4.2.1 Sample

Independent sector healthcare organisations are not homogenous entities and can be further divided into private sector healthcare organisations, run ‘for-profit’, and third-sector healthcare organisations which, in contrast, are run ‘not-for-profit’. The majority of third-sector healthcare organisations’ business strategies involve seeking to maximise their profits before re-investing them internally (generally by improving services to consolidate or enhance their space in the market) and will largely be considered alongside private sector healthcare organisations.

Independent sector healthcare providers in both the private sector and third-sector were contacted to enrol in the study. Organisations were approached for participation through email communication with senior, board level, staff members. Given the exploratory nature of this project, anonymity was offered to each participating independent sector healthcare provider (ISP) and they will not be named nor intentionally made identifiable in anything which follows here. No incentives were offered for participation but enrolled ISPs were sent a copy of their results with inclusion of anonymised data from all other healthcare organisations completing the survey at the same time for benchmarking purposes.

Research Ethics Committee review was not required since this study is classified as a *service evaluation* project under NRES guidelines.

4.2.2 Healthcare-OH survey

To measure organisational health, the *Healthcare-OH* survey was utilised. Its use has already been described in *Sections 2.2.2* and *3.2.1*. It was again accessed using a dedicated and multiplatform compatible WebApp housed at <http://healthy-hospitals.org/>. Data was collected between April and September 2016 and held on a secure server within Imperial College London.

4.2.3 Statistical analyses

Analysis was performed using IBM SPSS version 22 (Armonk, NY, USA) for data cleaning and graphical output and Mplus (version 7.4 for Mac, Muthén and Muthén, 1998-2015) for all modelling. MLR estimation was used for all models and was chosen given it is robust both to non-normality and missing data – as is anticipated for survey datasets.⁶³

Previous work into the dimensionality of the *Healthcare-OH* survey in NHS public sector healthcare organisations (presented in *Chapter 2*) found an eight factor structure with acceptable fit (RMSEA 0.03, CFI 0.87, SRMR 0.06) with each factor representing one of the main themes of organisational health: *Strategy, Resilience, Leadership & Management, Staff Wellbeing, Finance & Investment, Patient Safety, Efficiency* and *Communication*. The path diagram for this is found in *Figure 2-4*, reproduced below.

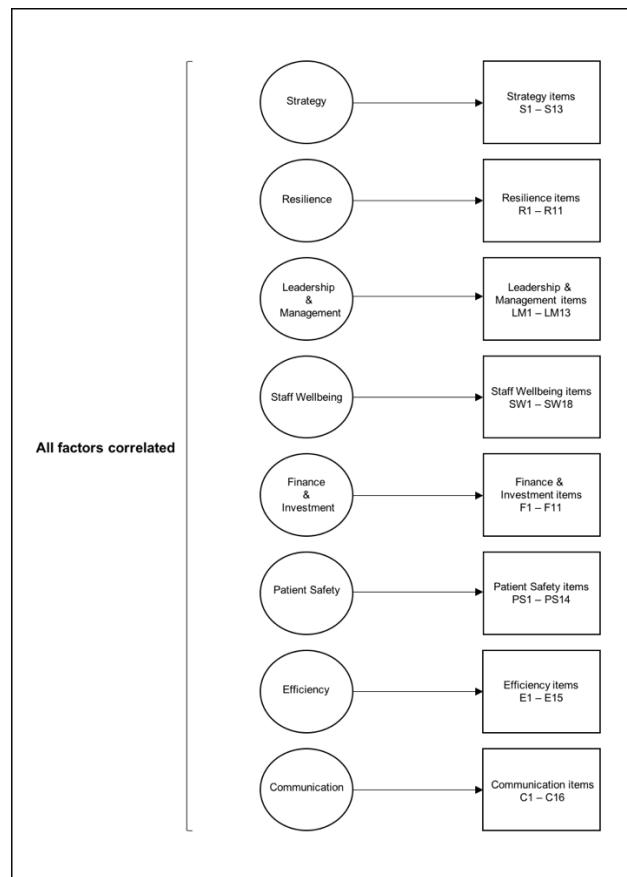


Figure 2-4 – Eight factor model for *Healthcare-OH* survey

Analysis began by testing the fit of this hypothesis's eight factor model to the dataset obtained from ISPs using CFA. Model fit was evaluated using the conventional goodness-of-fit indices: RMSEA, CFI and SRMR,⁶⁴ with "good fit" for these indices taken at $RMSEA \leq 0.05$, $CFI \geq 0.90$ and $SRMR \leq 0.08$.^{65,66} Factor reliability was assessed using model-based Omega (ω), as in *Chapter 2*.^{68,69}

The best fitting CFA model for the data was taken forwards for invariance testing.

For purposes of comparison, the nationwide acute NHS sector *Healthcare-OH* dataset was used (n=5412). This data was collected contemporaneously to the ISP data and has been explored in detail previously in *Chapters 2 and 3*.

Evaluation of measurement invariance combined the nationwide and ISP datasets and utilised multiple group CFA within Mplus. To permit comparison of latent scores across groups, it is necessary to establish configural, metric and scalar invariance, which are run in sequence. In keeping with recommended practice,¹¹⁶ a series of nested models was tested, beginning with the least restrictive configural model:

- The configural model allows each parameter (be it item factor loading, intercept or mean) to vary (commonly described as “freed”) across different samples. Essentially, it runs both datasets (referred to as “groups”) within the same structural model and so questions whether the survey is measuring a similar latent construct (or indeed series of constructs) in each group.
- The metric invariance model constrains factor loadings across both groups and questions whether the survey is measuring this construct in comparable units of measure.
- The scalar invariance model constrains both factor loadings and item intercepts and is required for comparison of item means. It questions whether the meaning of the construct and the levels of the individual items within the survey are equal across both groups.

The fit of each invariance model was evaluated using the indices noted above. When evaluating the comparative fit of nested models, differences in fit were evaluated using chi-squared change ($\Delta\chi^2$) using the Satorra-Bentler scaling correction for MLR.⁶⁷

Given each sequential model is more constrained than the last, $\Delta\chi^2$ is examined to assess if the fit of the constrained model demonstrates equivalence such that it is not significantly worse than the less restrictive model which preceded it. Since chi-squared test remains sensitive to sample size, differences in model fit were also held to a change in CFI<0.01 and a change in RMSEA<0.015.¹¹⁷ If a constrained model is found to fit significantly worse than its predecessor, modification indices are examined in an attempt to identify the least invariant item. This is then freed (i.e. it is allowed to be non-invariant across both groups) and the model is run again. This process proceeds in an iterative manner until the requirements of fit are met and allows partial measurement invariance to be established.¹¹⁸ Items whose loadings were found to be non-invariant in one model were not tested in subsequent models.¹¹⁶

Comparisons were then made between the latent sum scores for each theme of organisational health in the ISP dataset and the contemporaneous data, collected in an identical fashion, from NHS trusts in England, presented in detail in the previous chapter (*Chapter 3*).

4.3 Results

4.3.1 Sample description

Five ISPs were recruited to participate: four in the private sector and one in the third-sector (and registered as a charity). All participating hospitals are based in urban centres and, when considering other hospitals in the independent sector, are large in size, with the provision of more than fifty inpatient beds in each case. During the data collection window (April through September 2016), 593 participants completed the survey. Participation rate ranged from 11-42% (*Figure 4-1*).

Trust	n	Response rate (%)	% Sampling error (at 95% Confidence)
ISP1	234	41.8	4.9
ISP2	91	10.5	9.8
ISP3	91	16.3	9.4
ISP4	81	17.3	9.9
ISP5	96	19.6	8.9

Figure 4-1 – Participants grouped by healthcare provider (denoted ISP1-5 to preserve anonymity) showing response rate and associated level of sampling error

Participant demographics are tabulated in *Figure 4-2*. Since these questions are optional (in an attempt to offer an additional level of anonymity for participants), raw numbers do not sum for the total sample size. Response rate for demographic information varied: 63% of participants gave information regarding the length of their employment whilst only 58% of participants listed their job role or the department they worked in.

Figure 4-3 displays descriptive statistics for each item in the *Healthcare-OH* survey. As with the data presented in *Figure 2-7*, negatively phrased items (e.g. item F2: *Money is wasted*) have been reverse scored prior to tabulation.

4.3.2 Missing data

Figure 4-3 also lists item skip rate, which was seen to range from 7.6-38.3%. Whilst skip rate increased with progression through the survey (consistent with a degree of survey fatigue), the item with the highest skip rate was also the item with the largest proportion of 'not applicable' responses and represents a more department specific, and potentially context specific question (*E6: Patients wait a long time for emergency surgery*).

Figure 4-2 – Participant demographics for survey of independent sector healthcare providers

Gender		
	n	%
Female	251	68.4
Male	116	31.6
Total	367	100
Age		
	n	%
21-30 years	61	16.4
31-40 years	113	30.3
41-50 years	111	29.8
51-60 years	74	19.8
61-70 years	14	3.8
Total	373	100
Length of employment		
	n	%
Less than 1 year	66	17.6
1-2 years	69	18.4
3-5 years	81	21.7
6-10 years	83	22.2
11-20 years	57	15.2
More than 20 years	18	4.8
Total	374	100
Department		
	n	%
Medicine	47	13.7
Surgery	64	18.7
Anaesthetics	7	2.0
Corporate (Finance/HR)	61	17.8

Domestic	17	5.0
Emergency Department	11	3.2
ICT	5	1.5
Paediatrics	5	1.5
Medical records	3	0.9
Obstetrics and Gynaecology	14	4.1
Occupational Therapy	3	0.9
Outpatient Department	42	12.2
Pharmacy	8	2.3
Physiotherapy	16	4.7
Radiology	20	5.8
Speech and Language Therapy	4	1.2
Support (e.g. security/porters/estates)	16	4.7
Total	343	100
Job Role	n	%
Consultant	4	1.2
Midwife	8	2.3
Matron/Nurse Consultant	3	0.9
Staff Nurse	72	21.0
Sister/Nurse Specialist	33	9.6
Occupational Therapist	3	0.9
Operating Department Practitioner	3	0.9
Pharmacist	6	1.7
Psychologist/Psychotherapist	13	3.8
Radiographer	10	2.9
Speech and Language Therapist	3	0.9
Health Care Assistant	16	4.7
Healthcare Scientist	3	0.9
Middle Management (Band 5-7)	41	12.0
Senior Management (Band 8+)	29	8.5
Very Senior Management/Director	3	0.9
Administration (e.g. Secretary/PA/Clerk)	41	12.0
Clinical Support Staff (e.g. Phlebotomist/Social Worker)	4	1.2
Corporate services (eg Finance/HR)	24	7.0
Domestic (e.g. Catering/Housekeeper)	13	3.8
Estates	3	0.9
Support (e.g. Security/Porters)	6	1.7
Dentist	2	0.6
Total	343	100

Figure 4-3 – Descriptive statistics for survey of independent sector healthcare providers

Ref	Item	Mean	Median	Mode	SD	n	skipped	N/A
S1	Everyone is committed to a common goal	5.34	6	7	1.60	546	47	7
S2	Management and clinical teams work closely together	4.90	5	6	1.78	537	56	22
S3	Management and clinical teams have the same aims	4.84	5	6	1.82	538	55	20
S4	Everyone has the shared value of delivering high quality care	5.50	6	7	1.64	547	46	5
S5	The strategic direction of this organisation is not clear	4.82	5	7	1.99	537	56	22
S6	The strategic direction of this organisation is not realistic	5.02	5	7	1.85	533	60	29
S7	I am frequently reminded of the mission / vision statement	4.88	5	6	1.80	539	54	18
S8	Where I work, people put the patients first	5.96	6	7	1.49	541	52	15
S9	Where I work, people understand why we are here	5.69	6	7	1.63	548	45	3
S10	I put the needs of the patients above everything else	6.33	7	7	1.16	533	60	29
S11	There is friction or confrontation within my team	4.92	6	7	2.12	526	67	43
S12	There is friction or confrontation with other departments or teams	4.49	5	7	1.95	531	62	34
S13	We have different aims from the other departments or teams we work with	4.42	4	7	1.99	536	57	25
R1	It attracts the best quality nurses	4.85	5	6	1.71	503	90	35
R2	It attracts the best quality doctors	5.38	6	6	1.48	504	89	33
R3	It attracts the best quality clerical and secretarial staff	4.65	5	4	1.61	511	82	20
R4	It has a good reputation for administration and management	4.64	5	6	1.74	516	77	9
R5	It lacks a long term strategic plan	4.75	5	7	1.88	507	86	27
R6	It lacks a long term financial plan	4.94	5	7	1.84	502	91	37
R7	It is not very innovative	5.00	6	7	1.91	514	79	14
R8	It rarely puts new things in place to improve quality	5.06	6	7	1.95	516	77	11
R9	If there was a sudden unforeseen incident e.g. fire, deep snowfall or power cut, it would cope very well	4.87	5	6	1.70	513	80	16
R10	If there as a sudden major medical incident e.g. multiple casualties or influenza pandemic, it would cope very well	4.73	5	6	1.78	504	89	33
R11	If there was a sudden change in legislation e.g. a cut in funding, it would cope very well	4.34	5	5	1.85	499	94	43
LM1	I feel well supported by my manager*	5.29	6	6	1.89	505	88	2
LM2	I feel motivated by my manager*	5.19	6	7	1.94	505	88	2

LM3	My manager* praises good work	5.31	6	7	1.85	505	88	2
LM4	My manager* sets clearly defined objectives	5.34	6	6	1.70	505	88	2
LM5	I trust the senior managers to make the right decisions	4.90	5	6	1.85	505	88	2
LM6	The senior managers are approachable	5.21	6	6	1.80	505	88	2
LM7	The senior managers drive staff motivation	4.57	5	6	2.04	505	88	2
LM8	The senior managers have had little experience of patient care	4.81	5	7	1.94	486	107	39
LM9	Leaders in this organisation have a vision	5.21	6	6	1.62	502	91	7
LM10	Leaders appreciate staff	4.89	5	6	1.91	504	89	4
LM11	Leaders are committed to innovation	5.09	5	6	1.68	503	90	6
LM12	Leaders create a positive environment	4.80	5	6	1.88	505	88	2
LM13	Clinical staff are involved in leadership	4.85	5	6	1.76	478	115	54
SW1	I find my work challenging	5.10	6	6	1.69	495	98	2
SW2	I am bored at work	5.91	7	7	1.58	481	112	30
SW3	I am unhappy with my work	5.63	7	7	1.75	485	108	22
SW4	I lack sufficient appraisal or feedback meetings to review my performance	5.23	6	7	1.92	483	110	26
SW5	The right staff are in the right place	4.39	5	6	1.86	491	102	10
SW6	The right people are appointed rather than someone to fill a post	4.34	5	6	1.91	490	103	12
SW7	People are appointed because they really want to do that job	4.44	5	6	1.74	486	107	20
SW8	People act in a professional manner	5.30	6	6	1.53	494	99	4
SW9	It is difficult to get time off to attend training / education courses	5.04	6	7	1.99	482	111	28
SW10	Training and education is a low priority	5.30	6	7	1.91	485	108	22
SW11	My daily workload is not achievable	5.18	6	7	1.81	486	107	20
SW12	I feel overly stressed	5.11	6	7	1.90	487	106	17
SW13	Patients here are treated with dignity	6.21	7	7	1.16	490	103	12
SW14	Patients have faith in this organisation	5.97	6	7	1.27	490	103	12
SW15	People here lack the right attitude to work with patients	5.56	6	7	1.85	483	110	26
SW16	If a close family member / friend needed medical care I would bring them here	5.55	6	7	1.72	488	105	16
SW17	There is too great a reliance on agency / locum staff	4.03	4	4	1.92	473	120	47
SW18	There is too great a reliance on bank staff	3.80	4	4	1.91	475	118	43

F1	Money is wasted	4.35	4	7	1.89	469	124	37
F2	Money is used in the wrong areas	4.24	4	4	1.88	468	125	39
F3	People who manage the budget lack contact with clinical areas	4.20	4	4	2.00	456	137	67
F4	People here are compensated adequately for the job they do	3.84	4	4	1.84	481	112	12
F5	There is enough money invested in computer systems and technology	3.67	4	1	2.00	477	116	20
F6	There is enough money invested in patient care and clinical equipment	4.92	5	6	1.71	471	122	33
F7	There is enough money invested in buildings and renovations	5.09	6	6	1.77	476	117	22
F8	There is money available for innovation or new ideas	4.54	5	6	1.68	469	124	37
F9	People understand the cost of the equipment or tests they use	4.10	4	4	1.84	466	127	44
F10	All changes made are to cut costs	4.54	5	4	1.87	469	124	37
F11	Money saving ideas are not listened to	4.81	5	4	1.72	463	130	51
PS1	Absenteeism is a problem in this organisation	4.90	5	6	1.72	471	122	21
PS2	People take lots of sick leave where I work	5.25	6	7	1.73	474	119	14
PS3	Mistakes / critical incidents are reported here	5.86	6	6	1.29	469	124	25
PS4	Mistakes / critical incidents are learned from here	5.50	6	6	1.54	468	125	27
PS5	It is encouraged to report mistakes / critical incidents	5.93	6	6	1.31	475	118	12
PS6	Changes are made as a result of mistakes / critical incidents happening	5.54	6	6	1.39	469	124	25
PS7	There are sufficient nurses to look after patients out of hours (nights & weekends)	4.63	5	6	1.78	429	164	125
PS8	There are sufficient doctors to look after patients out of hours (nights & weekends)	4.89	5	6	1.67	427	166	131
PS9	There are sufficient nurses to look after patients during weekdays	4.94	5.5	6	1.78	436	157	105
PS10	There are sufficient doctors to look after patients during weekdays	5.18	6	6	1.58	434	159	111
PS11	There is a weak safety culture here	5.60	6	7	1.61	468	125	27
PS12	We lack regular meetings to discuss the mistakes / critical incidents reported	4.89	6	7	2.01	466	127	31
PS13	Patient safety is prioritised by management	5.52	6	6	1.60	468	125	27
PS14	There is a 'no blame' culture here	4.17	4	6	2.09	467	126	29
E1	It is haphazard and things work out by chance rather than by proper planning	5.18	6	7	1.77	462	131	21
E2	There are often last minute changes to staffing	4.13	4	7	1.99	449	144	51
E3	This organisation is efficient	4.95	5	6	1.64	471	122	2
E4	The processes in place are archaic and based on historical changes	4.52	4.5	4	1.77	458	135	30

E5	There are frequent cancellations in the operating theatres	5.29	5	7	1.52	369	224	327
E6	Patients wait a long time for emergency surgery	5.63	6	7	1.54	366	227	342
E7	There are delays in discharging patients	4.63	5	7	1.87	387	206	246
E8	Patient's notes are often unavailable	5.56	6	7	1.56	396	197	211
E9	Decisions are made based on patient care data collected	4.54	4	4	1.60	407	186	171
E10	Quality of patient care data collected is fed back to staff	4.81	5	6	1.66	424	169	118
E11	There is accurate data collected to assess the quality of patient care	4.72	5	6	1.62	424	169	118
E12	Innovations to help patients e.g. text messaging are embraced	3.99	4	4	1.79	412	181	155
E13	There are too many senior managers	4.38	5	4	1.83	456	137	35
E14	There are too many junior / middle managers	4.62	5	4	1.79	453	140	42
E15	There is too much bureaucracy to get something done	4.01	4	4	2.03	461	132	23
C1	Information flows from frontline staff up to Board level	4.12	4	4	1.83	457	136	19
C2	Information flows from the Board to all levels of the organisation	4.48	5	6	1.82	456	137	22
C3	There is transparency so it is easy to see what is being planned by the organisation	4.04	4	6	1.89	459	134	15
C4	Senior staff communicate with their teams in person	4.74	5	6	1.85	462	131	8
C5	Communication between nurses and doctors is poor	5.50	6	7	1.50	413	180	136
C6	Communication between medical staff and patients is poor	5.64	6	7	1.49	423	170	106
C7	Communication between medical staff and management staff is poor	5.22	6	7	1.64	421	172	112
C8	Patients with communication challenges e.g. deafness or non-native speaking are well catered for	4.95	5	6	1.68	425	168	100
C9	People here are polite to patients	6.12	6	7	1.17	462	131	8
C10	People here ignore patients	6.47	7	7	1.08	457	136	19
C11	People here talk in their own languages excluding others	4.92	5	7	1.96	458	135	17
C12	Patient complaint information is regularly fed back to staff	4.92	6	6	1.88	453	140	28
C13	Thank you or praise from patients is regularly fed back to staff	5.16	6	6	1.81	456	137	22
C14	There are inconsistent messages from senior levels	4.54	4.5	7	1.91	458	135	17
C15	Decisions are made behind closed doors	3.88	4	2	1.95	452	141	31
C16	Information is out of date by the time I get it	5.15	6	7	1.75	449	144	38
*manager means your line manager or nurse manager, or Consultant if you are a doctor								

4.3.3 Healthcare-OH dimensionality (CFA)

The results of the eight-factor CFA model are found in *Appendix C1* and illustrated in *Figure 4-4*. Correlations between each of the eight factors are listed in *Figure 4-5* (for purposes of clarity) and reliability estimates are tabulated in *Figure 4-6*. The table in *Appendix C1* includes both unstandardised factor loadings (B) and standardised loadings (β). R^2 represents the proportion of explained variance an item derives from its corresponding factor – for example, 71% of the variance of item *LM5: I trust the senior managers to make the right decisions* is explained by the factor *Leadership & Management*. Fit of this model was acceptable with RMSEA 0.033 (90% confidence interval 0.032-0.034, probability RMSEA <0.05 = 1.00), CFI 0.853 and SRMR 0.072.

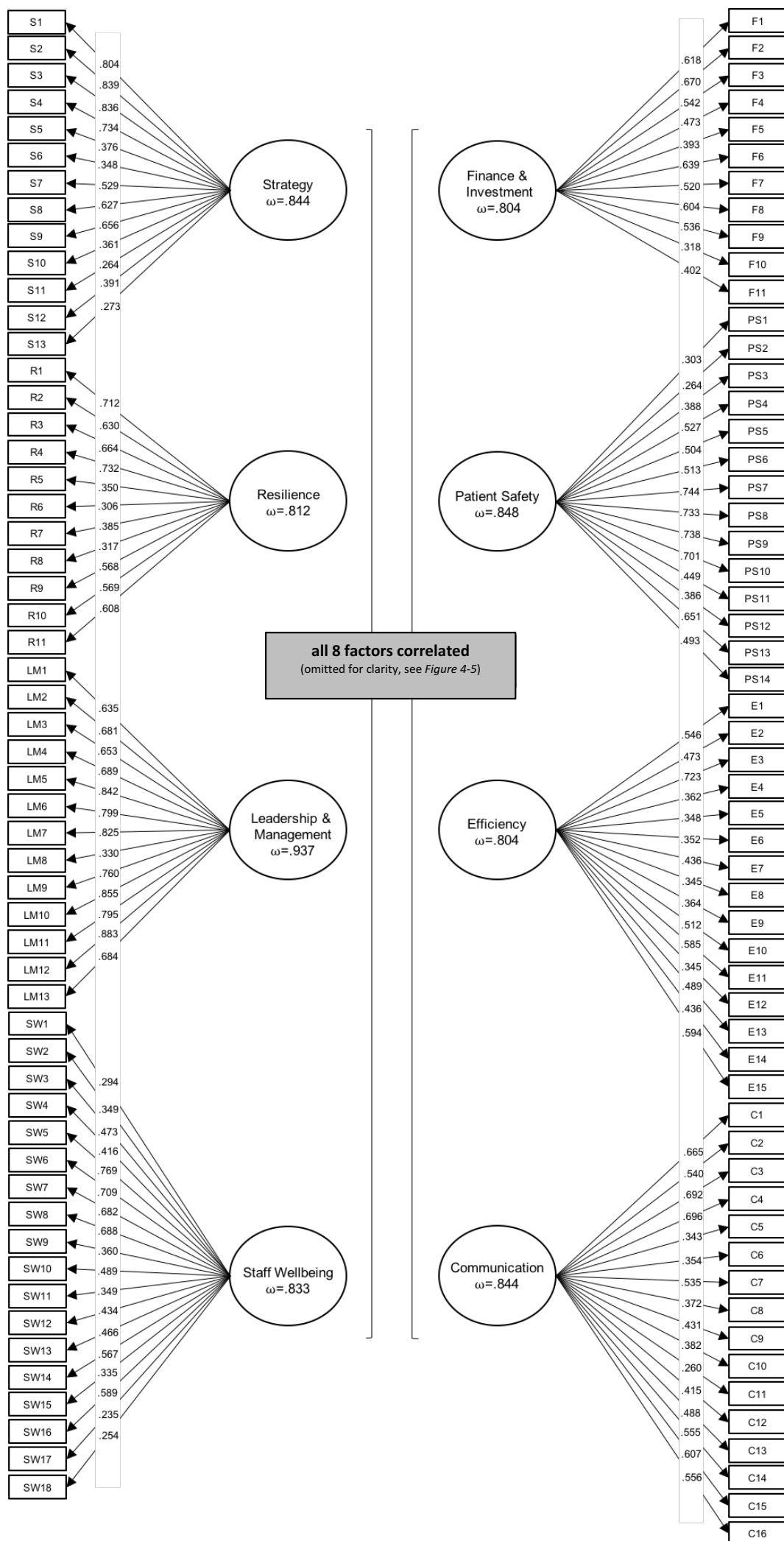


Figure 4-4 – CFA for eight factor model (Items denoted by Ref, standardised factor loading (β) denoted by unidirectional arrow, ω = omega)

Latent construct	Strategy	Resilience	Leadership & Management	Staff Wellbeing	Finance & Investment	Patient Safety	Efficiency
Strategy							
Resilience	0.89 (0.02)						
Leadership & Management	0.85 (0.02)	0.80 (0.02)					
Staff Wellbeing	0.81 (0.02)	0.87 (0.02)	0.85 (0.02)				
Finance & Investment	0.74 (0.03)	0.81 (0.03)	0.75 (0.03)	0.80 (0.03)			
Patient Safety	0.72 (0.04)	0.76 (0.03)	0.74 (0.03)	0.78 (0.04)	0.76 (0.03)		
Efficiency	0.79 (0.03)	0.83 (0.03)	0.80 (0.03)	0.88 (0.02)	0.95 (0.03)	0.81 (0.03)	
Communication	0.83 (0.02)	0.84 (0.03)	0.89 (0.02)	0.89 (0.02)	0.86 (0.03)	0.86 (0.03)	0.93 (0.03)

Figure 4-5 – CFA for eight factor model: correlations between factors (standard error in parenthesis; all $p < 0.01$)

Latent construct	Determinant	ω	SE
Strategy	0.96	0.85	0.01
Resilience	0.95	0.81	0.01
Leadership	0.97	0.94	0.00
Staff Wellbeing	0.95	0.83	0.01
Finance	0.94	0.80	0.01
Patient Safety	0.94	0.85	0.01
Efficiency	0.96	0.80	0.01
Communication	0.97	0.84	0.01

Figure 4-6 – Reliability of factors within eight factor model (ω = omega, SE = standard error)

4.3.4 Measurement invariance analysis (multiple group CFA)

The extent to which this CFA model exhibits measurement invariance between the NHS and private sector was then examined. The nationwide acute NHS sector *Healthcare-OH* dataset (as collected in *Chapter 2*) served as the reference group in all invariance models. As described above, a configural invariance model was run first, in which models were estimated simultaneously in each group, with factor means pre-specified at 0 and factor variance pre-specified as 1. Residual covariance (entered as “WITH” statements in MPlus syntax) were also estimated in each group as per the original CFA model. As can be seen in *Figure 4-7*, the configural model demonstrated good fit (RMSEA 0.031, CFI 0.866, SRMR 0.065) and so a series of constraints were then imposed in successive models to examine potential decreases in fit resulting from measurement non-invariance.

Between group equality of item factor loadings were examined in a metric invariance model (*Model 2a* in *Figure 4-7*), with factor variance pre-specified at 1 in the NHS group but freely estimated in ISP group (factor means were still fixed to 0 in both groups). All factor loadings were constrained to be equal across both groups. This first metric invariance model fit well (RMSEA 0.031, CFI 0.865, SRMR 0.066) but $\Delta\chi^2$ demonstrated a significantly poorer fit relative to the configural model (rescaled $\Delta\chi^2$ 211.705, Δdf 103, $p=0.000$). Modification indices were then inspected to identify potential changes to improve model fit. Using these indices as a guide, a series of further models were run in which items were successively freed, iteratively, until the constrained model demonstrated equivalence (such that it is not significantly worse than the less restrictive configural model which preceded it). This was *Model 2n* (RMSEA 0.031, CFI 0.866, SRMR 0.066, rescaled $\Delta\chi^2$ 112.654 Δdf 90 $p=0.051$) and the individual model changes can be seen in *Models 2b-2m* in *Figure 4-7*.

Having achieved partial metric invariance, the between group equality of item intercepts were examined in a scalar invariance model (*Model 3a* in *Figure 4-7*), with factor mean fixed at 0 and factor variance fixed at 1 in the NHS group but freely estimated in the ISP group. Item intercepts were now constrained to be equal across both groups. The scalar invariance *Model 3a* demonstrated good fit (RMSEA 0.031, CFI 0.864, SRMR 0.066) but showed a significant decrease in fit relative to the metric invariance model (rescaled $\Delta\chi^2$ 400.145, Δdf 90, $p=0.000$). Having again consulted modification indices, a series of partial scalar invariance models were examined, with the intercept for individual items allowed to differ between groups improving the fit of successive models (*Models 3b-3ad* in *Figure 4-7*) until partial scalar invariance *Model 3ae* reached equivalence to the preceding partial metric model (RMSEA 0.031, CFI 0.865, SRMR 0.065, rescaled $\Delta\chi^2$ 79.001 Δdf 60 $p=0.051$). The parameters for *Model 3ae* are listed in full in *Appendix C2*.

Figure 4-7 – Fit indices for eight factor single order and higher order models (χ^2 = chi-squared, df = degrees of freedom, RMSEA = root mean square error approximation, CI = confidence interval, CFI = comparative fit index, SRMR = standardised root mean square residual, MLR = robust maximum likelihood estimation)

Model description	χ^2			RMSEA			CFI	SRMR	Satorra-Bentler			
	Estimate	df	p-value	Estimate	CI	Probability <0.05			MLR scaling factor	rescaled $\Delta\chi^2$ [vs previous model]	Adf	p-value
1. Configural model	34355.363	11622	0.000	0.031	(0.031-0.032)	1.00	0.866	0.065	1.1312		n/a	
2a. Metric model	34569.845	11725	0.000	0.031	(0.031-0.032)	1.00	0.865	0.066	1.1309	211.705	103	0.000
2b. Partial metric (as above AND now with item F9 freed)	34559.031	11724	0.000	0.031	(0.031-0.032)	1.00	0.865	0.066	1.1309	200.618	102	0.000
2c. Partial metric (as above AND now with item SW13 freed)	34549.696	11723	0.000	0.031	(0.031-0.032)	1.00	0.865	0.066	1.1309	191.051	101	0.000
2d. Partial metric (as above AND now with item S10 freed)	34541.822	11722	0.000	0.031	(0.031-0.032)	1.00	0.865	0.066	1.1309	182.987	100	0.000
2e. Partial metric (as above AND now with item E7 freed)	34532.612	11721	0.000	0.031	(0.031-0.032)	1.00	0.865	0.066	1.1309	173.540	99	0.000
2f. Partial metric (as above AND now with item R8 freed)	34525.099	11720	0.000	0.031	(0.031-0.032)	1.00	0.865	0.066	1.1309	165.840	98	0.000
2g. Partial metric (as above AND now with item SW5 freed)	34517.344	11719	0.000	0.031	(0.031-0.032)	1.00	0.865	0.066	1.1309	157.886	97	0.000
2h. Partial metric (as above AND now with item S3 freed)	34509.778	11718	0.000	0.031	(0.031-0.032)	1.00	0.865	0.066	1.1310	151.585	96	0.000
2i. Partial metric (as above AND now with item S2 freed)	34501.778	11717	0.000	0.031	(0.031-0.032)	1.00	0.865	0.066	1.1310	143.443	95	0.001
2j. Partial metric (as above AND now with item PS8 freed)	34494.909	11716	0.000	0.031	(0.031-0.032)	1.00	0.865	0.066	1.1310	136.454	94	0.003
2k. Partial metric (as above AND now with item S12 freed)	34485.558	11715	0.000	0.031	(0.031-0.032)	1.00	0.865	0.066	1.1310	131.015	93	0.006
2l. Partial metric (as above AND now with item PS7 freed)	34482.950	11714	0.000	0.031	(0.031-0.032)	1.00	0.866	0.066	1.1310	124.288	92	0.014
2m. Partial metric (as above AND now with item C3 freed)	34476.830	11713	0.000	0.031	(0.031-0.032)	1.00	0.866	0.066	1.1310	118.058	91	0.030
2n. Partial metric (as above AND now with item C7 freed)	34471.520	11712	0.000	0.031	(0.031-0.032)	1.00	0.866	0.066	1.1310	112.654	90	0.051
3a. Scalar invariance	34857.648	11802	0.000	0.031	(0.031-0.032)	1.00	0.864	0.066	1.1301	400.145	90	0.000
3b. Partial scalar invariance (as above AND now with item R11 freed)	34832.626	11801	0.000	0.031	(0.031-0.032)	1.00	0.864	0.066	1.1301	372.714	89	0.000
3c. Partial scalar invariance (as above AND now with item R2 freed)	34805.086	11800	0.000	0.031	(0.031-0.032)	1.00	0.864	0.066	1.1301	342.406	88	0.000
3d. Partial scalar invariance (as above AND now with item E8 freed)	34781.799	11799	0.000	0.031	(0.031-0.032)	1.00	0.864	0.066	1.1301	316.789	87	0.000
3e. Partial scalar invariance (as above AND now with item SW14 freed)	34760.783	11798	0.000	0.031	(0.031-0.032)	1.00	0.864	0.066	1.1301	293.660	86	0.000
3f. Partial scalar invariance (as above AND now with item PS14 freed)	34747.069	11797	0.000	0.031	(0.031-0.032)	1.00	0.864	0.066	1.1301	278.676	85	0.000

3g. Partial scalar invariance (as above AND now with item C11 freed)	34733.865	11796	0.000	0.031	(0.031-0.032)	1.00	0.865	0.066	1.1302	264.000	84	0.000
3h. Partial scalar invariance (as above AND now with item F11 freed)	34722.501	11795	0.000	0.031	(0.031-0.032)	1.00	0.865	0.066	1.1302	251.723	83	0.000
3i. Partial scalar invariance (as above AND now with item E5 freed)	34711.102	11794	0.000	0.031	(0.031-0.032)	1.00	0.865	0.066	1.1302	239.383	82	0.000
3j. Partial scalar invariance (as above AND now with item E6 freed)	34694.697	11793	0.000	0.031	(0.031-0.032)	1.00	0.865	0.066	1.1302	221.441	81	0.000
3k. Partial scalar invariance (as above AND now with item P51 freed)	34684.704	11792	0.000	0.031	(0.031-0.032)	1.00	0.865	0.066	1.1302	210.609	80	0.000
3l. Partial scalar invariance (as above AND now with item E12 freed)	34675.302	11791	0.000	0.031	(0.031-0.032)	1.00	0.865	0.066	1.1302	200.413	79	0.000
3m. Partial scalar invariance (as above AND now with item P510 freed)	34667.844	11790	0.000	0.031	(0.031-0.032)	1.00	0.865	0.066	1.1302	192.370	78	0.000
3n. Partial scalar invariance (as above AND now with item P59 freed)	34648.015	11789	0.000	0.031	(0.031-0.032)	1.00	0.865	0.065	1.1302	170.446	77	0.000
3o. Partial scalar invariance (as above AND now with item P52 freed)	34638.649	11788	0.000	0.031	(0.031-0.032)	1.00	0.865	0.065	1.1303	161.162	76	0.000
3p. Partial scalar invariance (as above AND now with item SW4 freed)	34632.065	11787	0.000	0.031	(0.031-0.032)	1.00	0.865	0.065	1.1303	154.100	75	0.000
3q. Partial scalar invariance (as above AND now with item S6 freed)	34625.735	11786	0.000	0.031	(0.031-0.032)	1.00	0.865	0.065	1.1303	147.305	74	0.000
3r. Partial scalar invariance (as above AND now with item E1 freed)	34619.252	11785	0.000	0.031	(0.031-0.032)	1.00	0.865	0.065	1.1303	140.326	73	0.000
3s. Partial scalar invariance (as above AND now with item F7 freed)	34613.590	11784	0.000	0.031	(0.031-0.032)	1.00	0.865	0.065	1.1303	134.246	72	0.000
3t. Partial scalar invariance (as above AND now with item F6 freed)	34604.068	11783	0.000	0.031	(0.031-0.032)	1.00	0.865	0.065	1.1303	123.852	71	0.000
3u. Partial scalar invariance (as above AND now with item E4 freed)	34599.314	11782	0.000	0.031	(0.031-0.032)	1.00	0.865	0.065	1.1303	118.750	70	0.000
3v. Partial scalar invariance (as above AND now with item E11 freed)	34594.473	11781	0.000	0.031	(0.031-0.032)	1.00	0.865	0.065	1.1303	113.540	69	0.001
3w. Partial scalar invariance (as above AND now with item E9 freed)	34589.622	11780	0.000	0.031	(0.031-0.032)	1.00	0.865	0.065	1.1304	109.847	68	0.001
3x. Partial scalar invariance (as above AND now with item S7 freed)	34585.188	11779	0.000	0.031	(0.031-0.032)	1.00	0.865	0.065	1.1304	105.125	67	0.002
3y. Partial scalar invariance (as above AND now with item S1 freed)	34579.303	11778	0.000	0.031	(0.031-0.032)	1.00	0.865	0.065	1.1304	98.791	66	0.006
3z. Partial scalar invariance (as above AND now with item C6 freed)	34575.123	11777	0.000	0.031	(0.031-0.032)	1.00	0.865	0.065	1.1304	94.327	65	0.010
3aa. Partial scalar invariance (as above AND now with item LM3 freed)	34570.713	11776	0.000	0.031	(0.031-0.032)	1.00	0.865	0.065	1.1304	89.599	64	0.019
3ab. Partial scalar invariance (as above AND now with item R1 freed)	34569.489	11775	0.000	0.031	(0.031-0.032)	1.00	0.865	0.065	1.1304	88.394	63	0.019
3ac. Partial scalar invariance (as above AND now with item R9 freed)	34568.660	11774	0.000	0.031	(0.031-0.032)	1.00	0.865	0.065	1.1304	87.629	62	0.021
3ad. Partial scalar invariance (as above AND now with item C9 freed)	34565.392	11773	0.000	0.031	(0.031-0.032)	1.00	0.865	0.065	1.1304	84.151	61	0.026
3ae. Partial scalar invariance (as above AND now with item C10 freed)	34560.633	11772	0.000	0.031	(0.031-0.032)	1.00	0.865	0.065	1.1304	79.001	60	0.051

4.3.5 Comparison of latent means – independent healthcare providers and NHS trusts

Survey response rates are tabulated in *Figure 4-1* alongside percentage sampling error (<10% for each ISP at a 95% level of confidence). *Healthcare-OH* scores are considered as the latent sum scores of the eight dimensional constructs and tabulated in the upper half of *Figure 4-8*.

Contemporaneous scores taken from a nationwide survey of NHS trusts (and originally presented in *Figure 3-6*) are plotted alongside ISP scores in composite *Figure 4-9* (with each chart *a-h* plotting a different construct of organisational health on the y-axis).

The lower half of *Figure 4-8* presents consolidated data representing the means of all ISPs for each construct. This is again presented alongside consolidated data taken from the nationwide NHS survey. Comparison of these two datasets shows ISPs score significantly higher than NHS trusts in all aspects of organisational health, as measured by the *Healthcare-OH* survey ($p < 0.01$ for all). This is illustrated graphically in *Figure 4-10*. ISPs are subdivided into those in the private sector (ISP2-ISP4; $n=4$) and those in the third-sector (ISP1; $n=1$) with their *Healthcare-OH* scores plotted alongside NHS scores in *Figure 4-11*.

Figure 4-8 – Mean score by dimension of organisational health (as measured by the *Healthcare-OH* survey). Consolidated data presented in lower half of table alongside contemporaneous data from NHS trusts (as presented in *Chapter 3*) for comparison.

Healthcare Provider	Dimension of organisational health - mean score (<i>Healthcare-OH</i> survey)							
	Strategy	Resilience	Leadership & Management	Staff Wellbeing	Finance & Investment	Patient Safety	Efficiency	Communication
ISP1	5.37	4.94	5.24	5.24	4.55	5.31	4.82	5.08
ISP2	4.64	4.32	4.28	4.66	3.80	4.75	3.99	4.51
ISP3	4.95	5.05	4.86	5.17	4.21	5.29	4.60	4.91
ISP4	4.87	4.55	4.64	4.79	4.13	5.10	4.35	4.82
ISP5	5.00	4.74	5.39	5.09	4.54	5.20	4.71	4.94
Consolidated data [range]								
NHS trusts (n=15)	4.56 [3.71-5.05]	4.24 [3.18-5.07]	4.17 [3.27-4.86]	4.50 [3.84-4.92]	3.45 [2.70-3.99]	4.44 [3.80-5.02]	3.84 [3.13-4.27]	4.32 [3.60-4.79]
Independent sector providers (n=5)	4.96 [4.64-5.37]	4.72 [4.32-5.05]	4.88 [4.28-5.39]	4.99 [4.66-5.24]	4.25 [3.80-4.55]	5.13 [4.75-5.31]	4.49 [3.99-4.82]	4.85 [4.51-5.08]
two-tailed t-test (p-value)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

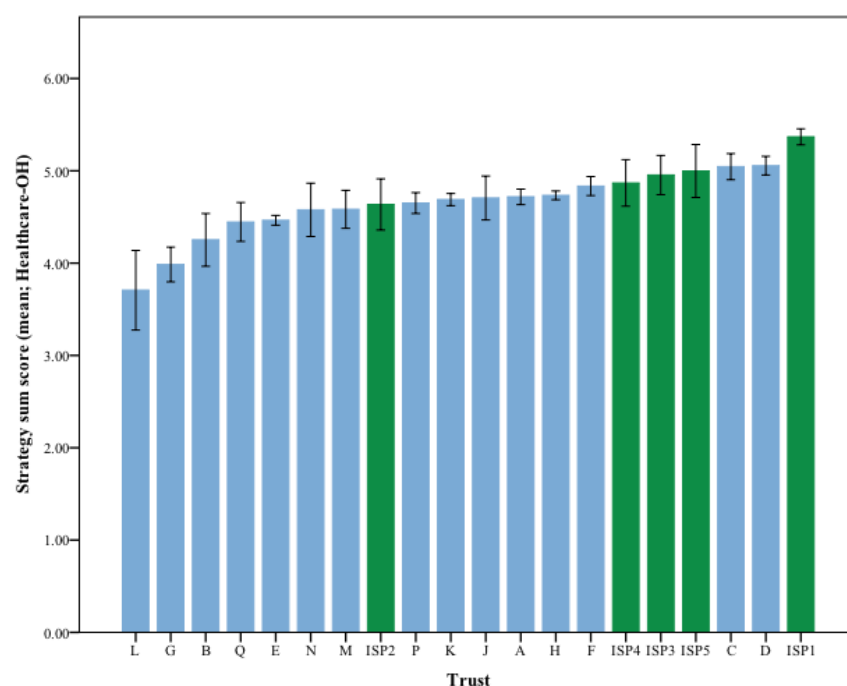


Figure 4-9a – Healthcare-OH subscale *Strategy* sum score (y-axis) for participating acute NHS trusts (light blue), labelled A-Q, and independent sector providers (green), labelled ISP1-5 (x-axis). Error bars represent 95% confidence interval of the mean for each trust.

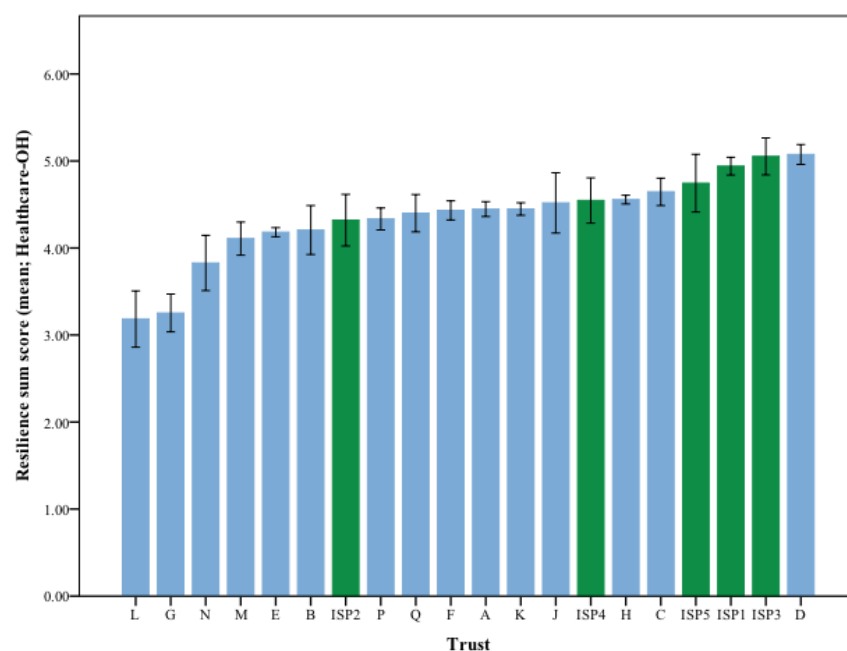


Figure 4-9b – Healthcare-OH subscale *Resilience* sum score (y-axis) for participating acute NHS trusts (light blue), labelled A-Q, and independent sector providers (green), labelled ISP1-5 (x-axis). Error bars represent 95% confidence interval of the mean for each trust.

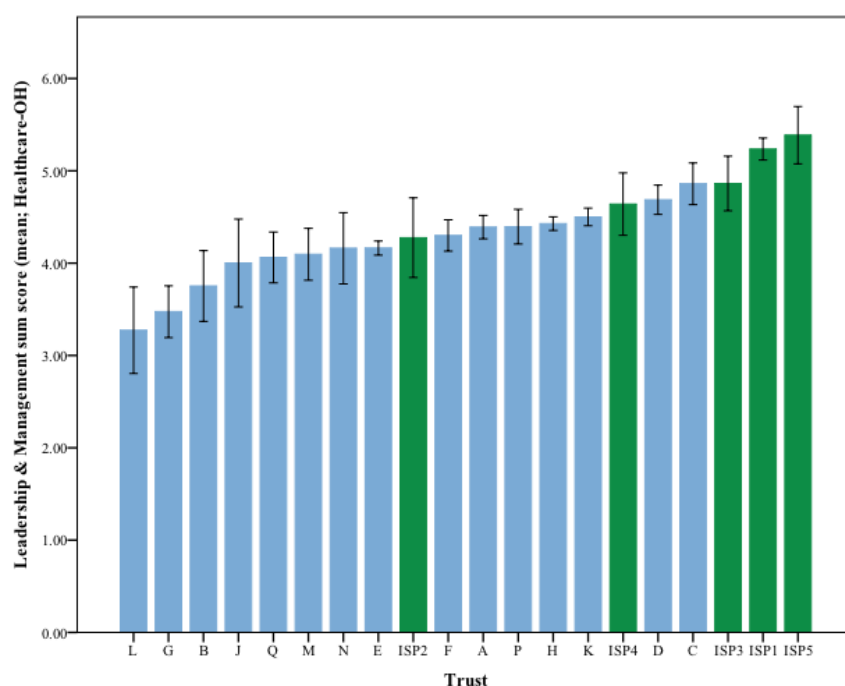


Figure 4-9c – Healthcare-OH subscale *Leadership & Management* sum score (y-axis) for participating acute NHS trusts (light blue), labelled A-Q, and independent sector providers (green), labelled ISP1-5 (x-axis). Error bars represent 95% confidence interval of the mean for each trust.

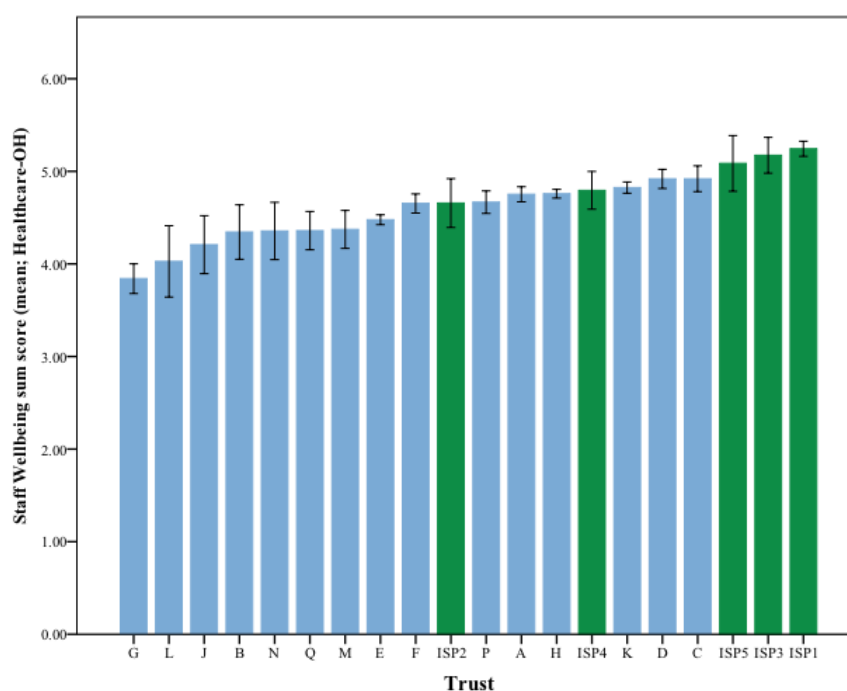


Figure 4-9d – Healthcare-OH subscale *Staff Wellbeing* sum score (y-axis) for participating acute NHS trusts (light blue), labelled A-Q, and independent sector providers (green), labelled ISP1-5 (x-axis). Error bars represent 95% confidence interval of the mean for each trust.

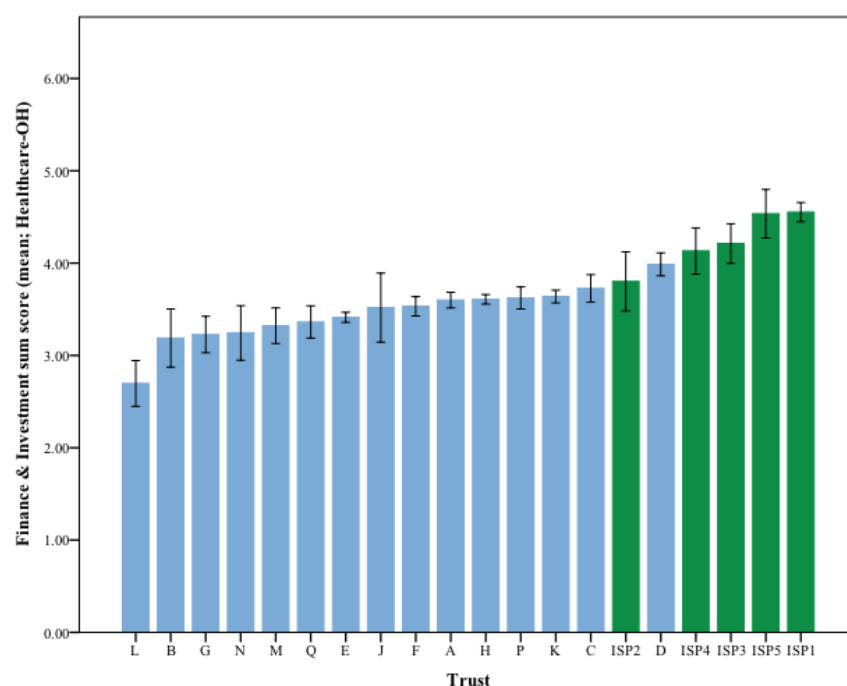


Figure 4-9e – *Healthcare-OH* subscale *Finance & Investment* sum score (y-axis) for participating acute NHS trusts (light blue), labelled A-Q, and independent sector providers (green), labelled ISP1-5 (x-axis). Error bars represent 95% confidence interval of the mean for each trust.

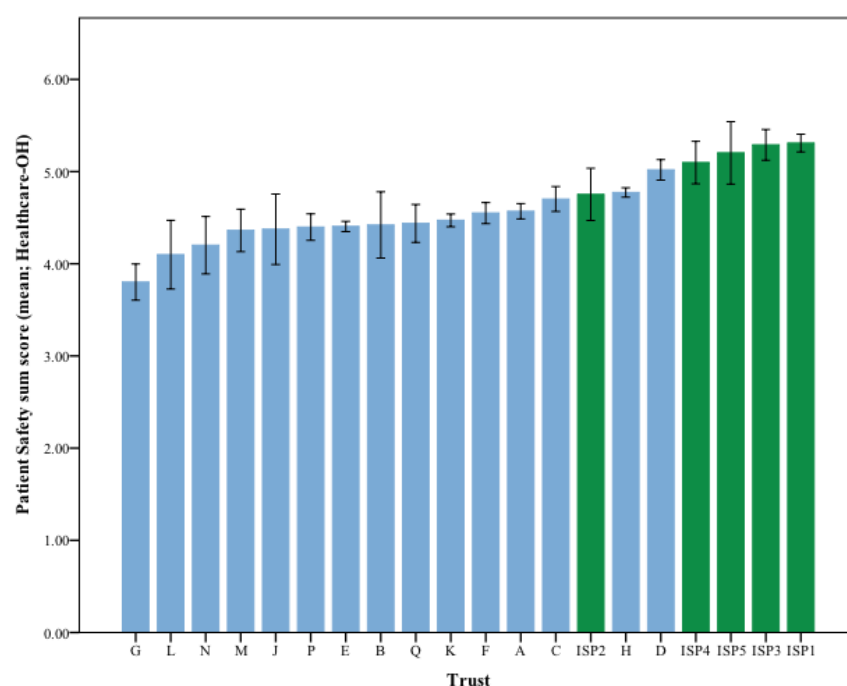


Figure 4-9f – *Healthcare-OH* subscale *Patient Safety* sum score (y-axis) for participating acute NHS trusts (light blue), labelled A-Q, and independent sector providers (green), labelled ISP1-5 (x-axis). Error bars represent 95% confidence interval of the mean for each trust.

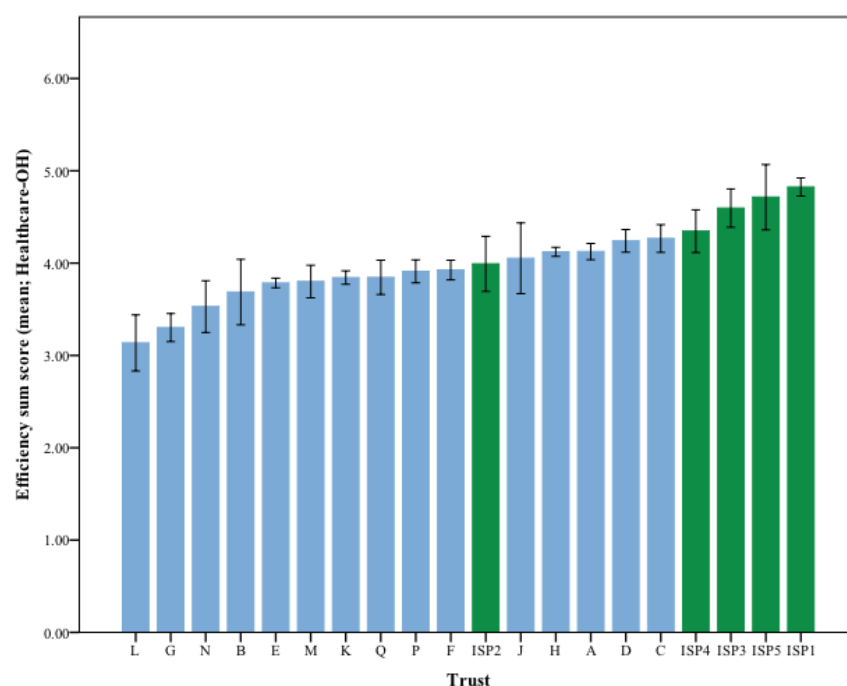


Figure 4-9g – Healthcare-OH subscale *Efficiency* sum score (y-axis) for participating acute NHS trusts (light blue), labelled A-Q, and independent sector providers (green), labelled ISP1-5 (x-axis). Error bars represent 95% confidence interval of the mean for each trust.

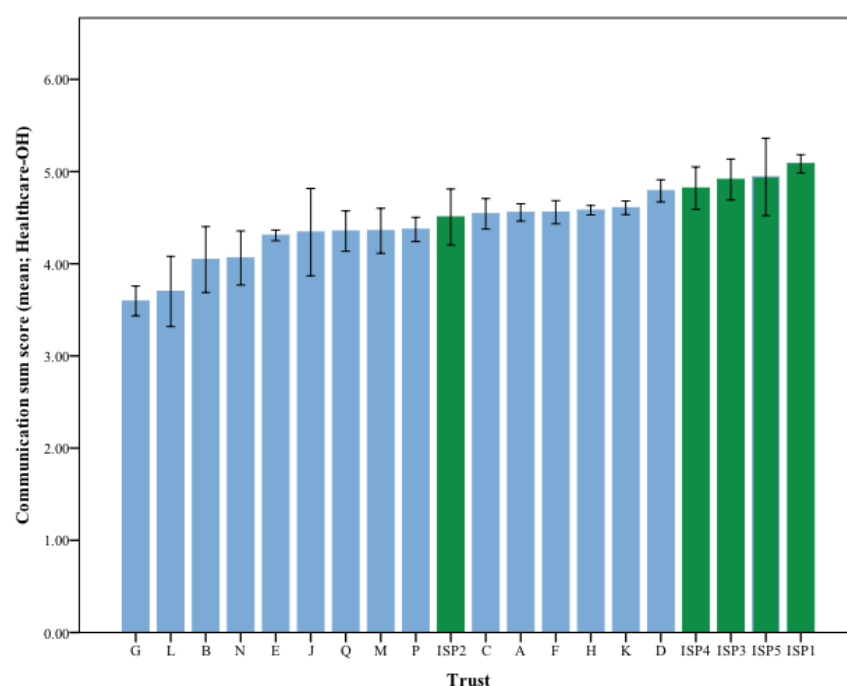


Figure 4-9h – Healthcare-OH subscale *Communication* sum score (y-axis) for participating acute NHS trusts (light blue), labelled A-Q, and independent sector providers (green), labelled ISP1-5 (x-axis). Error bars represent 95% confidence interval of the mean for each trust.

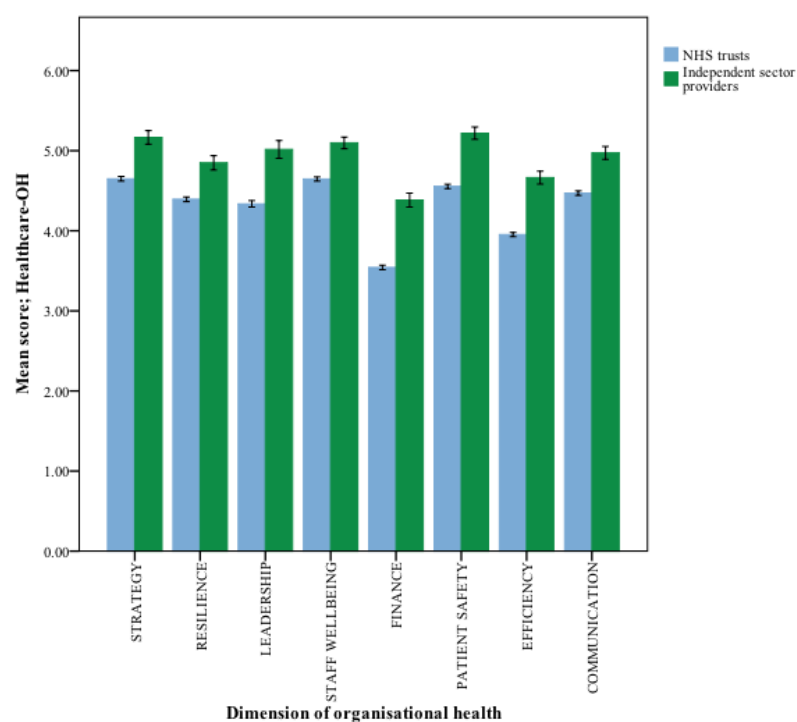


Figure 4-10 – Mean *Healthcare-OH* score (y-axis) considered by dimension of organisational health (x-axis) for consolidated data from both participating NHS trusts (light blue) and independent sector providers (green). Error bars represent 95% confidence interval of the mean.

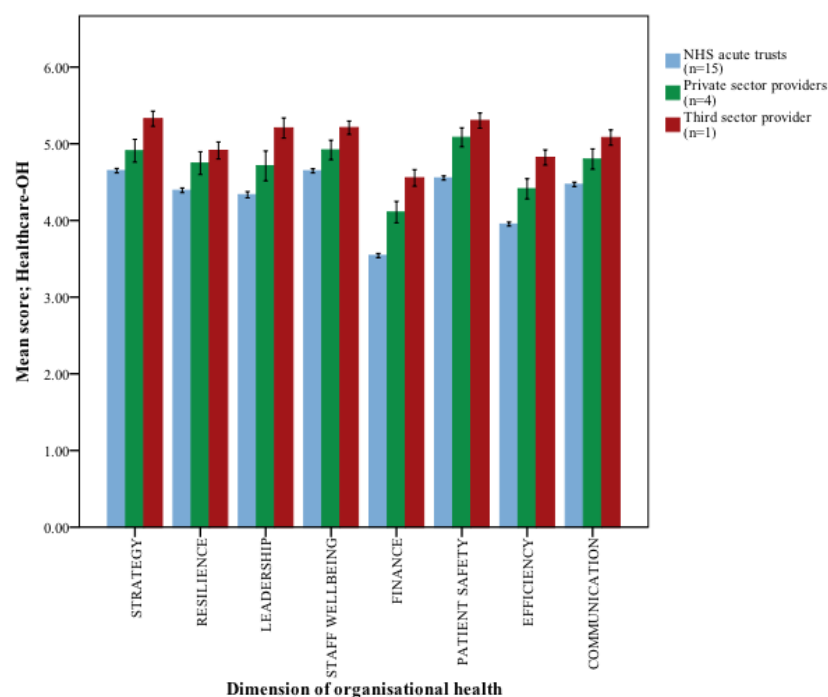


Figure 4-11 – Mean *Healthcare-OH* score (y-axis) considered by dimension of organisational health (x-axis) for consolidated data from participating NHS trusts (light blue), private sector providers (green) and third sector provider (maroon). Error bars represent 95% confidence interval of the mean.

4.4 Discussion

Given the increasing role of the private sector in healthcare provision in the UK, it is crucial that comparative information on quality of care is readily available.¹¹⁹ This is the first time organisational health has been measured in the independent healthcare sector explicitly for comparison with results in the public sector. Making widespread comparisons between the public and private sector is an exercise fraught with difficulties given the differences which exist between the systems under which both organisational contexts operate. Accordingly, albeit to a rather surprising degree, there is a paucity of studies in the literature making comparisons in clinical outcomes between these two healthcare sectors.¹²⁰⁻¹²²

This study therefore enters relatively uncharted territory. Criticism of attempts to compare results between the NHS trusts and ISPs often points to the differences between these healthcare contexts, largely in terms of their setup regarding both finance and provision of services. However, it is also true that, despite all their dissimilarities, they both share the central aim of providing high quality clinical care. One can accept that differences between these healthcare contexts could extend to changes in the way organisational health is perceived within each, but it would be facile to think that a healthcare organisation in the public sector cannot learn from the functioning of its high performing counterpart in the private sector (and vice versa). By quantifying the sub-constructs of organisational health in healthcare organisations from each sector and comparing them side-by-side, the central aim is to start a conversation as to why measurable differences reported here are so apparent and what this means for healthcare providers, in any context, who set out to be high performing in the long term. By extension, the eventual goal is to challenge current frames of thinking and the fixation on downstream performance metrics and, in their place, to consider

the importance of elements such as organisational *Resilience*, *Leadership* and *Staff Wellbeing* and promote the exchange of ideas between all healthcare organisations, irrespective of context.

4.4.1 Summary of main findings

Five large ISPs participated in this study with a high response rate of 21.1% (averaged across all sites) suggesting good levels of engagement. The *Healthcare-OH* survey was utilised as a measure of organisational health and, since it has been used to date exclusively within acute sector NHS trusts, it was necessary to explore first its validity within this new healthcare setting. For the dataset analysed here, the dimensionality of the *Healthcare-OH* survey is consistent with that seen in NHS trusts, as shown by the satisfactory fit of the eight factor structure which emerged from work presented in *Chapter 2* (RMSEA 0.033, CFI 0.853, SRMR 0.072; *Appendix C1*; *Figure 4-4*). Furthermore, despite a relatively small sample size (for CFA as a statistical method; $n=593$), it is reassuring to see such consistently high reliability estimates for all factors in the model ($\omega > 0.8$ throughout).

Whilst such exploration of the internal structure of the *Healthcare-OH* survey is required to make comparisons in the organisational health of ISPs (between themselves), to permit comparison with healthcare organisations in a different context (in this case NHS trusts) it is crucial that measurement invariance is established. Indeed, establishing measurement invariance provides the necessary psychometric basis, and so should be considered a prerequisite, for any comparison of latent sum score means between different groups.¹²³

Measurement invariance requires that item scores be dependent only on the underlying latent factor being considered (be it *Strategy*, *Resilience* or *Leadership & Management*, for

example) and not on group membership.¹²⁴ Essentially, organisational health, as a construct and as measured using the *Healthcare-OH* survey, should be the same in both acute NHS trusts and ISPs.

Measurement invariance analysis was conducted in a pre-determined sequence, as recommended elsewhere.¹²⁵ This being said, there is no solid consensus on the specific tests which are required for measurement invariance analysis or indeed the nomenclature by which one denotes each test. Work presented here follows the step-wise paradigm proposed by Vandenberg and Lance (2000),¹²⁵ and utilises the nomenclature as recommended originally by Byrne *et al.* (1989).¹¹⁸ The tests considered above were ones of configural, metric and scalar invariance and were done with between-group mean comparison tests in mind. Were more sophisticated analyses required then a further round of strict invariance testing would have been performed by way of residual variance invariance analysis.

As outlined above, each step of measurement invariance testing considers whether the same construct is being tested in the same manner across each group and so allows us to interpret comparisons between these groups in a meaningful fashion. To do this a series of models are examined within multiple group CFA with specific constraints applied in each model. The configural model begins by testing whether the construct itself can be said to consist of the same factors and so runs the same model in both groups with the same factor structure constrained across each. This was shown to demonstrate good fit (*Model 1* RMSEA 0.031, CFI 0.866, SRMR 0.065; *Figure 4-7*). Additional constraints were then introduced, in a sequential manner, as both metric and scalar invariance were examined. This required a large number of models to be run but it was possible to establish both partial metric invariance (*Model 2n*

ΔCFI 0.000, ΔSRMR 0.001; rescaled $\Delta\chi^2$ $p=0.051$; *Figure 4-7*) and partial scalar invariance (*Model 3ae* ΔCFI 0.001, ΔSRMR 0.001, rescaled $\Delta\chi^2$ $p=0.051$; *Figure 4-7*). Whilst a considerable number of iterations were required at each step, sufficient items remain within each factor for partial invariance to be said to hold.¹¹⁸

Metric invariance testing is an extension of the configural model and considers whether the same latent variables are being measured in each group.¹²⁶ The items which were freed in partial metric invariance testing are listed in *Figure 4-12*. These may reflect expected group differences. Indeed, closer review of this figure shows that a number of items regarding the aims and alignment of clinical and managerial staff (items S2, S3 and S12 within the dimension of *Strategy*) are not metric invariant. Such differences in strategic alignment may reflect the greater clarity that comes within organisations (in this instance ISPs) whose scope of work is narrower and so more specialised than that within most acute NHS trusts. Other variant items include those relating to staffing levels (item SW5 within *Staff Wellbeing* and items PS7 and PS8 within the *Patient Safety* subscale) and recent reports have noted significant staff shortages in NHS sector organisations relative to ISPs.¹²⁷ It should also be noted that item E7: '*There are delays in discharging patients*' differed between groups, likely reflecting the fact that ISPs are not reliant on public social care to facilitate hospital discharge in the way their NHS counterparts are.

Scalar invariance testing examines whether the latent variable in question is measured in the same scale in different groups, essentially whether groups have the same expected item response at the same absolute level of the latent variable. If scalar invariance holds then observed differences obtained using the measure in question are down to differences in

factor means and this is what permits subsequent comparisons of sum scores.^{128,109} Partial scalar invariance required a number of items to be freed and these are listed in *Figure 4-13*. Again, these may reflect expected group differences and it is particularly notable that a large proportion of these items were from the dimension of *Efficiency*. Many of these items are based around deficiencies in planning, delays and cancellations (items E1, E5 and E6), which are much rarer occurrences in healthcare organisations where the bulk of clinical work is elective practice, such as ISPs. As with the items identified during metric invariance testing, many related to staffing levels and the quality of recruitment (items R1 and R2 in *Resilience* and items PS1, PS2, PS9 and PS10 from the dimension of *Patient Safety*) while items on the topic of investment likely reflect the obvious group differences in funding and so *Finance & Investment* (items F6 and F7).

Figure 4-12 – Non-metric invariant items from final partial measurement invariance *Model 3ae*

Ref	Item
STRATEGY	
S2	Management and clinical teams work closely together
S3	Management and clinical teams have the same aims
S10	I put the needs of the patients above everything else
S12	There is friction or confrontation with other departments or teams
RESILIENCE	
R8	It rarely puts new things in place to improve quality
LEADERSHIP & MANAGEMENT	
STAFF WELLBEING	
SW5	The right staff are in the right place
SW13	Patients here are treated with dignity
FINANCE & INVESTMENT	
F9	People understand the cost of the equipment or tests they use
PATIENT SAFETY	
PS7	There are sufficient nurses to look after patients out of hours (nights & weekends)
PS8	There are sufficient doctors to look after patients out of hours (nights & weekends)
EFFICIENCY	
E7	There are delays in discharging patients
COMMUNICATION	
C3	There is transparency so it is easy to see what is being planned by the organisation
C7	Communication between medical staff and management staff is poor

Figure 4-13 – Non-scalar invariant items from final partial measurement invariance *Model 3ae*

Ref	Item
STRATEGY	
S1	Everyone is committed to a common goal
S6	The strategic direction of this organisation is not realistic
S7	I am frequently reminded of the mission / vision statement
RESILIENCE	
R1	It attracts the best quality nurses
R2	It attracts the best quality doctors
R9	If there was a sudden unforeseen incident e.g. fire, deep snowfall or power cut, it would cope very well
R11	If there was a sudden change in legislation e.g. a cut in funding, it would cope very well
LEADERSHIP & MANAGEMENT	
LM3	My manager praises good work
STAFF WELLBEING	
SW4	I lack sufficient appraisal or feedback meetings to review my performance
SW14	Patients have faith in this organisation
FINANCE & INVESTMENT	
F6	There is enough money invested in patient care and clinical equipment
F7	There is enough money invested in buildings and renovations
F11	Money saving ideas are not listened to
PATIENT SAFETY	
PS1	Absenteeism is a problem in this organisation
PS2	People take lots of sick leave where I work
PS9	There are sufficient nurses to look after patients during weekdays
PS10	There are sufficient doctors to look after patients during weekdays
PS14	There is a 'no blame' culture here
EFFICIENCY	
E1	It is haphazard and things work out by chance rather than by proper planning
E4	The processes in place are archaic and based on historical changes

E5	There are frequent cancellations in the operating theatres
E6	Patients wait a long time for emergency surgery
E8	Patient notes are often unavailable
E9	Decisions are made based on patient care data collected
E11	There is accurate data collected to assess the quality of patient care
E12	Innovations to help patients e.g. text messaging are embraced
COMMUNICATION	
C6	Communication between medical staff and patients is poor
C9	People here are polite to patients
C10	People here ignore patients
C11	People here talk in their own languages excluding others

With acceptable levels of measurement equivalence holding true across both groups, organisational health (considered as the latent sum scores of each of the eight constructs of *Strategy, Resilience, Leadership & Management, Staff Wellbeing, Finance & Investment, Patient Safety, Efficiency and Communication*) was compared between independent and public sector healthcare providers with fascinating results.

Inspection of *Figure 4-10* shows that ISPs outperformed NHS trusts across all dimensions of organisational health. This is particularly true for the themes of *Finance & Investment* and *Efficiency*, as might be expected for ISPs, since they do not rely on public funding (and so are not subject to the current climate of financial austerity to the same extent) and generally provide a more limited range of clinical services for more low-risk patients. Whilst the NHS has been consistently rated as one of the most efficient healthcare systems worldwide,¹³⁰ the clinical workload of ISPs is predominantly concerned with elective practice, allowing

processes within them to be efficient without having to consider the same levels of emergency work NHS trusts do with the extra demand and stress this applies to an organisation.

Although *Figure 4-8* shows that differences between groups are significant across all dimensions (at $p<0.01$), intriguingly, *Figure 4-9* illustrates a particularly marked change for the theme of *Patient Safety*. This is interesting, although at odds with a number of recent concerns which have been raised over differing levels of accountability regarding patient safety in the private sector.^{54,131} Whilst this could well reflect a strong patient safety ethos within the five ISPs examined in this study, it should also be noted that a considerable number of items within this domain (PS1, PS2, PS7, PS8, PS9 and PS10) relate to staffing levels and the NHS, as a whole, has been afflicted by both high staff vacancy rates and difficulties with staff retention and attrition.¹³²

Closer inspection of the bar charts in composite *Figure 4-9*, allow for visualisation of the relative performance of each individual site. These graphs further reinforce the manner in which ISPs outperform NHS trusts across all dimensions, especially for the themes of *Finance & Investment*, *Patient Safety*, *Efficiency* and *Communication*. However, it should be noted that NHS trust data, when consolidated (e.g. in *Figures 4-8*, *4-10* and *4-11*), suffers from lower performing trusts (in most cases Trusts G and L) negatively impacting on the overall group mean. If one solely considers the highest performing NHS trusts (particularly trusts C, D, H and K), it could be argued that their results sit more comparably alongside those from ISPs. This is particularly true for the dimensions of *Resilience* (in which the highest score across both groups come from NHS trust D) and *Strategy* (where the second and third highest scores

across both groups come from NHS trusts D and C, respectively). *Healthcare-OH* survey responses represent participants' beliefs and perceptions of the healthcare organisation they work within. An organisation's *Resilience* and the *Strategy*, that both shapes and directs work within it, are often best forged out of trying circumstances.¹³³ It is plausible that, in recent times, NHS trusts will have been exposed to greater hardship and therefore had more opportunity, and indeed need, to shape their *Strategy* in response to real and present external drivers and test their *Resilience* as an organisation. Crucially, experiencing a period of hardship such as this would make all the staff working within an organisation aware of the relative strengths of their trust in these domains, and so answer accordingly during participation in the *Healthcare-OH* survey.

Figure 4-11 divides ISPs into those in the private sector and those in the, not-for-profit, third-sector. It shows that results for the single third-sector ISP (ISP1) are higher than both NHS trusts and other (private sector) ISPs in this study (ISP2-ISP5). Whilst sub-group analysis of this dataset should be performed with caution given the small number of ISPs in this study (n=5), it could be suggested that these results reflect differences in how staff within the private and third-sector align themselves with the overall ethos of their relative organisations - with staff working in the private sector aware of the relatively increased commercial aspect of their work and that profit is a major driver for their organisation. Indeed, looking outside of healthcare, staff within third sector organisations have been found to have higher morale, engagement and overall wellbeing than those in private sector organisations.¹³⁴

4.4.2 Limitations

Whilst a number of the items in each elemental domain were found to vary between groups (*Figure 4-12* and *Figure 4-13*), after stringent testing, sum scores were found to be invariant and so between group comparisons were performed between NHS trusts and ISPs. Though measurement invariance testing revealed the construct to be consistent across these two groups it would be naive to take the results of *Figure 4-8* and *Figure 4-10* at face value without reflecting on the various constraints under which NHS trusts function. As government funded entities they have significant limits on how much room they have to both formulate *Strategy* and manage their finances – especially in times of austerity and cuts in public funding (with resultant effects on *Finance & Investment*). Indeed, much of the *Efficiency* efforts within NHS trusts function on cost-saving rather than throughput and productivity (as in ISPs).¹³⁵ Resource shortages also commonly extend to staffing levels which can easily be hypothesised to lead to difficulties in the domains of *Communication* and the *Resilience* of the organisation.¹³² All of this would have quite a predictably negative impact on *Staff Wellbeing*. These inherent differences between NHS trusts and ISPs are the reason why so few comparative studies are undertaken between these two sectors and doubtlessly limits any conclusions drawn from the comparative component of the work presented here.

This study also suffers from many of the same limitations that characterise previous work with the *Healthcare-OH* survey. As with use of the survey in NHS trusts, ISPs were provided with a drafted email for use in inviting all staff working for them to participate in the study (*Appendix B*). Again, it is impossible to know the extent to which employees were contacted within each site, though, from the high response rates from each site (*Figure 4-1*), it is presumed that enrolled ISPs did invite all staff to participate. Specific note should be made to

the low number of Consultants who participated (1.2%; n=4). Relatively few Consultants undertake all their clinical work in the private sector and Consultants working in the private sector largely do so, not as employees but rather under agreed practising privileges.¹³⁶ As such, none of the ISPs participating in this study sent invitations to complete the survey to their Consultants with practising privileges. The small number of Consultants that completed the survey are thought to represent those who either perform clinical work exclusively for that ISP or have an additional executive role in that organisation.

Sampling error was minimised through use of the same WebApp utilised for data collection in the public sector, provision of the weblink to directly access the survey being included within all invitation emails and the use of reminder emails to follow up slow responders. Sample size was considered acceptable under pre-specific conditions level of 95% and a level of sampling error <10%.¹¹⁰ Under these criteria, all ISPs enrolled in this study were included in analysis (*Figure 4-1*). Despite high response rates from all sites (10.5-41.8%), if sampling error had been set more stringently at <5% only one ISP would have been considered acceptably representative for analysis. This is due to the sensitivity of sample size algorithms to small overall populations.⁸³

As with all studies involving the use of surveys, it is impossible to exclude potential non-response bias without 100% completion rates.¹¹⁰ Data on staff demographics from ISPs is not readily available within the public domain and since demographic questions were left optional (and completed by only 58-63% of participants), the weighting of responses was not considered useful. Reports were sent to all participating sites, none of which judged responses to be non-representative.

There was a large degree of participant skip rate between items in the survey (7.6-38.3%; *Figure 4-3*). Closer inspection of *Figure 4-3* shows the items *E5: There are frequent cancellations in the operating theatres* and *E6: Patients wait a long time for emergency surgery*, in particular, stand out as having not only high skip rates but also high rates of “not applicable” responses (55.1% and 57.7% respectively). Whilst it could be argued that these findings suggest items E5 and E6 are indeed less applicable in the context of ISPs, ultimately, the topics these items address are heavily department and job role specific – since not all staff within a given healthcare organisation will be involved in the care of patients undergoing surgery. Indeed, previous work also shows that these two items demonstrate high skip rates when the *Healthcare-OH* survey is used within NHS trusts (*Figure 2-7*). Though consideration was paid to revising the instrument and omitting these items, they were retained within the structural models (and subsequent analysis), since they represent theoretically different aspects of the construct of *Efficiency* not considered by any of the other items within this subscale. The inclusion of items linked to specific clinical situations is essential for a construct such as *Efficiency* actually to be captured and mapped across its full continuum.

Both the initial CFA solution (*Appendix C1* and *Figure 4-4*) and the invariant solution (*Appendix C2*) show items with low levels of loading on to their relevant factors. However, given all factor loadings were found to be significant ($p < 0.01$ for all loadings within both solutions) and model fit was acceptable, all items were included in construct sum scores.⁷³

Whilst there is a large body of literature to support partial measurement invariance, its use here is not without limitation.¹¹⁸ When model constraints are iteratively relaxed, in an

attempt to improve overall model fit, such post-hoc exploratory data-driven analysis risks divergence from theory and the potential acceptance of chance findings.¹²⁵ Though some have proposed that items freed in partial measurement invariance models should be removed from further analysis,¹²⁵ such items have been retained in the latent sum-score mean comparisons discussed above. Whilst their omission could have potentially led to different results, the inclusion of such items here is a pragmatic “real-world” approach and accepted practice, particularly given (with the exception of the *Efficiency* subscale already discussed above) the majority of items within each subscale remained invariant through both metric and scalar invariance analysis.^{118,137}

Whilst it was possible to establish between-group partial measurement invariance, results represent a single round of survey in each setting (be it within acute NHS trusts or ISPs). Were the survey to be repeated in the future, such additional rounds of data collection would allow examination of measurement stability. If invariance can be shown to be stable between these groups over time, it would add greater weight to the validity of any comparisons made in organisational health between the public and private sectors.

Finally, all ISPs enrolled in the study on a voluntary basis and, considering the variations in size and span of practice between different independent healthcare organisations, the results presented here may not be generalisable to all UK organisations in this context. However, findings are, at the very least, intriguing and, ideally, the study should be repeated on a much larger scale across independent healthcare organisations in the future.

4.4.3 Conclusion

This was the first study seeking to measure organisational health in the context of independent sector healthcare organisations and all results were shared with participating ISPs. Organisational health measurement considers potentially underappreciated elements and quantifying them, through the use of the *Healthcare-OH* survey, allows targets for organisational change to be identified. Relative differences in these elements also represent potential areas for transferrable practice between organisations. Encouraging dialogue between healthcare organisations is somewhat beyond the scope of this thesis (and one hopes would organically stem from the propagation of this work in the mainstream medical literature) but it is logical to think next as to how such changes might be implemented and the relative efficacy of interventions which seek to achieve these aims. This is revisited in **Section III**.

This chapter presents work demonstrating the applicability of organisational health in previously unconsidered healthcare settings. Logically, **Section II** should next extend to consider organisational health in the largest group of healthcare organisations in the UK: primary care. This will be addressed in the next two chapters.

Chapter 5: Defining a healthy organisation in primary care: a qualitative interview study

5.1 Introduction

Organisational health as a model is something of a 'bundle' approach, considering performance, as it does, over a range of interrelated organisational domains. Applying such a systemic view to primary care organisations offers a certainly broader and arguably more reflective methodology when considering the performance of a GP practice.

To the best of our knowledge, no work to date has considered organisational health in the setting of primary care. We believe that by unpicking the elements of organisational health in GP practices we can shift focus from considering down-stream clinical outcomes in isolation to practices taking a more long term view centred around fostering ongoing high performance.

This chapter aims to qualitatively develop a theoretical framework for organisational within the setting of GP practices and so answer **RESEARCH QUESTION 5: What are the elements of organisational health in primary care sector healthcare organisations?** This will be achieved through a series of semi-structured interviews across a range of staff from a number of different practices with the following objectives:

- 1 – Define organisational health in the setting of primary care healthcare organisations
- 2 – Compare this with existing definitions from other settings and contexts

5.2 Methods

5.2.1 Study design

The study was structured in close accordance with the COREQ (consolidated criteria for reporting qualitative research) checklist.¹³⁸ Work took the form of a non-experimental, exploratory qualitative interview study utilising a number of methodological aspects from grounded theory in sampling, data collection and analysis.¹³⁹

5.2.2 Participants and procedures

Participants were all staff members from GP practices within a large, urban-based, GP Federation. This was selected through convenience sampling and contained a number of practices (ranging in size from 'single-handed' practices to large 'super-surgeries' covering more than one geographical site). Maximum variation purposive sampling was used in selecting participants to allow us to capture a range of perspectives across the entire spectrum of roles within general practice with participants considered under prior strata: GP partners (or equivalent), practice managers (or equivalent), salaried GPs, practice nurses and healthcare assistants (HCAs). All individuals within all practices in the GP Federation were approached by email asking them to participate in the study using a pre-designed invitation email (see *Appendix D*). As data collection continued, reminder emails were preferentially sent to individuals in underrepresented job roles to ensure a maximum variation sample. Sampling continued until theoretical saturation was reached.

All participants were volunteers and no payment was offered for their involvement in the study. NHS Research Ethics Committee approval was not required since all participants were members of staff but local research governance permission was sought before individuals

were approached. Participant anonymity and confidentiality was preserved through the allocation of identifier codes built around job role (eg. *Practice Manager 3*; *PM3*).

5.2.3 Data collection

Semi-structured interviews were performed following an interview guide (as found in *Appendix D*). This guide consisted of two sections. The first was purely inductive in approach with open questions asked around the topics of organisational health and performance in healthcare: allowing for the emergence of potentially novel insights into organisational health within primary care. These initial questions were formulated around broad existing definitions of a healthy organisation as one which has a strong provision of the elements required for sustained high performance.^{12,16,23} The second section began to introduce existing theory with a framework-driven approach (as extrapolated from, and so theoretically informed by, previous work in the acute health sector) and utilised as prompts to explore participant perspective on the application of the acute sector model of organisational health in primary care. These prompts were derived from the eight themes of organisational health as seen in *Figure 2-1*.³⁸

Interviews were carried out at a time and place of the participant's choosing - usually a private room within their workplace. All interviews were conducted by one member of the research team (Stephen Williams, SPW) and were digitally audio recorded. Participants were aware that the interviewer was a clinician, by background, working in a collaboration of researchers from the Faculty of Medicine, Imperial College London and Imperial Business School. Participants had not met the interviewer prior to the interview date itself, communicating only by email to confirm arrangements. All participants were given an information sheet (see

Appendix B) and gave their informed consent. Verbatim transcription was done internally by the research team prior to analysis. Participants were offered the chance to review their transcripts for correction or comment.

Interviews were carried out between April and June 2016 and ranged from 23 to 72 minutes with an average duration of 41 minutes (22 hours, 43 minutes in total). Data saturation was reached after 33 interviews which involved participation of 9 salaried GPs (or equivalent; denoted SGP), 8 GP partners (or equivalent; GPP), 8 practice managers (or equivalent; PM), 5 practice nurses (N) and 3 HCAs. Staff were drawn from across 21 different practices.

5.2.4 Data analysis

Transcripts initially underwent open coding using qualitative research software (NVivo for Mac version 11, QSR International, Australia) with a tranche of four transcripts open coded by two researchers working in concert (SPW and Artemis Panigyraki, AP). Working in this manner helped to develop and consolidate consistency of coding. After this point, transcripts were coded by SPW alone. Axial coding was performed by SPW and AP with both working with the raw data. Coding disagreements were resolved by consensus, involving the senior researchers as required.

Researchers met regularly throughout the project to allow data collection and analysis to run simultaneously. This allowed ongoing analysis to feed back into modification of the interview guide in an iterative manner in keeping with theoretical sampling. During analysis memos were made and the constant comparative method was used to continually re-question the data at each level of analysis.

As analysis continued and a definitive structure began to emerge, higher level groups of codes were formed into themes around a core definition of organisational health via selective coding. As the working thematic framework began to stabilise, established theory was introduced into the analysis for both comparison and contrast. Differences were explored in later interviews with participants, again in keeping with theoretical sampling.

Once data saturation was reached, the provisional thematic framework was discussed within the full research group at length, including experts from the fields of organisational health (Sanjay Purkayastha, Ara Darzi), health policy (Ara Darzi), social science (Jonathan Benn) and organisational behaviour and management (Sankalp Chaturvedi). Themes were then submitted to participants to allow further comment and feedback at this stage before the final framework was confirmed.

5.3 Results

A total of six themes emerged from our data analysis: *Strategy, Resources, Leadership, Staff Wellbeing, Capacity for change* and *Ways of working*. Whilst each has its own distinct sub-structure, a number of overlaps exist between the themes – as one would expect given they must interrelate with one another for a healthy organisation to exist. In keeping with the axial coding strategy employed in this qualitative work, each of these themes (complete with sub-structure) was considered to represent a higher-order sub-construct of organisational health. *Figure 5-1* depicts these themes in a hierarchical theoretical framework and the structure of each will be discussed at length below, alongside supporting transcripts.

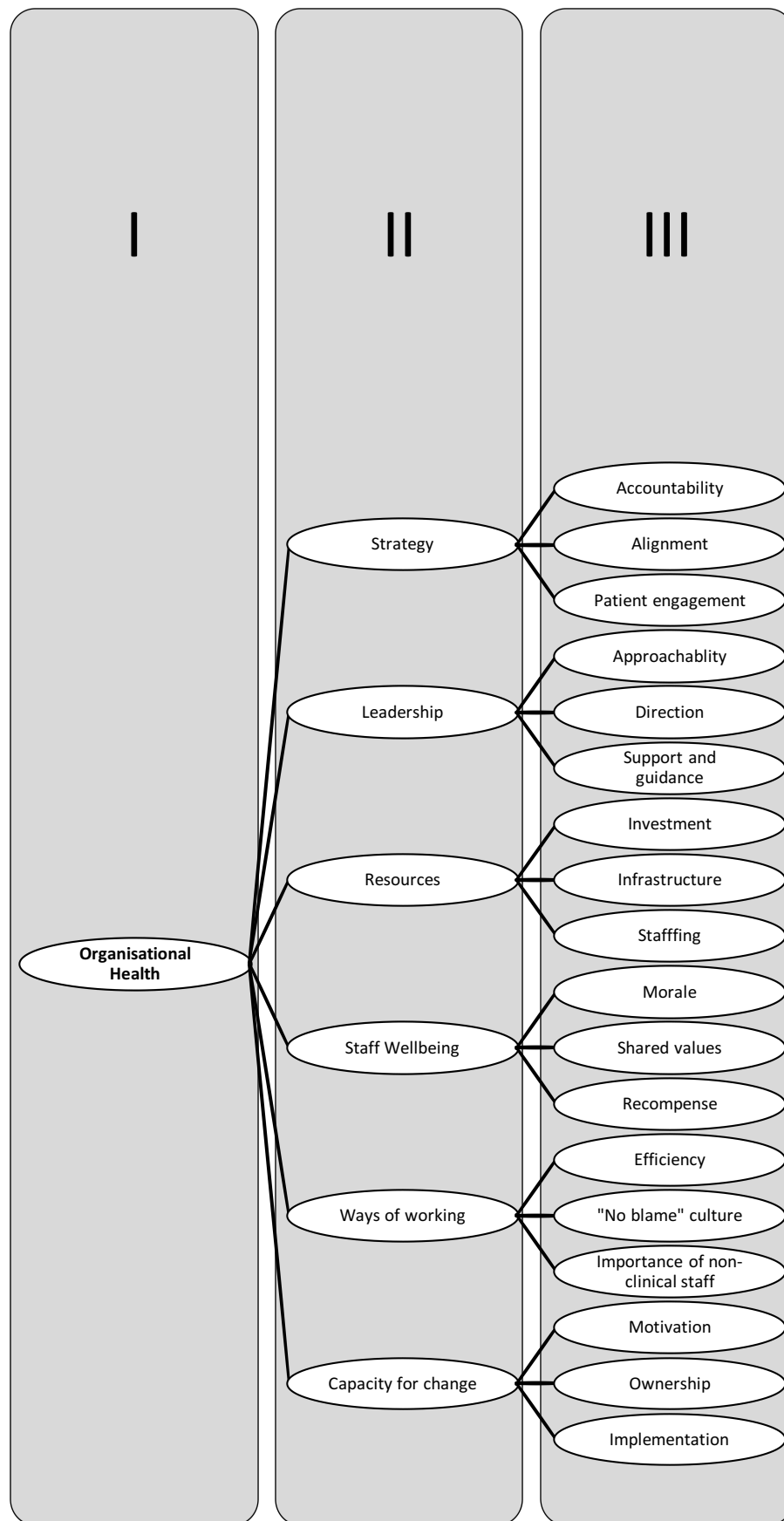


Figure 5-1 – Theoretical framework demonstrating dimensional constructs, and sub-constructs, of organisational health in primary care

5.3.1 Strategy

A number of different sub-themes emerged under an overall heading of *Strategy*. These relate, principally, to the direction the practice moves in, shaped by its accountability towards a number of different entities. Striking a balance between these, sometimes opposed, goals is complex and strategy in primary care is heavily influenced by a number of external drivers. Many participants also stressed the need for alignment of all staff within the practice to the strategy.

The central group to which practices felt accountable was the patients they serve:

First and foremost, I feel that everybody should have accountability and responsibility for their duties because you're doing a duty of care to the patients [HCA1]

The heart of it has to be a commitment from all the staff for good clinical care; that the patients are important and they need to be looked after – so that's the first element [PM2]

The need to consider the financial income of a practice was also noted as a component of a practice's strategy. Indeed, many participants stressed the importance of keeping a practice's accountability to patients by framing it in the context of accountability towards practice income:

I think vision and long term planning... vision and thinking about the future as well as the here and now ...and thinking about the sustainability of the services which we are offering and actually not offering them because we have to offer them to keep open because of financial reasons but offer them because they actually benefit the patients and can shape the health of the population. [GPP3]

The strategy of a practice reflects its accountability towards different bodies, each with different perspectives on performance. In weighing the accountability towards one's patient group against a more pragmatic accountability towards income (which itself is fundamental for the viability of a practice), many participants spoke specifically of the need for balance.

Staff in the practice should look into the business point of view but also the care they deliver. It needs to be effective and cost effective so it works both for the patient and the business. That's how I look at it. [HCA2]

You can get GPs that go into that who are very financially focused and actually will just strip everything down to the bones so that they make the most profit, you'll get other practices who just invest absolutely everything

into the practice and walk away with not very much themselves. I think there's a happy medium between those two extremes and I think if you've got GPs who are driven mainly by wanting to provide good quality clinical care – and there's no reason why good quality clinical care shouldn't be financially attractive or sustainable – then you're probably going to end up with a reasonable balance between those. [GPP8]

It is almost impossible to discuss the elements that comprise organisational health within a GP practice without considering the landscape in which a GP practice finds itself currently and this emerged from the majority of interviews. Primary care has gone through a series of changes over the last few decades and a number of the changes which have come into play in recent times principally involve increased accountability to a number of different bodies. The effects of these changes are borne out in a number of the themes in our model but none more so than under the topic of *Strategy*. The main method through which this accountability is reinforced is through performance based income – practices are held accountable to a number of external bodies and if they do not meet specific requirements then they will not be financially remunerated. As such, external drivers play a considerable part in shaping the strategy of a GP practice. Unfortunately, there are strong feelings amongst many of the participants that these drivers are often misaligned and yet continue to shape the strategy of a practice since they remain linked to income.

We're told what to offer, we're not given options, we're told "this year you can offer this service and it gets paid this much and you must have this much activity otherwise your income will be down and if you don't earn that money then you're going to be paying the staff your salaries" so we're chasing these services... we don't have to... but then you don't earn the income that keeps us moving and I don't think we have much say over what services we choose. [GPP3]

They attach a financial incentive to that so you're incentivised to do it, you kind of almost have to do it otherwise you don't get money for it because they... often the way this works is that they pinch some budget from elsewhere and say 'now if you want this money then you have to do this...' [SGP2]

There's too many entities within the NHS: that you've got to do this through them... it's just an inefficient means of doing it and if you're always having to tender on a regular basis then time and resource is taken away from providing medical services to try to win contracts to be a health provider. It's certainly taking attention and resources away from delivering health services. [PM3]

The trouble is with the NHS now, no one's quite sure, even the people doing the external driver things, they're not quite sure, it's not coordinated. [SGP6]

It's like commissioning by numbers. They just look at activity, it's quantitative not qualitative. [PM4]

A lot of the stuff we get sent is meant to be good and it's for patient care but then it gets contradicted six months or a year later and you kind of think "Well actually, why do we bother tearing our hair out to fit in with this new directive when actually it's just been changed?" [SGP9]

Some participants felt that some of this accountability was helpful, with some performance indicators having a positive effect on patient care.

What it has done is standardise care so practices which were very poor in providing care... it's actually a measure that says 'this is the absolute standard'. So it's calibrating. [GPP1]

For an organisation it is very good to know how you compare, it is very good to know where you stand in terms of your outcomes. You know, in a like-minded and like-example of a typical population - if your outcomes are significantly poorer then you need to look at what someone else is doing and you need to be a bit more reflective. [PM5]

This was also mirrored in other participants speaking positively about a practice's accountability towards external organisations:

You have to have a framework that has a quality element to it. CQC have to be involved, we need it. [N1]

However, the terms 'mismatch' (in the context of an indicator's relationship to patient care) and 'tick box' (largely in relation to financial reward) frequently emerged:

I could entertain myself all day without listening to a single complaint or what the person needs right now and that's what a big part of my payment is based on. [SGP1]

Some of the QoF targets are ridiculous and some of the CQC things they want us to do equally... they feel like such a tick box exercises which doesn't feel like its aim is to improve patient welfare. [SGP5]

What do people want for their health? It's not necessarily the same as what come up on a list that you then start then imposing on people. Is that what they want? Is that what their idea of what healthcare is? I think that it's quite interesting to think about what actually is good healthcare and what people actually want. [GPP2]

GP practices are not just accountable to patients for the care they provide. Many also felt there was a role for the practice to involve and engage with their local community.

A healthy GP practice needs to as well as be self-aware, be aware of the people they are serving – so good patient dialogue with patient involvement and patient enablement. [SGP6]

I think you can't expect to achieve good health outcomes unless you've got your patient with you. You've got to work in partnership. They've got to be part of your shared decision making and if there are things, even in the operations of the practice that are interfering with that then you really need to address them. [GPP6]

Look at our population's needs because it's always changing ...so very much being on top of that is our priority to look at in the future. [GPP3]

The strategic direction of a practice should be clear, and there is a large role for the management of the practice (partners and practice manager) in shaping and delivering this:

Your vision of what you want your practice to be and what you want general practice to do. You need a shared sort of objective so everybody is working to the same end goal so we have a very simple outlook and our outlook is patient outcomes and practice income. [GPP7]

Finally, it is important that all staff align themselves with the strategy of the practice:

Having a vision as a practice; that everybody is on-board with the vision. Most, well all, of GP practices want to give good care to their patients but that's an end product, if the mechanism doesn't work then the end product doesn't happen. So you've got to have a good team pulling in the same direction or at least, you know, nearly in the same direction. [N5]

5.3.2 Resources

Participants frequently referred to the finite inputs that a GP practice has as components of its organisational health. Responses were sub-divided into three further themes, namely finance and investment, infrastructure and staff as a resource.

The financial position was commonly cited as a component of organisational health and, as already mentioned, a large part of the strategy of a GP practice is designed around maximising financial income. There are therefore a number of cross-links between the categories of *Strategy* and *Resources* in this respect:

I think appropriate funding, capacity, resources to meet the demand, that's just one of the things that has to shape everything because demand is high now. [PM6]

Historically, people have just gone in and done their clinical bit but not understood the whole fact that you have to prove things to get paid so people have got a bit sloppy with coding and things like that, easy things that could just bring you money. It's about doing the same work but actually getting paid for it and I think changing clinician's attitudes to the fact that finance doesn't come from just a big pot of endless money, you have to actually go through the right processes to get it, is difficult but it is necessary. Absolutely, they need to be in a good financial steady position because otherwise the whole practice would... when you feel like things are uneasy, you're not sure how things might go. [SGP4]

Yeah finances, critical... with the new contract there actually was quite a lot of money in general practice, in primary care and obviously that terrain has changed completely now and therefore you have to concentrate on making best use of the money that is available but I firmly believe that you have to keep your eyes open for opportunities. I've seen practices go in two different directions in the last few years – there's one lot who have reduced services, cut staff hours, cut staff pay and tried to survive that way and there are other ones which have said there are opportunities but you have to invest in order to do so and hold more hours. [PM2]

When we began to delve deeper in the financial resources of a practice, it became clear that it was whether or not this was reflected in subsequent investment that was important:

Our partners are very committed to the kind of NHS ethos about, you know, the staff welfare, staff wellbeing and those kind of things so if they're in a healthy financial position, money is released in order to develop staff, support staff, create a culture within the practice where people feel happy turn up to work because if people don't feel happy to turn up to work then you've got an unhealthy organisation and I think that will impact on the services that are delivered. So I don't think the financial position... it depends on how those funds are invested, how they're used. [PM8]

I think it is, it's really important. I think the attitude of the partners towards finance is very important. Will they reinvest the money into the practice and the surgery or are they looking to make... you now ...and I think that varies a lot amongst practices and certainly I'm really fortunate that the surgery where I've been working is very much about investing money in the practice and the welfare of the patients and improving things for their patients and not just trying to run a sort of profit making... obviously they want to earn money but they're not trying to fleece their patients. [SGP5]

I don't think it's an ideal business model because basically a load of money is given to them and then the objective is to spend as little of it as possible, so you can divvy it up at the end of the year. That's maybe slightly cynical. I think that's a problem; if you can't change that mindset then I think it's difficult to see what a healthy GP practice might look like because the financial health of a GP practice might only be apparent to those who've benefited from that. [PM8]

Again, it is important that we take stock of the landscape that primary care currently finds itself in. At a time when a number of practices are under considerable financial pressure, and some are having to close, the financial position of a practice becomes essential for its viability.

The financial pressures experienced by practices were mentioned by many:

There's no slack to invest in the services, no slack to invest in the staff who deliver those services. So yes that's my main concern around financial health in primary care it's the huge imbalance and the fact that the powers that be don't really recognise it. [GPP8]

I think it's fundamental because everyone needs to earn a living and at the moment I think people aren't striving to make too many profits in primary care right now it's actually just trying to balance books and becoming efficient and saving. [SGP4]

There needs to be a significant financial rebalance of the health service to make primary care healthy. [GPP8]

Participants were keen to discuss the infrastructure of a practice as an important resource and a component of its health.

I think it's prime to have a good, well set building with all the facilities for disabled people, for instance, and even non-disabled patients they need to go somewhere where it's clean, where their hygiene is there and other facilities otherwise we won't be able to perform our job anyway. [HCA2]

I think there's something about the physical environment, so it tends to vary a lot more than hospitals and it can be a place that you walk in and feel really happy to work or really horrible premises so I think there is something to say about physical environment. [SGP9]

The building is important, probably more important than we think. I've worked in a purpose built surgery most of my time and it was a perfect environment and I do look at some of the environments that others are trying to work in and think "How do they manage to do it?" ...because it works on a number of different levels, ours was single storey which meant that patients could... wheelchair patients: fine, easy of access and communication between everybody inside the people was huge; visibility of each other was massive – all of these things which make team working much better. So I think a nice open area where there's a lot of visibility of different people is a good office, accessible to the patients. [PM2]

The final resource listed by participants was the staff that work within a practice. Various facets were mentioned, including having the right number of staff and the right mix of staff:

The right level of staff mix is really important, not only from a clinician's point of view but... so I think primary care, for a long time, has struggled to meet demand and I don't think it's changed... but if anything the volume of demand and work has increased over the years ...and I don't believe that primary care teams – i.e. practices – have actually kept up with that. I think that's an issue right now. So we have a flow of patients who keep coming in, going out, and we're quite fortunate that our practice list has continued to grow ...and if I was honest I'd probably say our staffing and our clinical input hasn't grown in the same way. I think that's really important. I think one of the biggest struggles for primary care teams is ensuring the right capacity within the practice to meet the demand that's out there and I don't think we've got it right. I say that for my practice but I think in general we haven't. [PM6]

I think, from previous experience, it needs enough staff because the demands are increasing for so many reasons, which I'm sure you're aware of. So you need the doctor and you need doctors who are ideally willing to take on the of leading the practice and doing the various areas that need doing; you need the management staff, you need the practice manager, you need admin staff in terms of dealing with the letters, the reception staff ...so in terms of successful general practice you need to have not loads of staff but well managed staff. [SGP7]

Participants rarely highlighted the importance of their own role but did usually highlight the important contributions made by staff in other roles.

In terms of size, GP practices are small to medium sized organisations at their largest and workforce stability was felt to be another key feature by many participants.

A good team of stable people that have been there a while. So something about staff turnover, obviously you're always going to have staff turnover but you need some key people that are there for a little bit longer, so I think that's important for organisational health. [GPP4]

Not only are the right number and mix of staff required but they also need to be assigned the right job roles within a practice.

Having defined roles so that different people know what their roles are and trust, so people trusting someone else in their role – obviously they have to earn that trust to a certain extent but you do need to be able to delegate so you're feeling as if you've got to keep your finger in every pie or you're interrupting what other people are doing. So there's a degree of building trust and then letting go and being able to trust. [GPP4]

It's a combination of the right people in the right roles. So I've worked in a few different GP practices and, I'm not naming names, but I can tell the difference between certain ones because people are evidently good at their job and they know what to do and they just get things done. That's one part of it. [SGP2]

Over recent times, the more historical job roles assumed in primary care have shifted. A lot of this evolution has happened organically or at local level though increasingly it is occurring as a result of specific initiatives lead by external organisations and driven by financial incentives (such as the changing role of pharmacists¹⁴⁰). The impact of these evolving roles and its impact on the skill mix was mentioned in both a positive and negative context:

I think about the workforce and the skill mix. I think in primary care, nurses have been such an amazing resource and they have been allowed to develop and a lot of them have gone into leadership roles. So, again, 20 years ago a nurse was just like a HCA and primary care has allowed nurses to be almost independent practitioners so that's been a strength... [GPP1]

Staff are very important and you can't function in healthcare without staff and I think there's something about challenging the staff roles and responsibilities now and to see whether they are the right fit for the future... whether we need to think about the skills matrix again and what staff are doing throughout the whole organisation. [PM7]

For primary care to survive it has to be multi-skilled, it has to go way from the GP and have less GPs, have more nurses, advanced nurse practitioners, pharmacists, osteopaths, just have a large multi-skilled department; converting admin staff to healthcare assistants. [PM1]

We have to work in a different way and be innovative and it's about using HCAs etc etc, different workforce... though I still believe that a doctor can still do three times more than a nurse or nurse practitioner can do in 20 minutes... but I think there's a false economy there. [GPP1]

People with so many different kinds of responsibilities within that role that they can't necessarily deal with them all. [PM8]

I think it works in some roles. Say if you've got someone who is a receptionist in the morning and a HCA in the afternoon or vice versa then that works really well because that person gets an interest that they're doing two different jobs but they are not taking responsibility for everything. I think the problem with having a GP who is also the practice manager is how can you do both jobs? How can you spend your morning seeing patients and your afternoon seeing patients; when are you actually going to do the oversight running of the practice? ...I don't understand how that GP that's is doing both roles is able to function well as an employer because he's not giving his full time to it, he's too busy seeing patients in his other job. [SGP3]

I think that many GP surgeries are probably financially vague because like here, I'm in charge of finances – I haven't got a clue about finances... I understand numbers... I know how to manage... I'm not an accountant... but we have to reconcile and manage all the incomings and outgoings. Now I can do it in a real and logical way, in terms of forecasting I can do it in a logical way, I can have a pretty good understanding that we're not going to go bankrupt in the next two or three months, but lots of practices, they just won't have the capacity or the space to be able to do that, so I think that's a real problem and if you don't understand yourself financially, you're going to struggle to be able to develop and to be progressive and be strategic, as opposed to living day by day. [PM4]

The function of a practice manager in my eyes is finished. The jobs are redundant; they'll be phased out over a period of time. I'm expected to manage finances, manage compliance, manage IT, operation manage the service and anything else that comes through the door. You won't find many or any people that do all of that successfully... you can have experts doing expert functions, finance is an expert function therefore you need... it doesn't have to be at a very senior level, you just need someone experience of working in finance to do that. Same with compliance, same with performance management of contracts. [PM4]

5.3.3 Leadership

The importance of *Leadership* within a practice was a consistent topic within the interviews and a number of sub-themes emerged under this heading. Interestingly, participants were keen to identify the partners and/or practice manager as the *de facto* 'leaders' within the organisation. The clear demarcation of leadership may well come from the partner model of general practice in the UK, with the relationship between GP partners and their staff that of employers and employees, respectively.

I think for leadership, obviously we tend to look at the partners. [SGP9]

The partners as a group define what they expect as standards, professional standards in the place. [GPP6]

This includes less-explicit responses from GP partners and practice managers who self-identified as the leaders within the practice and spoke in the first person throughout. This also has knock-on effects on many of the aspects highlighted as important within leadership in primary care as they all relate to aspects of the relationship between leaders and their 'followers'.

The first of these aspects is that the figures considered to hold leadership roles in the practice are approachable to all staff. Indeed, when participants talk about the absence of hierarchy, they may well be underscoring the importance of leaders within the practice being approachable. There are considerable overlaps here with *Capacity for change*.

You want good leadership that's approachable, that deals with issues when they come up, that doesn't bury their head in the sand. [GPP4]

People who listen, who are approachable, so they actually take on board what you're saying and then they see it through and change things – not just appease you. [SGP4]

Leadership figures are required to provide direction for the practice and, in many ways, act as the figurehead for the implementation of the strategy of the practice. This direction

involves exerting control over the processes within the practice and the staff that work within it. As such, there are extensive overlaps with the themes of *Strategy*, *Ways of working* and *Staff wellbeing*.

That leadership figure, that almost inspiration, motivation, to organise the practice and manage the practice and make it flow I suppose. [N4]

As a leader you need to be the one to hold the line, bring people together, hold things together when they get really bad because that's when you're going to have to act as a leader, not when things are going all hunky-dory. [GPP8]

Something which can engage the people in the collective – that, for me, is leadership. [SGP1]

Interviewees also frequently remarked that leaders should provide both support and guidance for their staff. This ties in with *Staff wellbeing* and the role leaders have in fostering this within primary care.

The practice that I work in, the senior partner is very supportive and that's a real... it's fantastic, you know 100% she will support your decisions, she's behind you... whatever happens in the surgery, whatever happens clinically she would back you up or be supportive towards you and that's a really nice feeling. It's a supportive environment. [SGP5]

This should be provided in a fair manner and the fairness of the leadership within the practice will also have an impact on the wellbeing of practice staff.

I'm very honest and open and straightforward. So people know with me that they'll find genuine advice and I think that's part of it, it's integrity from your leadership... I think that honesty at the top level is very very important. [GPP7]

One of the most common attributes of good leadership in primary care was felt to be setting a good example and role modelling.

I think that behaviour by example is really important, being proactive, being inclusive, and being open so listening but also being fair and clear – so if decisions and difficult decisions are made they are made with a level of transparency so people are clear why things have been done. That's the way I'd like to be treated, that's the way I like to treat my staff and that's the way I like them to treat each other. That's all really important. That's hopefully what they'd say about me. [PM7]

So I think one of the really important leadership qualities is role modelling. I think people pay a lot of credence to leaders who do set an example, are basically about providing good patient care and good services for their population, as being the most important driver for what makes them get up in the morning. [GPP8]

It is worth noting that the absence of leadership within a practice may not be related to a lack of specific personnel with key attributes but be related to time pressures and workload.

I think there's a lack of leadership because of capacity issues that I'm so under pressure just to get through the day that actually you have trouble to set aside time, to spend time helping and supporting and discussing and reflecting on challenges. [PM4]

5.3.4 Staff Wellbeing

The importance of the health and wellbeing of the body of staff working within a GP practice was evident in all of the interviews conducted. Whilst we have considered the staff themselves as an important resource of a healthy GP practice, the retention of these individuals – and crucially keeping them happy and motivated – is vital for a healthy organisation. Again, there are extensive links to other themes, with factors influencing retention including the pride employees take in their job and aligning their personal values and beliefs with the *Strategy* of the practice. Furthermore, staff also place high stock in feeling valued in team decisions (*Leadership* and *Ways of working*) and that they're treated fairly (*Leadership*). Other positives participants suggest promote wellbeing include the provision of benefits, usually by way of pay or training.

Many of those interviewed stressed the importance of staff wellbeing by discussing many of the problems in primary care which can lead to burnout and problems with retention.

I think we're under a huge amount of pressure, the NHS has never been under such great pressure and wellbeing is really important because burnout is, at the moment, acute... we've got a workforce that is completely worked-out. [GPP1]

Sometimes we are overstressed, I can believe we are, but at the same time we try not to overload ourselves. [HCA3]

So for long term success, especially for general practice, patients have got to get continuity which requires retention of staff. [SGP4]

Deficiencies in other components of organisational health, especially a lack of resources, can have a significant bearing on the wellbeing of employees:

It's just when you're constantly fighting fire or when you feel that there isn't enough cover or capacity, that's when the organisational health will suffer and that's typically when people start leaving practices and we're seeing doctor after doctor leave and nurses and then it becomes a spiral and everyone else leaves as well. [SGP9]

Other participants took a more positive slant when considering wellbeing, with morale and motivation at work as two central components:

I would say an organisation in which you like to work, an organisation where you are prepared to give a lot, you feel satisfied, which provides you with a good balance between your other commitments in life... if you are cared for then you care for others, very simple. [SGP1]

A healthy GP practice needs a healthy team and healthy people. So they need to be self-aware and healthy themselves in functioning well as a team to give that. [SGP6]

Additionally, another sub-theme emerged around the formulation of positive working relationships with colleagues and the impact this has on *Staff wellbeing*. Perhaps this is particularly pertinent in a small-sized organisation such as a GP practice. These positive working relationships are forged through shared ideas and ethics with staff members working together with matched values and a collective passion.

So staff motivation, finding out why people are coming to work, what they'd like to achieve in their value sets – so you've got all the intrinsic values to look at – you try and match those and bend them towards organisational intent and cultural values; making the best of that's really important. [PM7]

I think it's, again, it's that whole thing about engaging with different staff because you can be quite isolated in general practice, certainly as a nurse and sometimes the odd day you've got a really busy clinic or something and you just thinking 'Oh god, I haven't spoken to anyone today' because you've just been really busy or you've just been able to get on with things and not had to get anybody for anything and only for the fact that we've got a common room that we can actually have lunch in all at the same time, that might be the first time you see anyone in the morning, especially if you've not had to call them in for something clinical or something. So I think it's that thing in the morning where everybody says "Good morning" to one another, so I do really think it's about team ethics. [N3]

I think it's really important because the reason people migrate to certain practices and stay is because they get on with people and they all kind of work in the same way and when you've got different personalities coming together who work in different ways, I think that it can be detrimental. [SGP4]

So I think we're working together to help patients, you're really building up a better, what's the word I'm looking for... you're all doing it for the same purpose and you're together, together – I think that's more powerful, when staff are motivated and feel valued. [GPP3]

Participants spoke of desiring a certain amount of control over their working practice, with a degree of inbuilt flexibility. This has obvious crossovers with the themes of *Leadership* and *Ways of working*.

I think it's really trying to retain staff by, if they're not partners, by ensuring the working environment is good, you feel valued, you're paid adequately, the work load is not insurmountable and you also provide your staff with flexibility, especially because – and this is going to sound a bit controversial – especially because the vast majority of the workforce are female so I think that is important. So if you're going to be very rigid in terms of clinical sessions, that's the sort of thing that makes me want to leave somewhere. [SGP4]

Where possible the system has enough flexibility to be able to listen to what they have to say and react accordingly and I think people value that kind of thing enormously. [PM2]

Aside from the work itself, the provision of some form of recompense is important. This includes adequate pay or the appropriate distribution of bonuses to recognise performance. Whilst wholly contracted to the NHS, GP practices are, in essence, private businesses and rates of pay can differ markedly between different practices. The issue of fair and appropriate pay can be considered a key maintenance factor for employee wellbeing:

I think fair pay conditions are essential. [N4]

I think that the more transparent it is and the fairer it is, the better. I think a healthy organisation is OK with perks and incentives and shares it out. [SGP1]

I do think people need to be financially rewarded. We don't work on a performance basis here but I think that people are well paid and that is important. [GPP5]

Motivating factors, such as the provision of training or capacity for personal growth also have an impact on staff wellbeing in primary care:

There are aspects of pay, aspects of skills, aspects of where people want to be in two, five years' time and beyond. A brave organisation will train people up and hopefully treat them so well that they don't want to move on. That's really important. [PM7]

We have a well versed route of career development for everyone, clinicians and non-clinicians... I think it's important to really support the staff, career development wise and it does affect retention because people don't want to leave you... The way we do that is through career development and incentivising. [GPP7]

If I wasn't offering training and I was just doing the same thing everyday then I think I'd be bored and want to go somewhere else that did offer training. [N2]

It is the atmosphere and the ambience where they work really because if you are working in an unhealthy health organisation then how would you want to be remaining there because obviously staff themselves have got their own lives and they need, obviously, to be looked after well at work, meaning that allowing them to progress, to attend training sessions, to deliver their work with confidence and the only way to do it is by equipping them with good training. [HCA2]

5.3.5 Ways of working

Sub-themes discussed here include the prevailing working culture of the practice and the importance of a strong team ethic.

I've never seen anybody say "No, I can't help you with that" or "If I can't deal with it, this is the person to speak to about it" ...the doors are always sort of 'please come and knock if you're in trouble or you're worried about something'. [N3]

Participants also stressed that it is vital that all processes within a practice are up to date and clear.

Ensuring that the clinicians are up to date, that they follow the latest guidance in terms of clinical and organisational things... up to date policies, protocols. I think a lot of this is governed by CQC inspections, so part of their remit is to look at the broad side of the practice in how we operate in terms of guidance, policies, protocols, staffing levels, patient engagement. I suppose my mind is just thinking along those lines, that is what we need to adhere to. I suppose most of them sit in if we've got it right as part of a healthy organisation. [PM6]

Good protocols to follow... direction, I feel that if you've got a clear direction of what you're expecting from myself and tell me what you want to deliver and clear direction of what you're expecting me to do and what you want me to deliver it's down to myself to deliver that in that way that both parties are happy. [HCA1]

This is achieved through organisation and structure and these were perceived as organisational strengths by a number of participants.

It needs to be well organised. [N4]

People knowing what their role is; people knowing what to expect; people knowing that they'll get help when they hit a problem. [PM7]

The importance of non-clinical staff in the smooth day-to-day running of the practice also emerged from a number of the interviews.

An organised practice manager who knows the system and how things work. [SGP5]

A huge amount of the day to day work in a GP practice is on the shoulders of smooth administration. I think that's a very overlooked but important part of the GP practice. I've worked in places before where you send a request, or a referral off and it doesn't go through, you don't find that out until weeks later and the patient's come back, they're angry, they're annoyed and quite rightly – they have every right to be – because they've probably missed out on something that they needed weeks ago. So the organisation on an administrative level is really important I think, that's one of the things. [SGP2]

Much of the discussion around this theme centred on plans that some practices have around merging. The rationale of these practices is that by working-at-scale they can operate in a more efficient and financially robust manner. As such, many participants illustrated the need for efficiency with discussion over merging.

I think that my general point about the performance of a practice is it goes back to economies of scale. The bigger you are, the more you can have experts doing expert functions, finance is an expert function therefore you need... it doesn't have to be at a very senior level, you just need someone experience of working in finance to do that. Same with compliance, same with performance management of contracts. [PM4]

Of course there's resilience in working with a large group of doctors and that's very... that's slightly safer. [GPP3]

As well as being processes being clear and efficient, they must not be too rigid as a certain amount of flexibility is required. This flexibility allows processes to adapt to the local population or to variable demands.

The problem is we all work so differently, we all have our own systems, you can't really standardise the way a practice works, it depends on the local environment. [GPP3]

It has to be flexible and it has to be done in an amount of time which doesn't lend itself to completely organised and standardised processes. [SGP1]

Finally, many participants specifically highlighted the need for an open "no blame" culture.

You learn from mistakes, if you don't have that odd one then it's no good saying everything's OK when you don't know from mistakes and you have to learn from mistakes to be able to move forwards from those sort of things. [HCA3]

I personally think a no-blame culture is absolutely fundamental and I always say this to everybody I come across and I absolutely mean it, you know, if somebody makes a mistake that's fine, we talk about it, we put it right, we learn from it and we move on. And I think if you have that kind of culture with your staff, then you have the opportunity to have a discussion with the staff about what the overall aims of the surgery are, that the staff will take their cue, by and large, from the GPs - so if the GPs or if the clinicians have a sense that they're trying to look after the patients then they can carry everybody with them. So it's a push and a pull if you like; the pull comes from finding an example - I personally, in my dealing with patients, and I think management in their dealings with patients, should show the kind of compassion and decent care that they're trying to promote, that the whole place is doing, but the GPs are they key to it and if the GPs pull that way and then if you can find the staff with a decent environment in which they're working - a supportive environment - then I think that those two things go together. [PM2]

5.3.6 Capacity for change

The first essential component for organisational change is motivation. Primary care has been through a raft of changes over the past decade and continues to evolve as it is shaped by a number of external drivers.

I think it's the culture of the organisation in terms of both the ability and willingness to embrace change. [GPP8]

I think, first and foremost, open mindedness... open to changes. [N3]

So your traditional general practitioners are traditional. They just like saying 'right this is the way we do it. There's no other way'. [GPP7]

This succession of changes has left many leaders in primary care 'change-weary' and this is also a subject discussed by many participants.

A really difficult thing to be in this current climate because if you're resistant to change – even if it's good change – because you're just change weary because there's been so so much. [SGP6]

I do think in general practice, in primary care we're going through a very difficult time. Not just in terms of professional practitioners and feet on the floor but providing the practice with all the re-organisation that we go through and it happens so often and you rename things and just the renaming process is an organisational hazard. [GPP5]

I think at the moment primary care probably hasn't got the breathing space to do that thinking probably it's too busy dealing with the day to day demand and is just knackered and burnt out. You need to have the emotional and intellectual energy and the capacity to develop a practice and to take it on to new things. [GPP8]

I think the problem is when you get people who are very experienced and they've gone through the change process five or six times and are quite jaded and certainly you might see that with senior partners and practices with very experienced GPs – whereas when we all start we're all new and enthusiastic and prepared to embrace it but I think even after only five years I've seen the same cycles happening again and you start to think it's a bit pointless. [SGP9]

The importance of the leadership of the practice, which again is depicted as the partners and/or practice manager, in driving change within the organisation was a frequent topic of discussion.

I think leadership is key, that for me is the key thing... and I didn't realise that until I actually got here, how important leadership is in driving change. [GPP1]

Particularly in today's circumstances you need to have flexible management, you need to have management that's prepared to change, to look around and see, on the one hand, opportunities. [PM2]

Once the motivation for change is established, the need for change then must be communicated throughout the organisation, often through practice meetings. This has links with other themes in our model as it requires input from leadership and has significant bearing on the wellbeing of staff.

Communicating with the rest of the team well so that they don't hear whispers and not really know what's going on – so keeping the team with you and understanding what steps are being taking. [GPP4]

Good communication between every level of staff - through from the cleaner to the senior partner can engage in conversation; regular meetings. [N3]

Indeed, having regular practice meetings was mentioned by many when explaining how organisational change works in their practice:

I think that one of the aspects of the practice meeting is suggestions for change and that's on a weekly basis so if there's been problems during the week – like a patient's had to wait an hour to be seen because a doctor or nurse is running late and the staff say "This is becoming a regular event" then we change it... so I think that having the structure allows for change to be implemented responsibly. [GPP5]

We have monthly meeting where we sit down and we listen to each other, we listen to the receptionists, we listen to the doctors and the nurse and we put it on the table and we deal with it - it keeps the system ticking. [SGP8]

I do believe in meetings, I do like a meeting, I know that they're time consuming. You set an agenda, and your points and make sure that your whole team is singing from the same song sheet because if you're not it's going to be out of sync and that's with anybody. [HCA1]

Opening organisational-wide dialogue is crucial for organisational change as it allows decisions to be made as a group. Instilling a sense of ownership is important if change is to be successfully implemented.

I've got friends who are practice nurses and they say 'We just don't get any communication between GPs... or someone will just come and tell us this is what we're doing'. That's never happened at this practice we've always sat down and said 'What do you think about, you know...', 'Do you think that we could do this or could do that?'... it's very much a team effort and that engagement just makes such a difference. [N3]

The best way to do it, I think, is to get everyone on board, everyone feeding into the process so they get a sense of ownership. Just by consulting people and asking for their opinion is one way to get them on board and then addressing the bits that they've suggested that you're not necessarily going to take forward by feeding back on those rather than just... again, just applying it... often the very people who you are imposing the changes on are in the best position to know what will work and what won't work and they may have seen several change policies come and go and fail before so there's a kind of collective expertise in knowledge at all levels. So it's good to find out what everybody thinks of those ideas. [PM8]

We should be taking everyone's opinion... all of us involved in the patient care so that they, all the stakeholders should give their opinion on major changes. [SGP8]

I think it's better if you make decisions as a group, as a team, because then you've all inputted into it and you're more likely to support it. If you didn't have a discussion and changes were imposed on me, I'm more likely to not embrace those changes because I'm thinking 'Why are you doing this to me when I know it doesn't work and you're not listening to why it doesn't work?' [SGP3]

It does work and when you have that conversation and when you make a decision as a group, whether you're a salaried or a senior partner, then that means that everyone embraces the changes because you've decided it together. [SGP3]

I think it's better to discuss it in meetings and take into account everyone decision and point of view or opinion. [HCA2]

The key behind then successfully implementing change in primary care is the use of pilot/feasibility projects and robust evaluation.

So we felt we could go and say 'This just isn't working could we go over to an appointments system?' and everything is 'Let's have a go and see how it goes...', 'Let's look at it again in a month's time' or something, see if works - if it does, let's carry on, if it doesn't we revert back to what we were doing or think of something else. So definitely within this practice that's definitely made a difference to how the practice works. [N3]

Change, it's showing... piloting little things to do. [SGP6]

At the moment, in our practice, we're trying to change things round so it's about evaluating things as we're going along and making people feel comfortable. [SGP4]

We're moving from kind of audit based stuff to quality improvement stuff where we're monitoring things as they're going along, so week by week updates. [GPP7]

5.4 Discussion

5.4.1 Summary of main findings

This study provides new insight into the essential elements required for sustainable high performance in primary care and is the first study to develop a theoretical framework for organisational health within a GP practice (*Figure 5.1*). Participants identified six main themes, namely *Strategy*, *Leadership*, *Resources*, and *Staff Wellbeing*, *Ways of working* and *Capacity for change*.

Participants felt that the *Strategy* of a practice was shaped largely by balancing accountability towards both patients and performance and financial metrics but that it was important that this was clear and that all employees had alignment with the same goals. *Leadership* was felt to fall heavily on the shoulders of the GP partners and practice manager. A healthy GP practice has approachable leaders who offer support and guidance and are exemplars for other staff. The *Resources* a practice can draw upon include not just the infrastructure but the staff themselves. Provision of the correct staff, working in the correct roles, was felt by participants to be particularly important, especially in this time of evolving job roles within primary care. The financial investment in a GP practice also emerged as a vital resource. Healthy GP practices depend on a motivated workforce and *Staff Wellbeing* was a major emergent theme. Participants felt that a feeling of control and value, allied with the provision of an appropriate salary, were positive reinforcing qualities. The *Ways of working* adopted by a healthy GP practice must be clear, up-to-date and efficient. The importance of fostering a 'no blame' culture was also frequently discussed by participants. Finally, the *Capacity for change* within a practice was seen to require staff with the motivation for change who were then

willing to discuss this with the whole practice to allow for shared decision making and instil ownership at every level.

Whilst the themes listed above have been discussed separately, extensive overlaps exist between each. This became particularly apparent during the coding process with many participant responses falling under a variety of headings. Such links between themes are to be expected given that a practice cannot be considered to be a healthy organisation unless it has a strong provision of each of these elements.

5.4.2 Strengths and limitations

Whilst existing performance metrics, such as the QOF, doubtlessly include process as well as outcomes, no performance monitoring framework can have the requisite variety to express the myriad, nuanced organisational and system processes that contribute to outcomes within any specific institutional setting. It is this argument that has led us to take a qualitative approach to understanding the up-stream drivers of outcomes within a GP practice, through the lens of the concept of organisational health. To the best of our knowledge, this is the first project to consider organisational health in the context of primary care. This study has also benefited from being conducted by a truly multi-disciplinary team comprising both clinical researchers and non-clinical researchers from the fields of social science and organisational behaviour and management. The different perspectives of the research team have all filtered through and enriched the analysis and outcome framework presented here.

The limitations of this work include, as with most qualitative research, that the small sample of participants may not be representative of all primary care workers. Also, whilst participants

herald from twenty-one different GP practices, all come from one geographical region led by convenience sampling. Though participants were recruited from a range of different practices and job roles, all work within urban practices and such sampling error suggests work may well not be generalisable to other regions. There is also the issue of volunteer bias as self-selection can introduce skewed perception. Finally, it should be noted that the work presented here may well suffer from temporality and that a variation on the themes discussed here could be found were this same study to be performed at a different time when the stressors and external forces being placed on primary care differ from now.

5.4.3 Comparison with other studies

The framework presented here is similar to the one our group have derived for the acute healthcare sector with themes such as *Strategy*, *Leadership* and *Staff wellbeing* remaining as constants in both contexts.³⁸ The structure has not simply been replicated however and the analysis has yielded a more parsimonious model with only six themes (*Figure 5.1*), compared to eight for acute NHS trusts (*Figure 2-1*). This reflects the manner in which these themes emerged from the interviews and could be considered to represent participants' views on the differences between these healthcare contexts.

As is outlined in the *Methods* section above, the interview process itself was split into two phases: an initial open inductive phase with broad questions and lacking in definite structure, and a second more framework-driven phase utilising a number of prompts. These prompts were initially based upon the themes that were derived from a previous qualitative study carried out by our research group within the acute healthcare sector. Prompts were triggered if certain topics were not touched upon within the first half of the interview. In keeping with

the process of theoretical sampling, the prompts evolved iteratively as analysis proceeded. It is important this methodology is revisited prior to any discussion of the topic of patient safety which emerged as a distinct and key theme within previous work in the acute sector.³⁸ This was not the case within the primary care sector as, despite thirty-three interviews, no participants directly mentioned patient safety as a component of organisational health.

When prompted, interviewees were quick to echo sentiments around the importance of patient safety but this somewhat different from organically discussing the topic and could be considered to reflect participants' eagerness to please and give a "correct" answer. Whilst this could be said to represent a potential weakness in the study design, it is important to be reflexive about the interview process itself. Interviews were all carried out by SPW, a researcher and clinician from Imperial College London and St Mary's Hospital, London. The impact of such an external individual, visiting your practice and asking questions regarding performance in healthcare, should be examined alongside the context of increasing accountability to external agencies, with words like "fear" and "survival" now often the lexicon of choice for practices due CQC visits.¹⁴¹ One should not underestimate the potential effect this may have had upon responses given during the second half of the interviews when it becomes difficult for participants to openly disagree with any potential topics posited.

There are a number of other reports in the literature observing that patient safety, as a concept and in contrast to other settings such as the acute sector, is less developed in primary care.¹⁴² This also rang true within this study, with participants, even when prompted, often either querying its significance, relative to other elements, or questioning whether it exists as an explicit concept within primary care:

[When asked if patient safety is a component of organisational health in primary care] I suppose... it's not a dangerous environment to come into, we're not doing dangerous... most of us are not doing dangerous things to people other than prescribing, injecting a few joints and doing a bit of minor surgery so it's as sort of different arena isn't it? And also we have the continuity of care so... which the hospital doesn't so I think patients going to hospital, it's more of a fearful environment for them - there's more potential for things to be unsafe there than here. [GPP6]

At the end of the day do patients want to feel safe in our health service? Do they just want to be referred and given a script? Is that their level of being safe – “I get what I want”? It's a really tricky one. [PM7]

When a patient walks into anywhere – let's just talk about this practice, my practice – I feel that their safety is paramount but I'm assuming it almost, which is perhaps wrong. We don't just put a lot of stock by patient safety - I suppose in a sense it's more patient satisfaction. So yes I think it's assumed. [GPP5]

Patients rarely ever say “I feel safe going into that practice, I know they'll look after me” it's always about appointments, dignity and respect, how are they treated on a personal level ...the message from me would be that next stage of this travel in GP land is what information would give a patient satisfaction that what we do is promoting their safety? Is it about the number of significant events we have? Are they interested? [PM7]

However, there is something of a degree of ambiguity in how questions were phrased within the interview guide as there is no definition provided as to what “performance” in healthcare actually comprises. Hence could be suggested that patient safety exists within the participants' implicit definition of performance itself and so and participants do not volunteer patient safety as an element of organisational health because it is an outcome of good organisational health. This tentative conclusion was put back to participants during later interviews.

For me, as a clinician, as a doctor, I think patient safety is the outcome of the clinical consultation. [SGP8]

We would probably see the patient safety as a result of the process, the systems being in place, the IT, the admin, everything that they do. [SGP9]

I hadn't mentioned patient safety at all but then I was thinking that actually part of the organisational culture and the service we provide, customers coming here is that we provide a good service – so what does “good” mean? [PM7]

I was thinking that as I was talking that we haven't mentioned much about the patients and their experience but I think certainly it's... you're not going to get good patient safety or good quality care if there's a lack of health, resilience, staff, etc in the organisation so I guess that's where it's implied. [SGP6]

Though equally it could be suggested that patient safety warrants incorporation under the heading of *Ways of working* as another vital facet of activity within primary care.

Safety is certainly an element that you should look into because obviously you have to have safe practice anywhere, be it in a hospital or in a general practice. But you can't just have safety and ignore other elements because they go hand in hand together. There's all the other processes you need to get safety. [HCA2]

Interestingly, organisational resilience, a central theme in the organisational health of an acute trust, finds no explicit place in the framework presented here. If one is to reconsider each of the themes in turn however, it might be suggested that resilience is an important aspect within each of them. Furthermore, it could be argued that resilience is implicit in any definition of organisational health, since an organisation must be resilient to perform consistently well in the long term. This is particularly true in primary care, given the shifting external forces which in many cases threaten the viability of GP practices, and this has been included in the diagrammatic model of organisational health found in *Figure 5-2*. This essentially represents a hierarchical ordering of the elements of our framework with resilience as a protective outer ring. As a model for organisational performance, it has similarities to Weisbord's six-box model in its shape, the core role it finds for leadership and with the depiction of interactions with the environment.¹⁴³

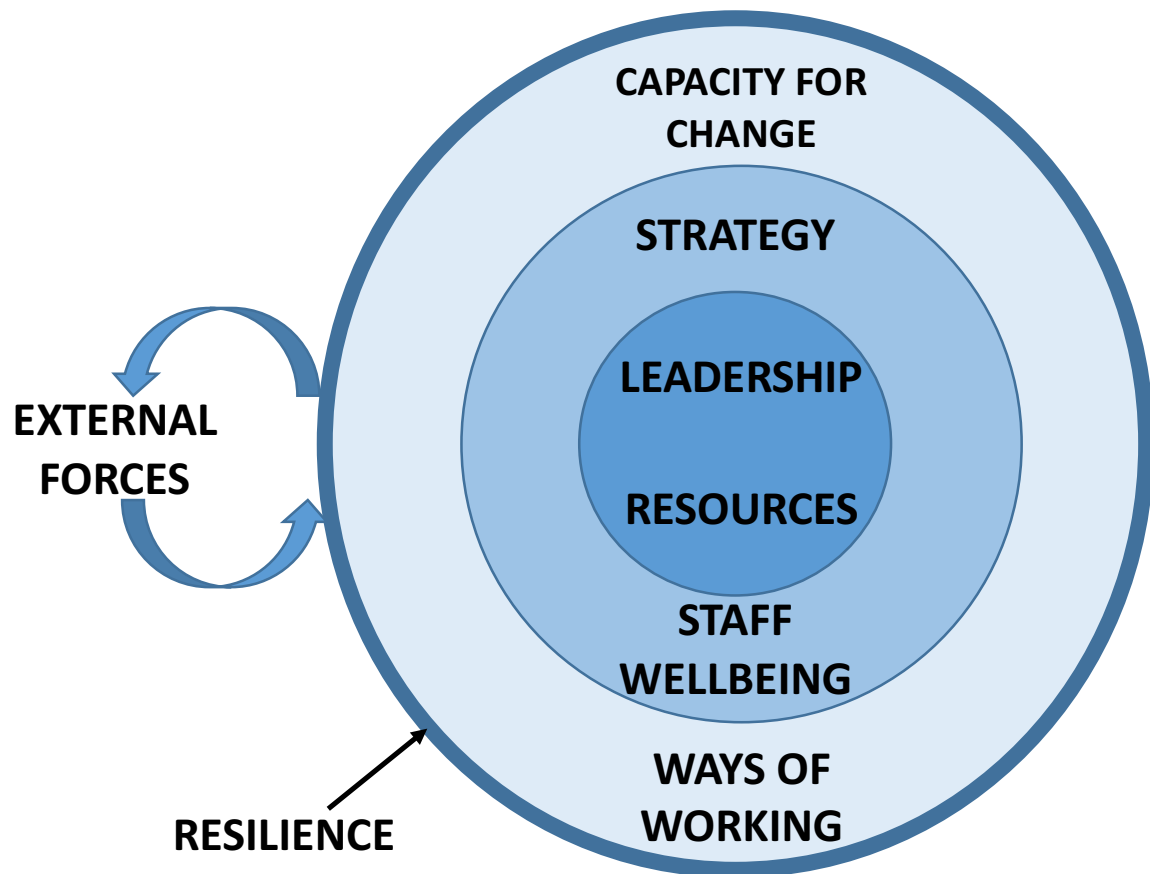


Figure 5-2: Diagrammatic model of the organisational health of GP practices

Organisational health, as a concept, has been defined in other contexts outside of healthcare and many of the elements overlap with those found in this study.²³ In one of the hallmark papers describing organisational health in the education sector, Miles notes the importance of resource utilisation, staff morale, goal focus and innovativeness; all themes which have direct links with those discussed above.¹⁶ In a more recent business-focused definition, De Smet *et al.* list direction, accountability and external orientation (all of which could fall under *Strategy*), motivation (*Staff wellbeing*) and culture and climate (*Ways of working*). They also consider leadership to play a pivotal role which is, again, consistent with much of which emerged from our interview study.¹⁴⁴

Moving outside of the concept of organisational health, other theories from the management literature share commonalities with the elements which emerged as important for long term high performance from our study. Indeed, the Donabedian model of healthcare quality stresses the importance of Structure, Process and Outcomes.¹ The first two of these are present within our framework and the latter could be said to relate back to the broadest definition of organisational health.

Complexity theory holds that organisations are complex adaptive systems capable of continually adapting and evolving in response to the environment around it.^{145,146} This is represented within our framework in the themes of *Strategy* and *Capacity for change*. Social worlds theory suggests that process within an organisation is the result of interactions between two or more social worlds.¹⁴⁷ Rhydderch *et al.* suggest that this is seen in the conflict within a practice in balancing targets against best patient care: this is a return to this idea of balance we stressed in our theme of *Strategy*.¹⁴⁸

The sub-theme of accountability emerged very prominently as the major driver of a practice's *Strategy*. The '*complex web*' of accountability relationships in primary care and the potential conflict which this can precipitate is a topic which has been characterised particularly well in other studies.^{149,150}

The sub-themes participants listed when discussing their practice's *Capacity for change* are very similar to the steps laid out by Lewin in his classic 'Three Steps of Change' model.¹⁵¹ These include the need for motivation, good communication pathways and implementation with close monitoring.

Considering the theme of *Ways of working*, we are far from alone in championing the importance of organisational culture for high performance, even within the context of healthcare.¹⁵² Many of the other sub-themes participants mentioned when discussing *Ways of working* mirror the five domains of the Care Quality Commission and reflect an emphasis on working to explicit standards of care.¹⁵³

Staff wellbeing has been characterised elsewhere in a similar manner to the sub-themes presented here. The two-factor theory posits that wellbeing requires motivating factors such as involvement, responsibility and meaning, as well as maintenance factors such as status and salary.¹⁵⁴ Other, more recent, models of wellbeing also echo ours with inclusion of career development, shared values and financial recompense.¹⁵⁵

The financial pressures faced by many in general practice currently are acute and the participants in this study are not alone in voicing their concerns over how lack of financial resources risk down-stream outcomes with patient care.¹⁵⁶ In this time of financial austerity, the absence of adequate *Resources* threatens not only the organisational health of some practices but also, ultimately, their fundamental viability.¹⁵⁷

5.4.4 Implications for research

Through defining organisational health in a primary care setting we hope to improve the way performance is considered, and indeed measured, in the future in this healthcare context. Whilst performance metrics exist within primary care for some of the elements that comprise our organisational health framework this is not true for all and we believe that the

development of a new comprehensive tool would allow for the quantitative evaluation of potentially neglected domains. This will be considered in the chapter which follows.

Chapter 6: The development and validation of a novel instrument to measure organisational health in general practice – the GP-OH survey

6.1 Introduction

As in any sector, high performance is a key goal for all healthcare organisations. Since 2004, performance in primary care has been measured using QOF indicators.¹⁵⁸ The impact of this scheme has been somewhat divisive and, indeed, there are growing calls within primary care for an extensive revision as to how performance should be both measured and rewarded.¹⁵⁹ Setting aside concerns over the risks of manipulation and ‘gaming’ of the system, one of the central aims of QOF is to drive incremental improvements in quality through the continuous measurement of a series of specific indicators.¹⁶⁰ However, this presents other dangers as purely focusing on down-stream targets can narrow the focus of a practice and risk short term benefit at cost of risk to long term ‘health’ of the organisation and so its future success.^{38,161}

As has been outlined throughout this thesis, organisational health shifts the focus of measurement up-stream and considers the elements needed for both high performance and sustainable success in the long term. However, existing instruments have not been designed or tested in the context of primary care.^{38,105} The aim of this study is to design a new instrument to measure organisational health within primary care and so answer **RESEARCH QUESTION 6: Can organisational health be measured in primary care sector healthcare organisations?**

As something of an abstract construct, organisational health (applied within the context of primary care), like all latent variables, defies conventional direct measurement. As such, one must theorise and then test suitable proxies. Following on from the successful measurement of this construct in other contexts,³⁸ a survey was designed, populated by a range of items covering each facet of organisational health in primary care – as outlined in the qualitative study presented in the previous chapter.

Constructing a useful and robust measurement tool for a concept as intangible as organisational health is not without its challenges. Here, a step wise approach is taken to survey design, in keeping with standard practice,¹⁶² to ensure that the validity and reliability of the resultant survey is examined at multiple stages.

Organisational health, as a construct itself, is complex and varied. Using the qualitative framework, derived in *Chapter 5*, as a base, it can be considered as a series of sub-constructs, each simple enough in structure to be considered as a continuum (*Figure 5-1*). Mapping out each sub-construct in this way allows us to identify qualitative levels at which a particular respondent may lie. These construct maps can then be used as a guide in the creation of a number of items, each representing a ‘real world’ manifestation of the theoretical construct. Each item must be closely related to the construct, ideally such that the construct is responsible for a given participant’s response to the items. If this is true, then the item responses allow us to make inferences about the underlying construct (*Figure 6-1*).

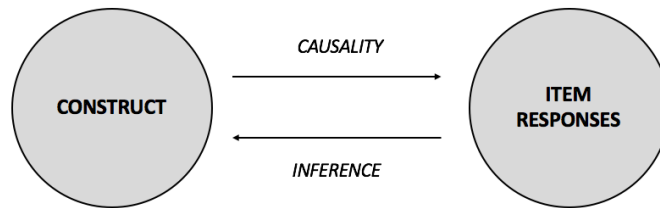


Figure 6-1 – Idealised relationship between construct and item responses (reproduced from Wilson, 2005)¹⁴⁶.

Psychometric modelling can then be used to test how the item responses actually relate, in practice, to the underlying construct and allow for examination of the validity of the survey.

Using the process outlined above, this chapter presents the development and validation of a novel tool to measure organisational health in general practice: the *GP-OH* survey. Its objectives are to:

- 1 – Generate a series of items to represent each sub-construct of organisational health (in the setting of primary care)
- 2 – Refine these items, based on their content validity, into a useable survey
- 3 – Test this survey to allow examination of both its internal construct validity and reliability

6.2 Methods

Development of the *GP-OH* survey involved three distinct phases: (i) construct mapping and item generation, (ii) content validity assessment and (iii) testing of the survey in its target demographic to permit construct validity examination by way of factor analysis.

6.2.1 Phase (i) Construct mapping and item generation

Following on from the qualitative work presented in *Chapter 5*, organisational health within the context of GP practices was considered as six related dimensions: *Strategy*, *Leadership*, *Resources*, *Staff Wellbeing*, *Ways of working* and *Capacity for change*. In keeping with the axial coding strategy employed in this qualitative work, each of these dimensions themselves represents a higher-order sub-construct of organisational health, as can be seen in *Figure 5-1*. Each of these sub-constructs was individually mapped, according to the principles outlined by Wilson (2005).¹⁶²

The layout of these construct maps is shown, in skeletal format, in *Figure 6-2*. The construct is mapped as a continuum, from high to low, in the central part of the figure. The left hand side of the figure considers the full range of respondents, each with a different sense and expression of the construct, while the right hand side plots these respondents against their corresponding responses to an ideal set of items.

Creating these construct maps involved re-visiting the qualitative output from the previous chapter and, for each construct, ordering interview responses on the right hand side against potential respondent levels on the left hand side.

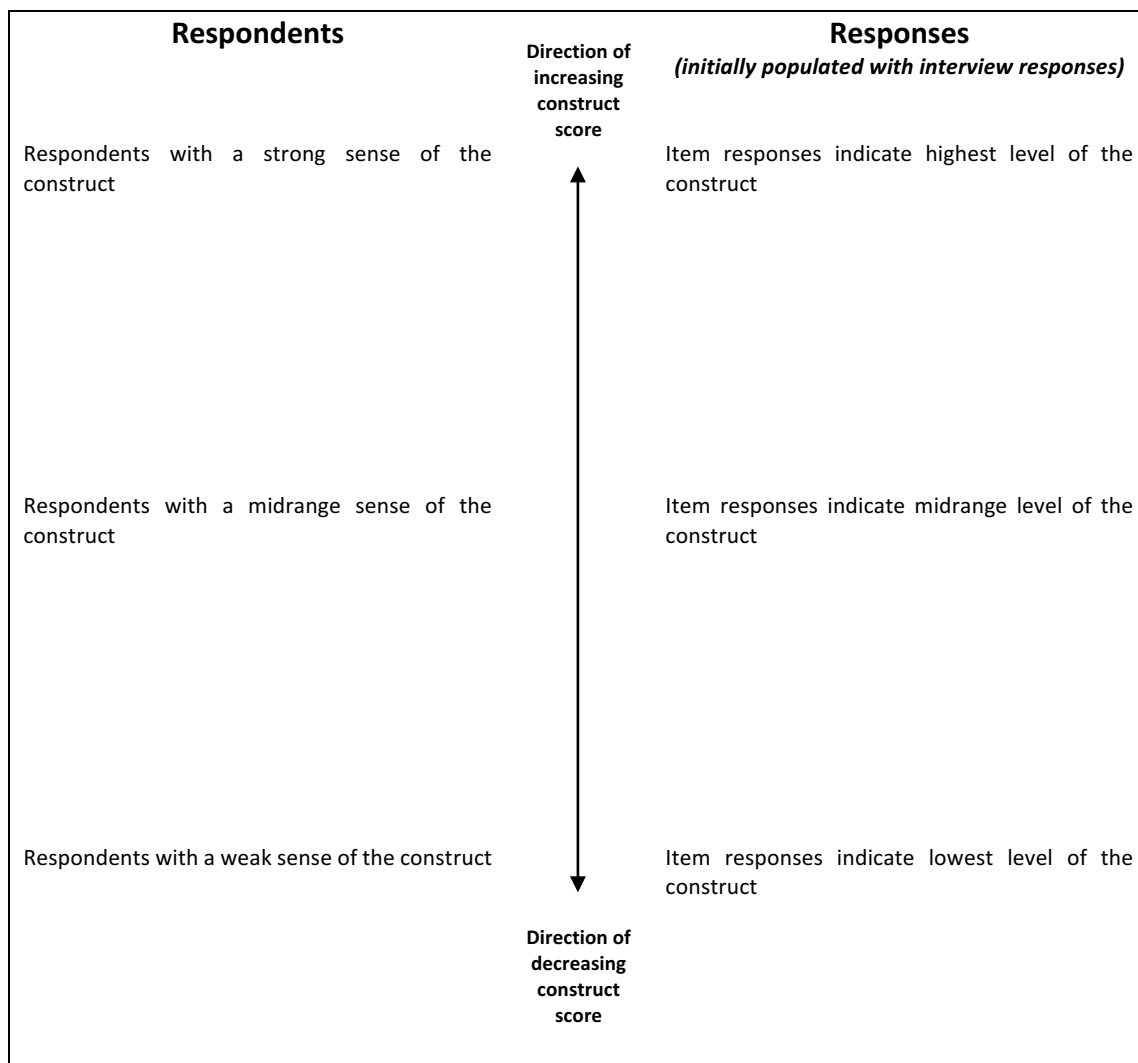


Figure 6-2 – Skeletal structure of a construct map, as described by Wilson (2005)¹⁶²

The construct maps were then used for item generation. Draft items were created for responses across the continuum of each construct. Where possible, draft items were derived from the interview quotes themselves, to ensure they were rooted to underlying theory as closely as possible. A selection of items from the *Healthcare-OH* survey (for acute NHS trusts as considered in earlier chapters) were also transposed across to their corresponding theme, as appropriate.

The chosen outcome space for items was a Likert-type fixed response format. This was chosen for reasons of historical continuity, as an identical format proved a very effective strategy

within the *Healthcare-OH* survey.^{38,47} In keeping with this, a seven-point scale was used consistently for each item (see *Figure 6-3*). Responses were anchored by the statements ‘*strongly disagree*’ and ‘*strongly agree*’, with ‘*neither agree nor disagree*’ in the centre. An option to select ‘*does not apply*’ was also included in case a participant feels a particular question is not relevant to them for any particular reason.

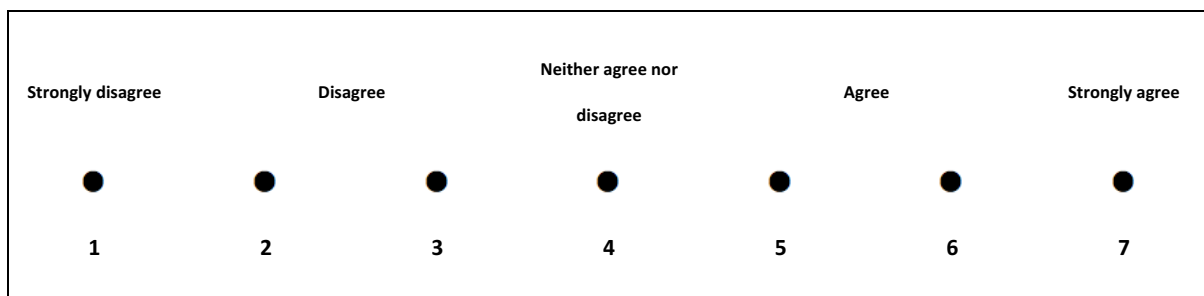


Figure 6-3 – Fixed response format for Healthcare-OH survey, using a seven-point Likert-like agreement scale. Bottom row denotes scoring system for responses (for positively phrased items) – *this represents a re-production of Figure 3-2 in keeping with the continuity of the outcome spaces for the Healthcare-OH and GP-OH surveys.*

6.2.2 Phase (ii) Content validity assessment

A panel of eight subject matter experts (SMEs) were invited to review the draft items. All SMEs were practising GPs with significant involvement in healthcare performance and were approached for participation by email. Involvement was voluntary and written consent was obtained in each case. Each SME was sent a summary of the background and purposes of the *GP-OH* survey and a copy of the draft items for each construct. The appropriateness of each item was rated as per the item level content validity index (I-CVI).^{163,164}

SMEs were asked to rank each question for clarity and relevance (to the construct in question) on a four-point ordinal scale as either *not relevant/clear* (scoring 1), *somewhat*

relevant/clear/needs revision (scoring 2), *relevant/clear* (scoring 3) or *highly relevant/clear* (scoring 4). Following best practice guidelines, a minimum of 3 SMEs were required for content validity assessment.¹⁶⁵

CVI-I essentially represents the proportion of SMEs rating an item either 3 or 4 and, when items are rated by eight SMEs, a CVI-I > 0.87 is considered acceptable.¹⁶⁵ Items with a satisfactory level of I-CVI were retained and taken forwards to form the draft *GP-OH* survey. Qualitative feedback from SMEs was also used to rephrase a number of items.

6.2.3 Phase (iii) Testing the GP-OH survey

The final stage of development involved testing the survey within its target demographic: members of staff working at GP practices in the UK. The draft *GP-OH* survey was created within Qualtrics (Provo, UT), under University subscription agreement. The online survey next underwent a number of cognitive walkthroughs completed by potential users of the survey. Qualitative feedback at this point allowed for potential issues with survey presentation and usability to be identified and addressed.

The survey was then disseminated within GP practices across both London and the Northwest of England. This required ethical approval (IRAS ID 234814, NIHR Portfolio CPMS ID 37378) and recruitment was aided by the NIHR Clinical Research Networks of Greater Manchester, North Thames, Northwest Coast, Northwest London and South London. As with the *Healthcare-OH* survey, the *GP-OH* survey was open to all staff members working across the full range of job roles in a GP practice, from GPs themselves through to practice nurses,

healthcare assistants and phlebotomists and non-clinical staff such as practice managers, administration staff and receptionists.

Staff were invited to participate by email with this message acting as both the information sheet for the study and also containing the URL weblink to access the survey itself (see *Appendix E1*). Consent was given by following the link and completing the survey. All participation was voluntary, anonymous and confidential.

Results were analysed using confirmatory factor analysis (CFA). This was used for both item reduction and to explore the dimensionality of the survey. All models tested were based around a six factor structure, with each factor representing one of the dimensions of organisational health in primary care (as defined in the previous chapter as *Strategy, Leadership, Resources, Staff Wellbeing, Ways of Working* and *Capacity for Change*). Pre-specified models examined single order relationships between the survey items and the dimensional constructs they were headed under. All models were evaluated using MLR estimation (maximum likelihood with robust standard errors), since it is robust to both non-normality and missing data.⁶³

Model fit was estimated using commonly reported goodness-of-fit indices: root mean square error of approximation (RMSEA), comparative fit index (CFI) and standardised root mean square residual (SRMR).⁶⁴

Factor reliability was assessed using McDonald's model-based Omega, which considers both the factor loading and residual variances of all items for a particular factor.^{68,69}

Initially, a full model was estimated using all items within the draft version of the survey. Item reduction then proceeded in a step-wise process based on both statistical and theoretical reasoning. Using structural equation modelling, such as CFA, for item reduction in an exploratory manner such as this is an accepted technique with increasingly widespread use in survey development research.¹⁶⁶⁻¹⁶⁸ This process begins by examining the output of the full model to identify lower quality items, namely those which load poorly onto their relevant factor (commonly taken as a standardised factor loading <0.3).⁷³ These items are removed and the model is run again with only the higher loading items retained. This process of item reduction continues, on an iterative basis, with items removed based on their relative contribution to model fit but weighed, in each case, against their value and coverage of underlying theory. Modelling continues until the best fitting, most reliable structure emerges.

6.3 Results

6.3.1 Phase (i) Construct mapping and item generation

As is discussed in detail in *Chapter 5*, organisational health within the context of GP practices can be considered as six inter-related dimensions: *Strategy*, *Leadership*, *Resources*, *Staff Wellbeing*, *Ways of working* and *Capacity for change*. These are depicted in *Figure 5-1* as higher-order sub-constructs of organisational health (denoted “II”) but they remain too multifaceted and complex to be mapped as a continuum. Returning again to the theoretical model which emerged from the qualitative work in the previous chapter, each of these sub-constructs was mapped at a further lower level (denoted “III” in *Figure 5-1*).

Accordingly:

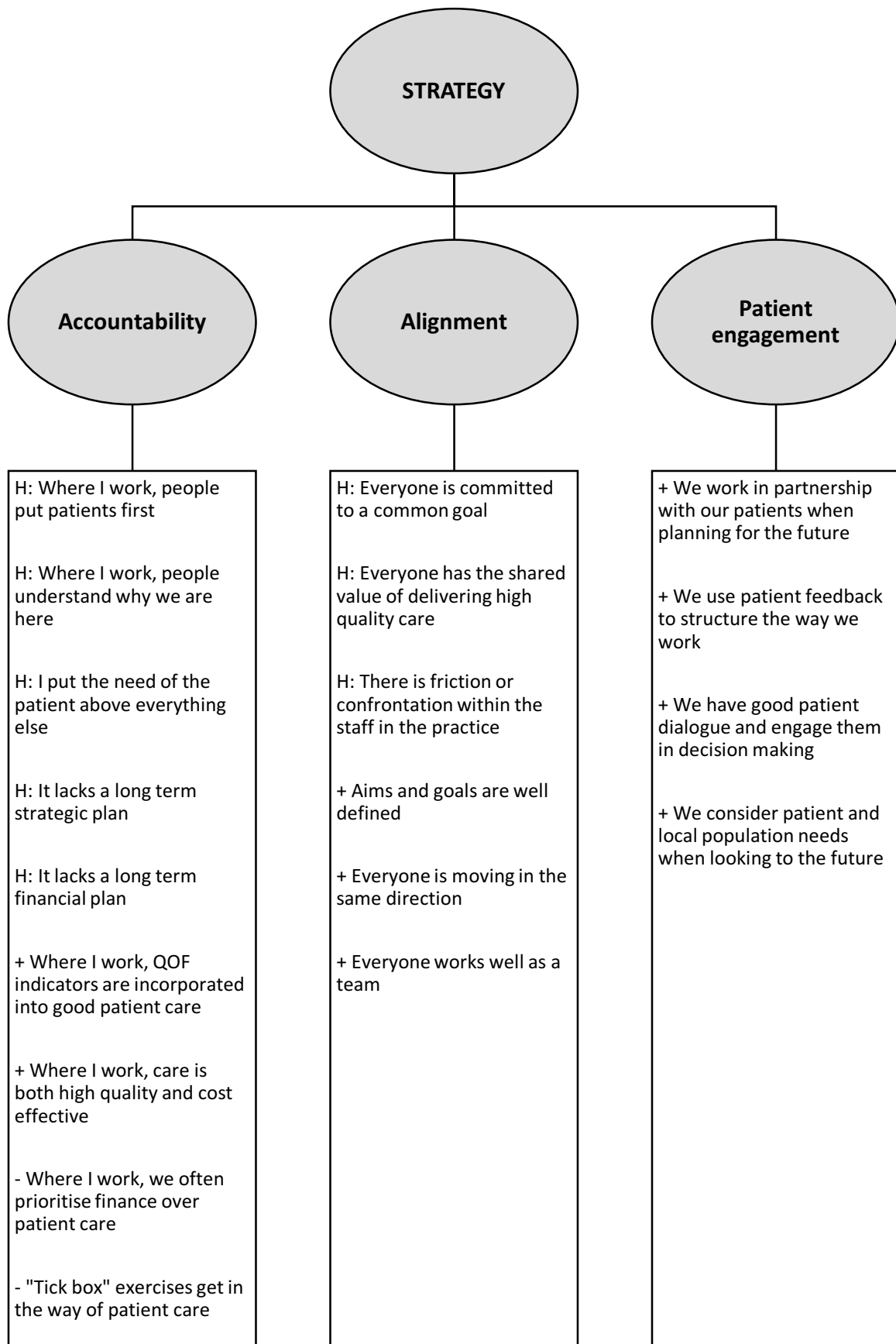
- *Strategy* was considered in terms of *Accountability*, *Alignment* and *Patient Engagement*
- *Leadership* was mapped as *Approachability*, *Direction* and *Support and guidance*
- *Resources* as not only *Investment* but also the *Infrastructure* and the *Staff* themselves working within the practice
- *Staff Wellbeing* as *Morale*, the importance of *Shared values* and the *Recompense* received by staff for performing their role within the organisation
- *Ways of working* was considered in terms of *Efficiency*, “*No blame*” culture and the, often underappreciated, *Importance of non-clinical staff*
- *Capacity for change* was mapped as *Motivation*, and *Ownership* and *Implementation of change*

The construct maps for each of these are found in *Appendix E (E2-E19)*.

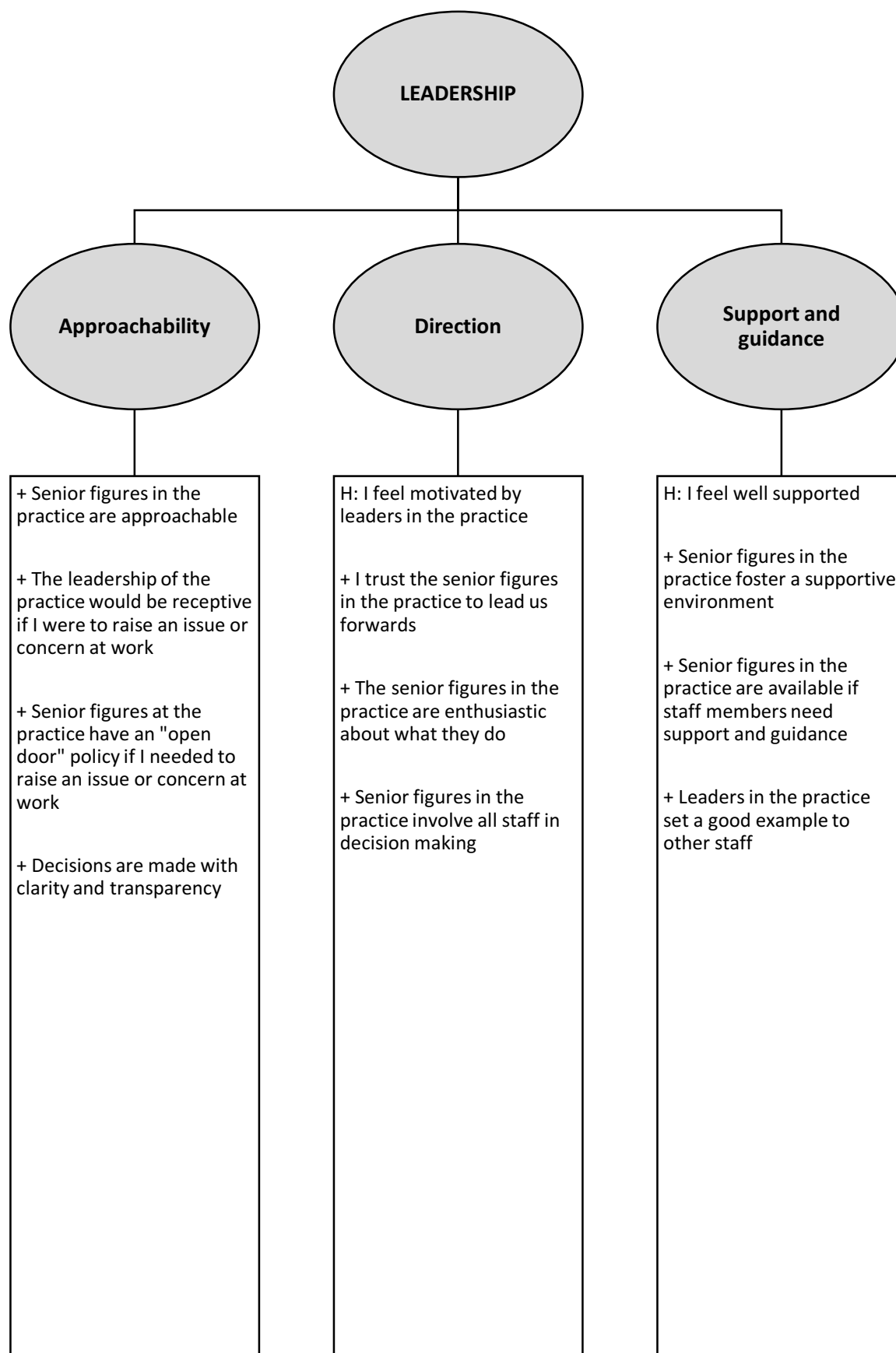
Each construct map is populated with potential item responses (each taken as a direct quote from the qualitative interview transcripts), plotted against pre-determined respondent levels, ranging from a high through to a low expression of the underlying construct, as per the skeletal layout seen in *Figure 6-2*.

Using these construct maps as a guide, a host of potential survey items (n=107) were drafted and can be seen in *Figures 6-4a – 6-4f*. Whilst the majority of draft items were derived from the interview transcripts in *Chapter 5*, a selection of items from the *Healthcare-OH* survey (*Appendix A1*) were also transposed to their corresponding theme. Within *Figure 6-4*, positively phrased items are denoted “+”, negatively phrased items as “-” and *Healthcare-OH* items initially denoted as “H”. These items were taken forwards to *Phase (ii)* for content validity assessment.

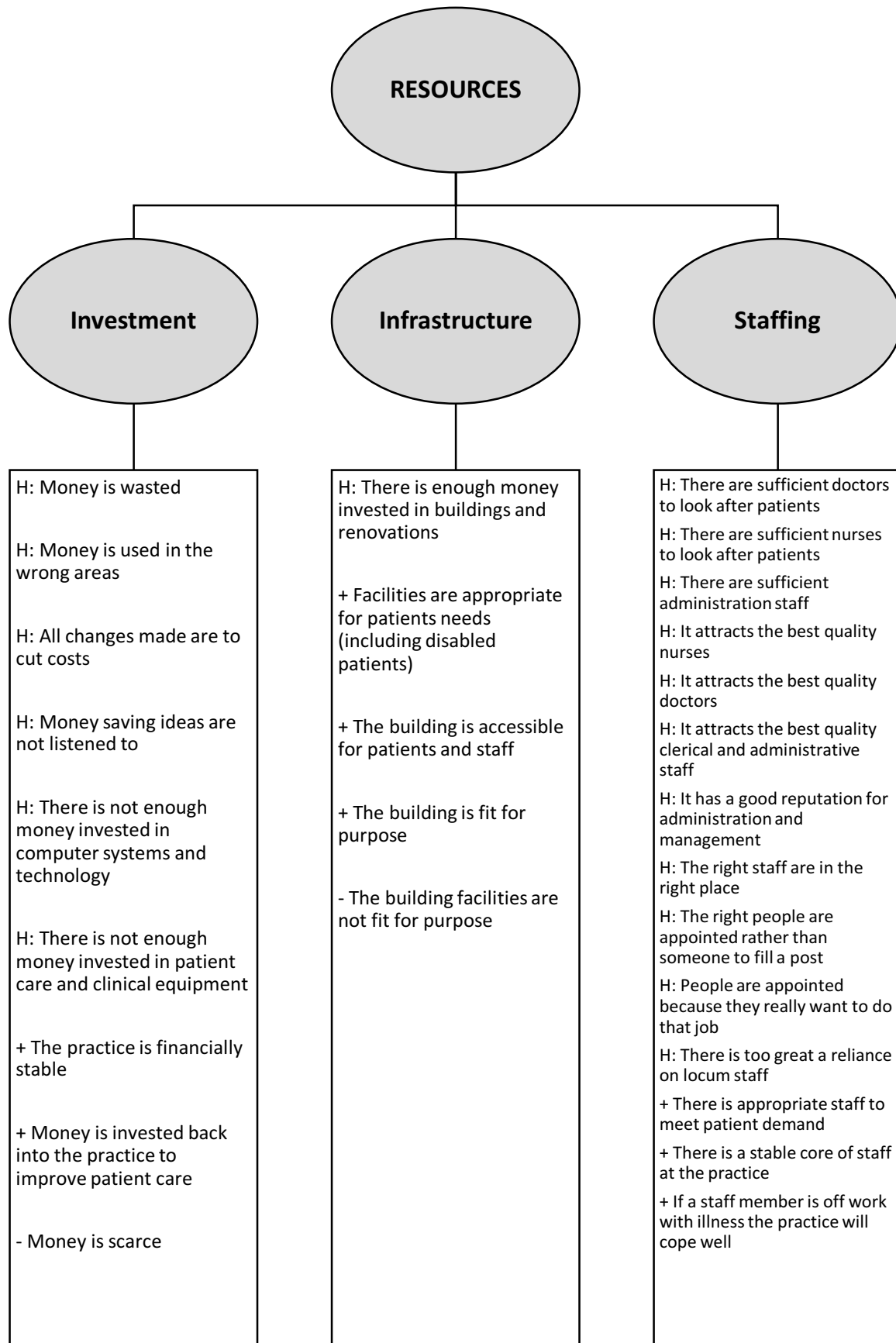
Figures 6-4a – Draft items for *Strategy* sub-construct (positively phrased items are denoted “+”, negatively phrased items as “-” and items transposed from *Healthcare-OH* denoted as “H”)



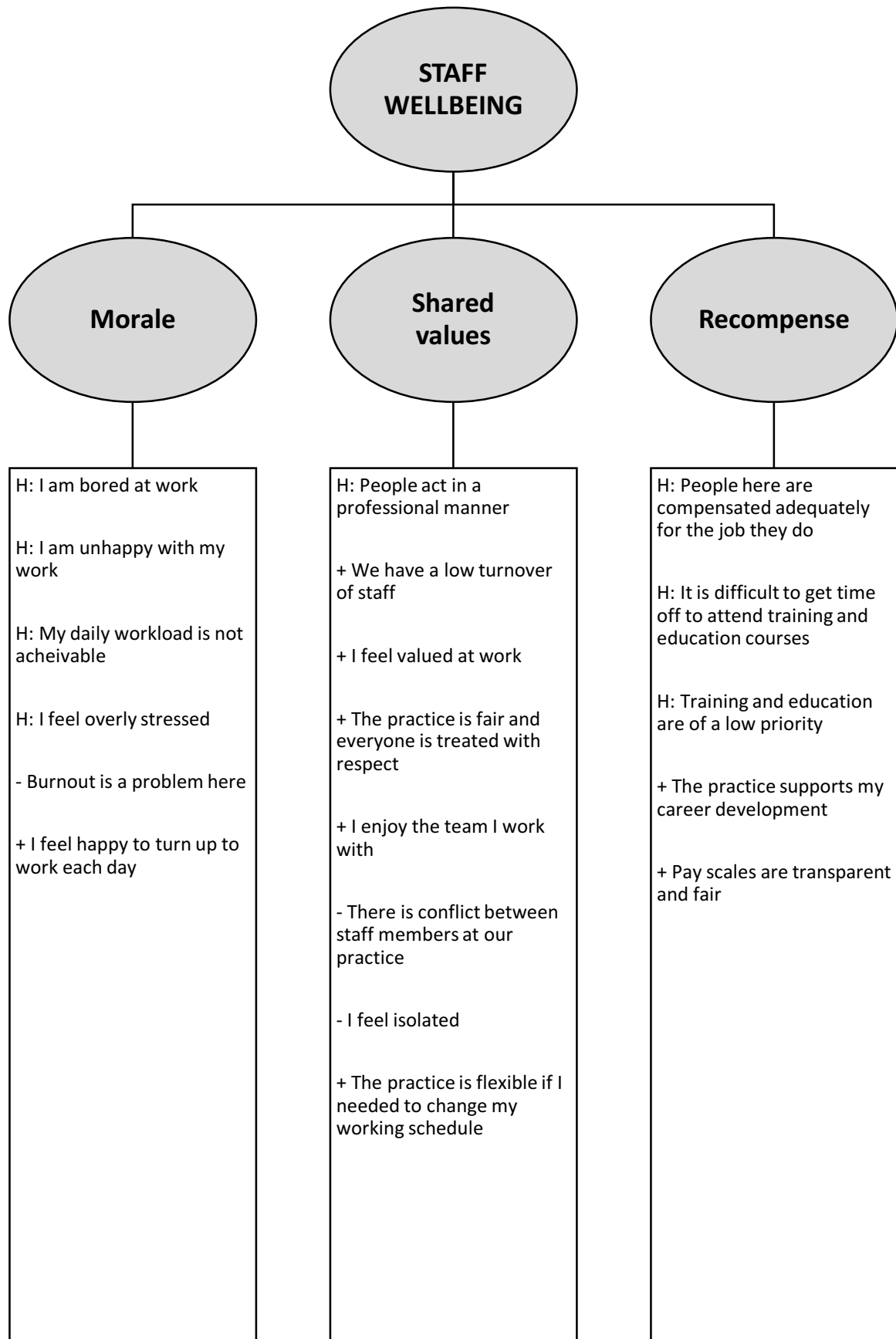
Figures 6-4b – Draft items for Leadership sub-construct (positively phrased items are denoted “+”, negatively phrased items as “-” and items transposed from *Healthcare-OH* denoted as “H”)



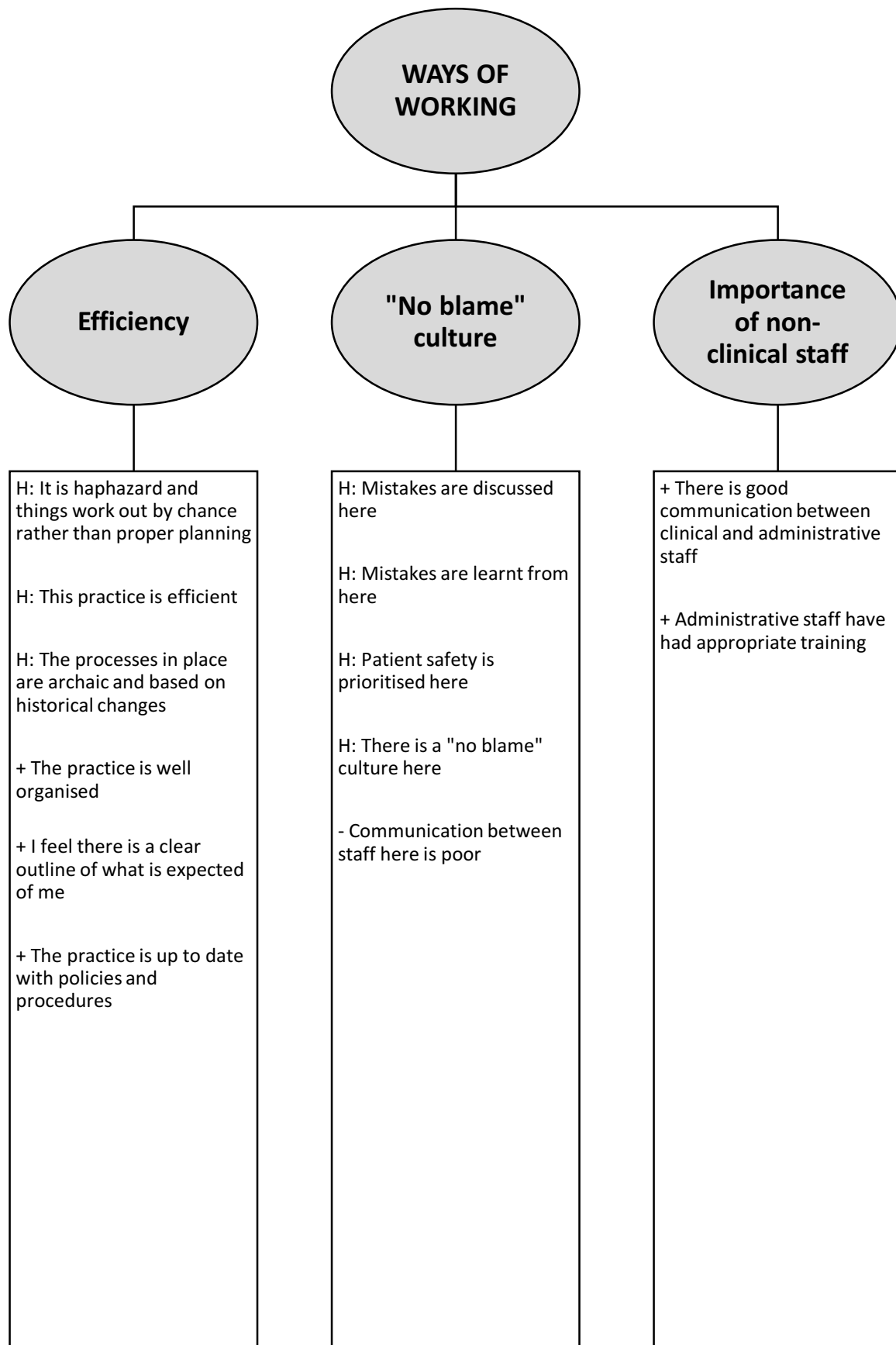
Figures 6-4c – Draft items for *Resources* sub-construct (positively phrased items are denoted “+”, negatively phrased items as “-” and items transposed from *Healthcare-OH* denoted as “H”)



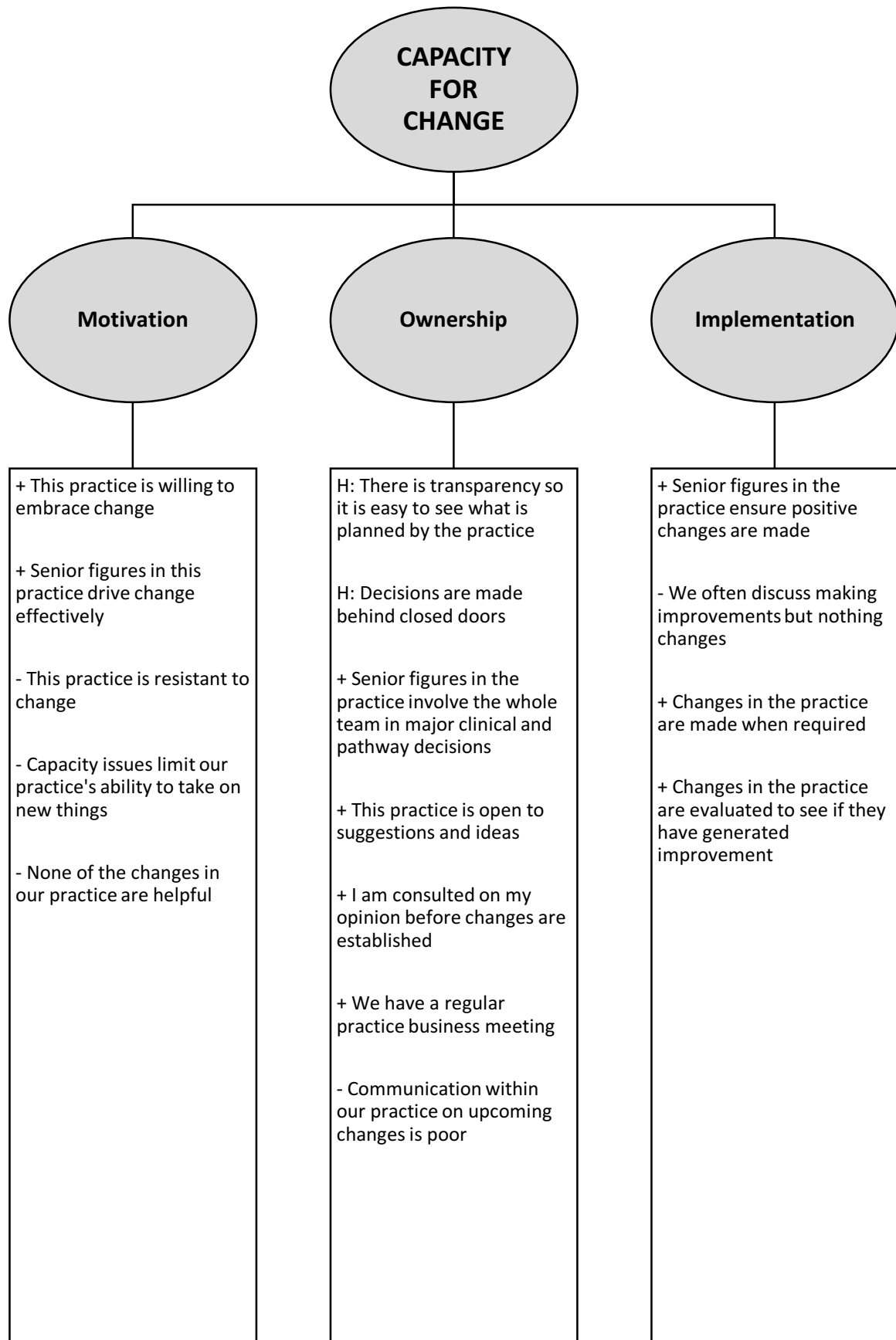
Figures 6-4d – Draft items for Staff Wellbeing sub-construct (positively phrased items are denoted “+”, negatively phrased items as “-” and items transposed from *Healthcare-OH* denoted as “H”)



Figures 6-4e – Draft items for *Ways of working* sub-construct (positively phrased items are denoted "+", negatively phrased items as "-", and items transposed from *Healthcare-OH* denoted as "H")



Figures 6-4f – Draft items for *Capacity for change* sub-construct (positively phrased items are denoted “+”, negatively phrased items as “-” and items transposed from *Healthcare-OH* denoted as “H”)



6.3.2 Phase (ii) Content validity assessment

The 107 draft items from *Phase (i)* were sent to the panel of SMEs and the results of the subsequent I-CVI analysis can be found in *Figure 6-5*. When items are rated by eight SMEs, a $I-CVI > 0.87$ is considered acceptable.¹⁶⁵ As such, 72 items were assessed as having satisfactory content validity and were retained and taken forwards to form the draft *GP-OH* survey.

Figure 6-5 – Item level construct validity index assessment of initial draft items (emboldened items retained in pilot survey)

Theme	Sub-theme	Ref	Item	CVI-I
STRATEGY	Accountability	S1	Where I work, people put patients first	0.88
		S2	Where I work, people understand why we are here	0.38
		S3	I put the need of the patient above everything else	0.63
		S4	It lacks a long term strategic plan	0.50
		S5	It lacks a long term financial plan	0.50
		S6	Where I work, QOF indicators are incorporated into good patient care	0.63
		S7	Where I work, care is both high quality and cost effective	0.25
		S8	Where I work, we often prioritise finance over patient care	0.57
		S9	"Tick box" exercises get in the way of patient care	0.88
		S10	Everyone is committed to a common goal	0.88
STRATEGY	Alignment	S11	Everyone has the shared value of delivering high quality care	0.88
		S12	There is friction or confrontation within the staff in the practice	0.63
		S13	Aims and goals are well defined	0.88
		S14	Everyone is moving in the same direction	0.25
		S15	Everyone in the practice works well as a team	0.88
		S16	We work in partnership with our patients when planning for the future	0.88
		S17	We use patient feedback to structure the way we work	0.88
		S18	We have good patient dialogue and engage them in decision making	0.88
		S19	We consider patient and local population needs when looking to the future	0.63
LEADERSHIP	Approachability	L1	Senior figures in the practice are approachable	1.00
		L2	The leadership of the practice would be receptive if I were to raise an issue or concern at work	1.00
		L3	Senior figures at the practice have an "open door" policy if I needed to raise an issue or concern at work	0.88
		L4	Decisions are made with clarity and transparency	0.63
		L5	I feel motivated by leaders in the practice	0.88
		L6	I trust the senior figures in the practice to lead us forwards	0.88
LEADERSHIP	Direction	L6	I trust the senior figures in the practice to lead us forwards	0.88

RESOURCES		L7	The senior figures in the practice are enthusiastic about what they do	0.88
		L8	Senior figures in the practice involve all staff in decision making	0.63
	Support and guidance	L9	I feel well supported	1.00
		L10	Senior figures in the practice foster a supportive environment	0.88
		L11	Senior figures in the practice are available if staff members need support and guidance	1.00
		L12	Leaders in the practice set a good example to other staff	0.88
		R1	Money is wasted	0.75
	Investment	R2	Money is used in the wrong areas	0.88
		R3	All changes made are to cut costs	0.38
		R4	Money saving ideas are not listened to	0.75
		R5	There is not enough money invested in computer systems and technology	0.88
		R6	There is not enough money invested in patient care and clinical equipment	1.00
		R7	The practice is financially stable	0.75
		R8	Money is invested back into the practice to improve patient care	0.88
		R9	Money is scarce	0.71
RESOURCES	Infrastructure	R10	There is enough money invested in buildings and renovations	0.88
		R11	Facilities are appropriate for patients needs (including disabled patients)	1.00
		R12	The building is accessible for patients and staff	1.00
		R13	The building is fit for purpose	0.88
		R14	The building facilities are not fit for purpose	0.75
	Staffing	R15	There are sufficient doctors to look after patients	1.00
		R16	There are sufficient nurses to look after patients	1.00
		R17	There are sufficient administration staff	1.00
		R18	It attracts high quality nurses	0.88
		R19	It attracts high quality doctors	0.88
RESOURCES		R20	It attracts high quality clerical and administrative staff	0.50
		R21	It has a good reputation for administration and management	0.88
		R22	The right staff are in the right place	0.63

		R23	The right people are appointed rather than someone to fill a post	0.75
		R24	People are appointed because they really want to do that job	0.50
		R25	There is too great a reliance on locum staff	1.00
		R26	There are appropriate staff to meet patient demand	0.88
		R27	There is a stable core of staff at the practice	1.00
		R28	If a staff member is off work with illness the practice will cope well	1.00
		SW1	I am bored at work	0.88
		SW2	I am unhappy with my work	0.88
		SW3	My daily workload is not achievable	1.00
		SW4	I feel overly stressed	0.88
STAFF WELLBEING	Morale	SW5	Burnout is a problem here	0.75
		SW6	I feel happy to turn up to work each day	1.00
		SW7	People act in a professional manner	0.88
		SW8	We have a low turnover of staff	0.88
		SW9	I feel valued at work	0.88
		SW10	The practice is fair and everyone is treated with respect	0.88
		SW11	I enjoy the team I work with	0.88
		SW12	There is conflict between staff members at our practice	0.88
		SW13	I feel isolated	0.63
		SW14	The practice is flexible if I needed to change my working schedule	0.75
	Shared values	SW15	People here are compensated adequately for the job they do	0.88
		SW16	It is difficult to get time off to attend training and education courses	0.88
		SW17	Training and education are of a low priority	0.88
		SW18	The practice supports my career development	0.88
		SW19	Contracts are transparent and fair	0.88
		WW1	It is haphazard and things work up by chance rather than proper planning	0.88
		WW2	This practice is efficient	0.88
		WW3	The processes in place are archaic and based on historical changes	0.50
WAYS OF WORKING	Efficiency			

CAPACITY FOR CHANGE		WW4	The practice is well organised	1.00
		WW5	I feel there is a clear outline of what is expected of me	0.88
		WW6	The practice is up to date with policies and procedures	0.88
		WW7	Mistakes are discussed here	0.88
	"No blame" culture	WW8	Mistakes are learnt from here	0.88
		WW9	Patient safety is prioritised here	0.75
		WW10	There is a "no blame" culture here	0.88
		WW11	Communication between staff here is poor	0.63
	Importance of non-clinical staff	WW12	There is good communication between clinical and administrative staff	0.88
		WW13	Administrative staff have had appropriate training	1.00
		CC1	This practice is willing to embrace change	0.88
		CC2	Senior figures in the practice drive change effectively	0.88
	Motivation	CC3	This practice is resistant to change	0.88
		CC4	Capacity issues limit our practice's ability to take on new things	0.63
		CC5	None of the changes in our practice are helpful	0.50
		CC6	There is transparency so it is easy to see what is being planned by the practice	0.63
Ownership		CC7	Decisions are made behind closed doors	0.63
		CC8	Senior figures in the practice involve the whole team in major clinical and pathway decisions	0.88
		CC9	The practice is open to suggestions and ideas	0.88
		CC10	I am consulted on my opinion before changes are established	0.63
		CC11	We have a regular practice business meeting	0.75
		CC12	Communication within our practice on upcoming changes is poor	0.63
		CC13	Senior figures in the practice ensure positive changes are made	0.88
		CC14	We often discuss making improvements but nothing changes	0.88
	Implementation	CC15	Changes in the practice are made when required	0.88
		CC16	Changes in the practice are evaluated to see if they have generated improvement	0.88

6.3.3 Phase (iii) Testing the GP-OH survey

6.3.3.1 Survey construction

The draft survey was built within Qualtrics as a series of sequential pages, each representing one of the six dimensions of organisational health in primary care. A screen shot of the items representing a practice's *Capacity for Change* is seen below in *Figure 6-6*. The font type, sizing and arrangement of items were amended as a result of a series of cognitive walkthroughs.

	Strongly agree	Agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Disagree	Strongly disagree
This practice is willing to embrace change	☐	☐	☐	☐	☐	☐	☐
Senior figures in the practice drive change effectively	☐	☐	☐	☐	☐	☐	☐
This practice is resistant to change	☐	☐	☐	☐	☐	☐	☐
Senior figures in the practice involve the whole team in major clinical and pathway decisions	☐	☐	☐	☐	☐	☐	☐
The practice is open to suggestions and ideas	☐	☐	☐	☐	☐	☐	☐
Senior figures in the practice ensure positive changes are made	☐	☐	☐	☐	☐	☐	☐
We often discuss making improvements but nothing changes	☐	☐	☐	☐	☐	☐	☐
Changes in the practice are made when required	☐	☐	☐	☐	☐	☐	☐
Changes in the practice are evaluated to see if they have generated improvement	☐	☐	☐	☐	☐	☐	☐

Figure 6-6 – Screen shot of GP-OH survey accessed via Qualtrics web portal

6.3.3.2 Sample description

After adoption within the NIHR portfolio, five primary care NIHR Clinical Research Networks (Greater Manchester, North Thames, Northwest Coast, Northwest London and South London) were recruited to participate in the testing of the draft survey. Data was collected from February to June 2018 inclusively with 978 participants in total. Participants were drawn from

191 different practices. Participant demographics can be found in *Figure 6-7*. To preserve participant anonymity, demographic questions were optional on completion of the survey. As such, the raw numbers shown in each subsection of this figure do not sum for the total sample size.

Figure 6-7 – Participant demographics for testing of draft GP-OH survey

NIHR CRN	n	%
Greater Manchester	40	4.1
North Thames	139	14.2
Northwest London	630	64.4
South London	169	17.3
Total	978	100
Gender	n	%
Female	660	80.3
Male	162	19.7
Total	822	100
Age	n	%
16-20 years	9	1.2
21-30 years	93	12.0
31-40 years	166	21.4
41-50 years	193	24.9
51-60 years	258	33.3
61+ years	55	7.1
Total	774	100
Length of employment	n	%
Less than 1 year	107	13.5
1-2 years	90	11.3
2-5 years	163	20.5
5-10 years	149	18.7
10-20 years	172	21.6
More than 20 years	114	14.3
Total	795	100
Job role	n	%
Administrative	145	20.1
GP Partner	153	21.2
HCA	43	5.9
Nurse	88	12.2
Practice Manager (<i>or equivalent</i>)	159	22.0
Receptionist	72	10.0
Salaried GP (<i>or equivalent</i>)	63	8.7
Total	723	100

Descriptive statistics for each item in the survey are tabulated in *Figure 6-8*. Negatively phrased items (e.g. item R2: *Money is used in the wrong areas*) have been reverse scored prior to inclusion in this table (and all further analysis hereafter).

Figure 6-8 shows that, for each item within the survey, missing data ranges from 1-11.9%. This increased with progress through the survey suggesting a degree of survey fatigue.

Figure 6-8 – Descriptive statistics for testing of draft GP-OH survey (“*” denotes negatively phrased items which have been reverse scored prior to tabulation)

Ref	Item	Mean	Median	Mode	SD	n	skipped or N/A
S1	Where I work, people put patients first	5.87	6	6	0.41	976	2
S9	"Tick box" exercises get in the way of patient care*	3.08	3	2	1.39	948	30
S10	Everyone is committed to a common goal	5.75	6	6	0.6	973	5
S11	Everyone has the shared value of delivering high quality care	5.82	6	6	0.53	961	17
S13	Aims and goals are well defined	5.57	6	6	0.8	972	6
S15	Everyone in the practice works well as a team	5.57	6	6	0.91	972	6
S16	We work in partnership with our patients when planning for the future	5.54	6	6	0.84	955	23
S17	We use patient feedback to structure the way we work	5.54	6	6	0.79	969	9
S18	We have good patient dialogue and engage them in decision making	5.53	6	6	0.82	973	5
L1	Senior figures in the practice are approachable	5.8	6	6	0.68	974	4
L2	The leadership of the practice would be receptive if I were to raise an issue or concern at work	5.74	6	6	0.76	974	4
L3	Senior figures at the practice have an "open door" policy if I needed to raise an issue or concern at work	5.78	6	6	0.64	974	4
L5	I feel motivated by leaders in the practice	5.59	6	6	0.91	974	4
L6	I trust the senior figures in the practice to lead us forwards	5.68	6	6	0.79	971	7
L7	The senior figures in the practice are enthusiastic about what they do	5.73	6	6	0.73	968	10
L9	I feel well supported	5.63	6	6	0.92	969	9
L10	Senior figures in the practice foster a supportive environment	5.65	6	6	0.89	969	9
L11	Senior figures in the practice are available if staff members need support and guidance	5.72	6	6	0.77	969	9
L12	Leaders in the practice set a good example to other staff	5.65	6	6	0.88	970	8
R2	Money is used in the wrong areas*	4.72	5	6	1.56	923	55

R5	There is not enough money invested in computer systems and technology*	4.21	4	2	1.7	922	56
R6	There is not enough money invested in patient care and clinical equipment*	4.46	5	6	1.67	917	61
R8	Money is invested back into the practice to improve patient care	5.12	6	6	1.07	924	54
R10	There is enough money invested in buildings and renovations	4.29	4	6	1.62	924	54
R11	Facilities are appropriate for patients needs (including disabled patients)	5.12	6	6	1.44	927	51
R12	The building is accessible for patients and staff	5.61	6	6	0.99	928	50
R13	The building is fit for purpose	5.29	6	6	1.35	927	51
R15	There are sufficient doctors to look after patients	4.84	6	6	1.51	924	54
R16	There are sufficient nurses to look after patients	5.01	6	6	1.45	926	52
R17	There are sufficient administration staff	5	6	6	1.49	926	52
R18	It attracts high quality nurses	5.43	6	6	1.07	921	57
R19	It attracts high quality doctors	5.57	6	6	0.91	924	54
R21	It has a good reputation for administration and management	5.39	6	6	1.05	920	58
R25	There is too great a reliance on locum staff*	4.61	5	6	1.81	913	65
R26	There are appropriate staff to meet patient demand	4.86	5	6	1.44	918	60
R27	There is a stable core of staff at the practice	5.63	6	6	0.85	918	60
R28	If a staff member is off work with illness the practice will cope well	5.24	6	6	1.22	923	55
SW1	I am bored at work*	5.97	6	7	1.33	909	69
SW2	I am unhappy with my work*	5.56	6	7	1.59	903	75
SW3	My daily workload is not achievable*	4.31	4	6	1.78	900	78
SW4	I feel overly stressed*	4.3	4	6	1.69	904	74
SW6	I feel happy to turn up to work each day	5.18	6	6	1.29	906	72
SW7	People act in a professional manner	5.63	6	6	0.91	904	74
SW8	We have a low turnover of staff	4.95	6	6	1.48	896	82
SW9	I feel valued at work	5.44	6	6	1.15	906	72
SW10	The practice is fair and everyone is treated with respect	5.53	6	6	1.05	903	75
SW11	I enjoy the team I work with	5.73	6	6	0.74	901	77
SW12	There is conflict between staff members at our practice*	4.85	5	6	1.7	901	77
SW15	People here are compensated adequately for the job they do	4.61	5	6	1.53	900	78
SW16	It is difficult to get time off to attend training and education courses*	5.2	6	6	1.59	903	75
SW17	Training and education are of a low priority*	5.64	6	6	1.37	903	75
SW18	The practice supports my career development	5.26	6	6	1.24	901	77
SW19	Contracts are transparent and fair	5.28	6	6	1.18	898	80

WW1	It is haphazard and things work up by chance rather than proper planning*	5.33	6	6	1.59	883	95
WW2	This practice is efficient	5.6	6	6	0.78	891	87
WW4	The practice is well organised	5.56	6	6	0.93	893	85
WW5	I feel there is a clear outline of what is expected of me	5.63	6	6	0.88	886	92
WW6	The practice is up to date with policies and procedures	5.7	6	6	0.76	888	90
WW7	Mistakes are discussed here	5.8	6	6	0.7	888	90
WW8	Mistakes are learnt from here	5.75	6	6	0.75	889	89
WW10	There is a "no blame" culture here	5.48	6	6	1.03	890	88
WW12	There is good communication between clinical and administrative staff	5.62	6	6	0.81	891	87
WW13	Administrative staff have had appropriate training	5.54	6	6	0.87	889	89
CC1	This practice is willing to embrace change	5.7	6	6	0.71	877	101
CC2	Senior figures in the practice drive change effectively	5.5	6	6	1	875	103
CC3	This practice is resistant to change*	5.23	6	6	1.54	871	107
CC8	Senior figures in the practice involve the whole team in major clinical and pathway decisions	5.07	6	6	1.34	872	106
CC9	The practice is open to suggestions and ideas	5.63	6	6	0.81	875	103
CC13	Senior figures in the practice ensure positive changes are made	5.49	6	6	1.01	862	116
CC14	We often discuss making improvements but nothing changes*	4.45	5	6	1.68	876	102
CC15	Changes in the practice are made when required	5.54	6	6	0.86	874	104
CC16	Changes in the practice are evaluated to see if they have generated improvement	5.24	6	6	1.07	871	107

6.3.3.3 Confirmatory factor analysis modelling

The first model to be examined considered all items within the draft survey and is presented in *Figure 6-9*. Model fit statistics showed acceptable levels of RMSEA (0.040) and SRMR (0.059) but relatively lower levels of CFI (0.874).

All factors correlated

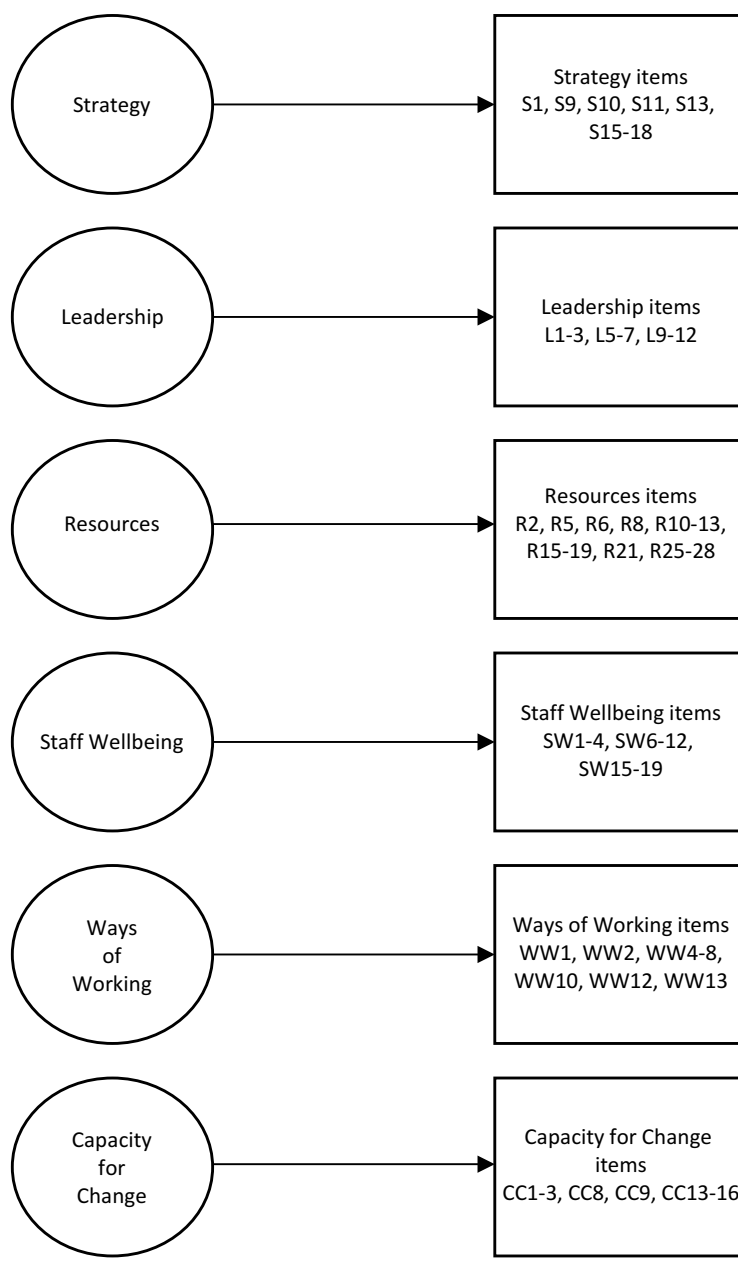


Figure 6-9 – Six factor model for items in draft GP-OH survey

Standardised factor loadings were examined for each item and those with relatively poor loading were removed (items S9, R5, R11, R12, R25, SW3, SW16). The model was run again, without these items. Whilst model fit improved, goodness-of-fit indices remained suboptimal: CFI 0.884, RMSEA 0.039, SRMR 0.056.

As such, a further round of item reduction was performed. The survey was considered dimension by dimension, with items weighed in terms of both their theoretical importance and statistical value: where two items were similar in terms of the underlying theory considered or there was conceptual overlap (e.g. items WW1: *it is haphazard and things work out by chance rather than proper planning* and WW2: *this practice is well organised*), the lower loading item (in this case item WW1 $\beta=0.422$; given WW2 $\beta=0.531$) was removed. Consideration was also paid to modification indices and large standardised residual covariances. Within the *Strategy* subscale, item S10 was removed (in favour of items S11, S13 and S15) and item S18 was removed (keeping items S16 and S17). Within the domain of *Leadership*, item L2 was removed (retaining items L1 and L3) and item L10 was removed (with items L9 and L11 preserved). When reviewing items concerning *Resources*, the removed items were R6 (retaining R2 and R8), R10 (retaining R13) and R15, R16 and R21 (preserving R17, R18, R19, R27 and R28). Within the *Staff Wellbeing* subscale, items removed were SW1 and SW2 (retaining SW4), SW8 and SW12 (retaining SW7, SW9, SW10 and SW11) and SW17 (retaining SW18 and SW19). Within *Ways of Working*, item WW1 was removed (in favour of WW2) and item WW7 was removed (in favour of items WW8 and WW10). Finally, within *Capacity for Change*, the items removed were CC3 (retaining CC1 and CC2) and CC8 (in favour of CC9).

A final CFA model was run containing the retained items. Goodness-of-fit indices improved further with RMSEA 0.036, SRMR 0.052 and a now excellent CFI value of 0.914. Factor loadings for this model are tabulated in *Appendix E20* and diagrammatically presented in *Figure 6-10*. *Figure 6-10* also shows acceptable levels of reliability for each factor (Omega 0.710-0.956). The items contained within this model form the final GP-OH survey, seen in *Figure 6-11*.

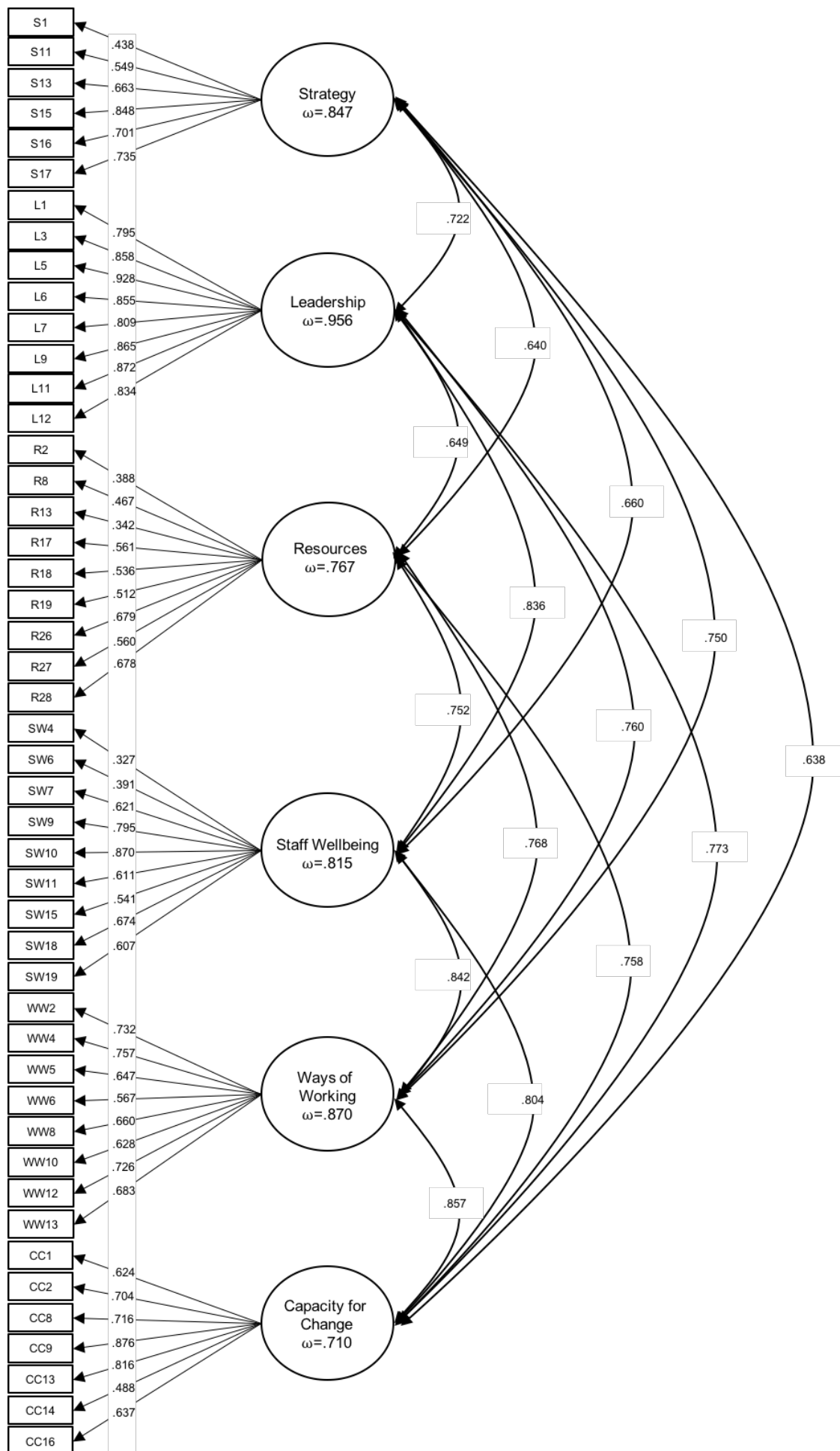


Figure 6-10 – CFA for six factor model (items identified by 'ref' for brevity, standardised factor loading (β) denoted by unidirectional arrow, correlation between factors denoted with bidirectional arrow, ω = omega)

Figure 6-11 – Final GP-OH survey (47 items)

GP-OH survey								
STRATEGY SUB-SCALE (6 items)								
<i>With respect to this organisation...</i>	Strongly agree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Does not apply		
Where I work, people put patients first	☐	☐	☐	☐	☐	☐		☐
Everyone has the shared value of delivering high quality care	☐	☐	☐	☐	☐	☐		☐
Aims and goals are well defined	☐	☐	☐	☐	☐	☐		☐
Everyone in the practice works well as a team	☐	☐	☐	☐	☐	☐		☐
We work in partnership with our patients when planning for the future	☐	☐	☐	☐	☐	☐		☐
We use patient feedback to structure the way we work	☐	☐	☐	☐	☐	☐		☐
LEADERSHIP SUB-SCALE (8 items)								
<i>With respect to this organisation...</i>	Strongly agree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Does not apply		
Senior figures in the practice are approachable	☐	☐	☐	☐	☐	☐		☐
Senior figures at the practice have an "open door" policy if I needed to raise an issue or concern at work	☐	☐	☐	☐	☐	☐		☐
I feel motivated by leaders in the practice	☐	☐	☐	☐	☐	☐		☐
I trust the senior figures in the practice to lead us forwards	☐	☐	☐	☐	☐	☐		☐
The senior figures in the practice are enthusiastic about what they do	☐	☐	☐	☐	☐	☐		☐
I feel well supported	☐	☐	☐	☐	☐	☐		☐
Senior figures in the practice are available if staff members need support and guidance	☐	☐	☐	☐	☐	☐		☐
Leaders in the practice set a good example to other staff	☐	☐	☐	☐	☐	☐		☐
RESOURCES SUBSCALE (9 items)								
<i>With respect to this organisation...</i>	Strongly agree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Does not apply		
Money is used in the wrong areas	☐	☐	☐	☐	☐	☐		☐
Money is invested back into the practice to improve patient care	☐	☐	☐	☐	☐	☐		☐
The building is fit for purpose	☐	☐	☐	☐	☐	☐		☐
There are sufficient administration staff	☐	☐	☐	☐	☐	☐		☐
There is appropriate staff to meet patient demand	☐	☐	☐	☐	☐	☐		☐
It attracts high quality doctors	☐	☐	☐	☐	☐	☐		☐
It attracts high quality nurses	☐	☐	☐	☐	☐	☐		☐
There is a stable core of staff at the practice	☐	☐	☐	☐	☐	☐		☐
If a staff member is off work with illness the practice will cope well	☐	☐	☐	☐	☐	☐		☐

STAFF WELLBEING SUBSCALE (9 items)								
<i>With respect to this organisation...</i>	Strongly agree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Does not apply		
I feel happy to turn up to work each day	☐	☐	☐	☐	☐	☐		
I feel overly stressed	☐	☐	☐	☐	☐	☐		
People act in a professional manner	☐	☐	☐	☐	☐	☐		
I feel valued at work	☐	☐	☐	☐	☐	☐		
I enjoy the team I work with	☐	☐	☐	☐	☐	☐		
The practice is fair and everyone is treated with respect	☐	☐	☐	☐	☐	☐		
People here are compensated adequately for the job they do	☐	☐	☐	☐	☐	☐		
Contracts are transparent and fair	☐	☐	☐	☐	☐	☐		
The practice supports my career development	☐	☐	☐	☐	☐	☐		
WAYS OF WORKING SUB-SCALE (8 items)								
<i>With respect to this organisation...</i>	Strongly agree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Does not apply		
This practice is efficient	☐	☐	☐	☐	☐	☐		
The practice is well organised	☐	☐	☐	☐	☐	☐		
I feel there is a clear outline of what is expected of me	☐	☐	☐	☐	☐	☐		
The practice is up to date with policies and procedures	☐	☐	☐	☐	☐	☐		
There is a "no blame" culture here	☐	☐	☐	☐	☐	☐		
Mistakes are learnt from here	☐	☐	☐	☐	☐	☐		
There is good communication between clinical and administrative staff	☐	☐	☐	☐	☐	☐		
Administrative staff have had appropriate training	☐	☐	☐	☐	☐	☐		
CAPACITY FOR CHANGE SUB-SCALE (7 items)								
<i>With respect to this organisation...</i>	Strongly agree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Does not apply		
This practice is willing to embrace change	☐	☐	☐	☐	☐	☐		
Senior figures in the practice drive change effectively	☐	☐	☐	☐	☐	☐		
Senior figures in the practice involve the whole team in major clinical and pathway decisions	☐	☐	☐	☐	☐	☐		
The practice is open to suggestions and ideas	☐	☐	☐	☐	☐	☐		
Senior figures in the practice ensure positive changes are made	☐	☐	☐	☐	☐	☐		
We often discuss making improvements but nothing changes	☐	☐	☐	☐	☐	☐		
Changes in the practice are evaluated to see if they have generated improvement	☐	☐	☐	☐	☐	☐		

6.4 Discussion

6.4.1 Summary of main findings

This study has both designed and tested the first survey seeking to measure organisational health specifically within the context of GP practices. A step-wise approach was taken to ensure that the validity and reliability of the survey were examined rigorously at multiple stages. Using the qualitative work of the previous chapter as a theoretical framework, a number of potential survey items were derived – all rooted in underlying theory. Draft items were reviewed, in a systematic manner using I-CVI, by a panel of SMEs for content validity assessment (*Figure 6-5*). Items judged as qualitatively valid formed the draft version of the survey which was then tested across GP practice staff members in both the Northwest of England and in London.

The draft survey was electronically disseminated across five NIHR primary care CRNs, linked with 70 Clinical Commissioning Groups (CCGs). 978 participants completed the survey and results were analysed using CFA. This was initially used for a further round of item reduction with the fitting of a series of increasingly parsimonious models. This enhanced the usability of the measure, with the final *GP-OH* survey a far less unwieldy length at 47 items (*Figure 6-11*). Construct validity was supported by confirmation of the hypothesised dimensional structure (with retained items fitted within their theoretical theme as depicted in *Figure 6-10*) with acceptable fit indices (CFI 0.914, RMSEA 0.036, SRMR 0.052). The internal consistency of the factor structure was examined using McDonald's omega, revealing acceptable levels of reliability ($\omega > 0.7$ throughout; *Figure 6-10*).

6.4.2 Comparison with existing literature

Organisational health has been extensively measured within the education sector,^{24,169} business sector¹¹ and, more recently, the social care sector.¹⁷⁰ There is, however, a relative dearth of research considering the measurement of organisational health within healthcare, with reports limited to two surveys.^{38,105}

Kharmmarnia *et al.* measured organisational health within seven different secondary care hospitals in Iran, with a survey of questions transposed across from use in the education sector.¹⁰⁵ Previous work by our group has also focused on secondary care healthcare providers, with the use of the *Healthcare-OH* survey.³⁸

The *GP-OH* survey is the first measure to consider organisational health within primary care and was developed through an admittedly complex but more robust process than the transposition of an existing survey from a different healthcare setting. The result is a novel survey measuring the elements needed for sustainable success with general practice.

The quantitative measurement of up-stream markers of performance in primary care is not a novel concept however. A practice's readiness for organisational change has been measured using a battery of measures by Christl *et al.* within Australia and patient safety culture in primary care within the Netherlands has been scored using the *SCOPE-PC* questionnaire.^{171,172}

The *PC-PIT* (Primary Care Practice Improvement Tool) was also developed for use in Australian primary care and considers a number of similar elements such as *Leadership, Communication* and *Patient-centred care*.¹⁷³

Whilst there is considerable overlap between the domains considered by these measures and aspects of the *GP-OH* survey, the combination of both the overarching nature of organisational health, as a concept, coupled with the comprehensive and rigorous approach to survey development presented here gives the *GP-OH* survey a breadth and scope of measurement which is arguably more reflective of general practice performance within the UK.

6.4.3 Limitations

Whilst all factor analyses were performed with a large dataset (n=978), it is difficult to be certain that the demographics of the sample are truly reflective of the population of interest and so results are open to potential coverage error. All CRNs recruited to participate in the study are predominantly urban-based and so results may not be truly generalisable to all practices within the UK. It is difficult to comment on response rate as individual CRNs controlled the regional distribution of the survey down to CCGs, GP Federations and individual practices. As such, it is impossible to know how much non-response error is present within the dataset.

Demographic questions in the survey were limited to a single job role so those staff members with shared roles (e.g. a practice nurse who is also a partner or a HCA who also performs purely administrative sessions). These could be improved through the incorporation of a free-text box alongside drop-down choices.

Measurement error was limited by the use of qualitative walkthrough; this led to the rewording of several items and changes to the electronic interface with respect to both font and accessibility.

As participants progressed through the draft version of the survey, a degree of survey-fatigue was noted – given missing data rates were higher for items under later themes (e.g. item CC13 missing data rate 11.9% versus 1.0% for item S1). This primacy bias could be reduced by alternating the order in which items are positioned within the survey, though skip rate would be expected to be lower for the final 47-item survey given its shorter length.

Due, in part, to the ever advancing techniques and statistical packages available to the survey developer, no consensus exists as to the optimal method for item reduction and content validity assessment in measure design.¹⁷⁴ Historically, when factor analysis has been used in survey development, it has been EFA which has been used initially for item reduction with CFA used to confirm the EFA structure thereafter.¹⁷⁵ EFA, as a technique, is largely data-driven and concerns have been raised regarding issues of interpretability, with the use of Eigenvalues and Scree plots somewhat subjective.^{174,176}

CFA was utilised for exploration of dimensionality in this study with existing theory (from *Chapter 5*) used to hypothesise a factor model *a priori* (*Figure 6-9*). The use of CFA allowed for the testing of a specific hypothesis with the provision of inferential statistics indicating degree of model fit. In this study, CFA was also utilised in an exploratory manner for the purposes of item reduction. Proponents of this strategy highlight the crucial importance of a methodologically rigorous process, in which results are interpreted item-by-item and both

statistical and conceptual criteria are considered prior to the removal of an item.^{177,178} By weighing conceptual reasoning against statistical criteria, analysis remains theory-driven yet data-informed. Replication of the factor structure demonstrated here at another time and by another group would add weight to the impact of the findings presented here.

6.4.4 Conclusion

Recognition of the importance of upstream drivers of performance within healthcare is long overdue. The use of measures such as the *GP-OH* survey allows a GP practice to not only consider but quantitatively measure their relative provision of organisational aspects essential for high performance in the long term.

Work presented in **Section II** has considered organisational health in a variety of different settings. However, as with the work performed in the acute healthcare sector reported in **Section I**, all attempts to quantify this concept have been limited in that, in each case, they represent a single round of survey conducted at a single time point. Ultimately, results are only truly reflective of the individuals who undertake the study within these organisations and will be impacted, to a certain extent, by the mood of these participants at this particular snap-shot in time. This, in itself, is a source of potential bias and could be accounted for by methodological modifications to permit data collection across a wider period of time. Conducting serial measurements over time would not only correct this limitation but allow for exploration as to whether or not organisational health varies with time. Indeed, if organisational health is to be applied on a large scale within a healthcare context, more must be known as to its temporal nature. This will be considered next in **Section III**.

SECTION III

INTERVENTIONS TO IMPROVE ORGANISATIONAL HEALTH

WITHIN HEALTHCARE ORGANISATIONS

Chapter 7 A year in the life of a 'healthy' organisation: a mixed methods exploratory study with a quarterly repeated-measure cross-sectional design

Chapter 7: A year in the life of a ‘healthy’ organisation: a mixed methods exploratory study with a quarterly repeated-measure cross-sectional design

7.1 Introduction

It is becoming increasingly recognised that, in order to ensure continual high performance, it is not enough to concentrate on a few hand-picked down-stream targets if they are prioritised at the expense of other key elements such as *Patient Safety* and *Staff Wellbeing*.³⁷ This description maps to many of the findings from the Francis inquiry, into the events at Mid Staffordshire NHS Foundation Trust,⁶ and serves as a stark reminder of the need to consider organisational health, as a concept, within the context of healthcare organisations.

It stands to reason that organisational health, when quantified, must be subject to change, following large scale changes in any of its constituent elements: a dramatic shift in funding could be expected to lead to a shift in *Finance & Investment* score and a change in trust leadership and direction to changes in both *Strategy* and *Leadership & Management* scores. If, alongside organisational health measurements, events in the life of a trust are monitored concurrently it will allow for discussion as to whether any changes were precipitated by a particular event.

That being said, it is obviously impossible to capture every event or occurrence that might have had an effect on participants’ responses. Even if we suppose that it were possible, one can only postulate on the degree to which any event, be it one which occurs within the trust

itself (hereafter termed an ‘internal’ event) or one which occurs outside the organisation (hereafter termed an ‘external’ event), actually impacts on employee beliefs and perceptions before considering that this will influence how they respond to a survey on a particular day. As such, this study is admittedly somewhat speculative, and any attempts at attributing causality would be futile, but it is akin to a real world natural experiment and could be useful in determining whether any existing interventions might correspond to changes in measurements taken with the *Healthcare-OH* survey.

The aim of this study is to test the hypothesis that the organisational health of a healthcare organisation varies with time and can be linked to events occurring within that organisation during the same period. In doing so it addresses **RESEARCH QUESTION 3: Does organisational health vary with time, driven by events within and around an organisation?** To achieve this aim, a quasi-experimental repeated-measure cross-sectional design was utilised. That is, a cross-section of staff from across the whole trust were surveyed on a quarterly basis over a period of 12 months. Unlike a longitudinal study, the cross-sectional design employed here involves the sampling of a different set of individuals at each time point. This was chosen to ensure sufficiently high response rates to ensure responses were representative – since longitudinal studies, which would involve individual participants surveyed four times within a small time period, would likely infer high levels of dropout.

Differences in organisational health scores over time were then examined and compared with contemporaneous internal and external events.

7.2 Methods

7.2.1 Sample

A single, large acute NHS trust was recruited to participate in the study: Imperial College Healthcare NHS trust (ICHT). This trust employs 8,919 staff over five sites spread across northwest London: Charing Cross Hospital, Hammersmith Hospital, St Mary's Hospital, Queen Charlotte's and Chelsea Hospital and the Western Eye Hospital. ICHT provides acute and specialist healthcare for a population of nearly two million people and is one of seven academic health science centres in the UK.¹⁷⁹

This study is classified as a *service evaluation* project under NRES guidelines and was registered as such with the relevant trust department. Formal Research Ethics Committee review was not required.

The contact details of all staff on pay roll in ICHT were provided to the research team by the trust's Organisational Development team. This contact list was split into four even groups using a random number generator.

7.2.2 Healthcare-OH survey

As with previous work presented in this thesis, organisational health was measured using the *Healthcare-OH* survey.³⁸ Participants were sent a pre-drafted email, inviting them to complete the survey and sent to their trust email account (*Appendix F1*). This email included a weblink to access the *Healthcare-OH* survey, housed online within a dedicated and multiplatform compatible WebApp (accessed at <http://healthy-hospitals.org/>).

The study was run over a twelve-month period beginning December 2015. Data collection was quarterly, such that the first survey round ran December 2015 – January 2016, the second round was collected between March – April 2016, the third June – July 2016 and the fourth (and final round) September – October 2016. Reminder emails were used to increase participation rates (*Appendix F2*). All data collected was held on a secure server within Imperial College London.

7.2.3 Qualitative log of internal and external events

Whilst quantitative data on organisational health was collected, a contemporaneous qualitative log of events, considered to have potential effect on staff working in the trust, was compiled.

Internal events in the trust were largely identified through prospectively cataloguing weekly trust-wide emails. These emails are sent on behalf of the trust's Chief Executive and present a summary of both previous and forthcoming events across the five sites of ICHT. This study was also supported by the departments for Organisational Development and Quality Improvement within the trust, in addition to senior trust members working within the Clinical Strategy Implementation Programme. Association with these departments and individuals allowed for greater access to forthcoming internal events.

External events, happening outside but with hypothesised effect within the trust, were also prospectively logged during the same time period as organisational health data collection. The 'Week Ahead' column of the Financial Times was utilised as the principal data source for this information.¹⁸⁰

Financial metrics, in terms of UK economic growth rate, inflation rate and interest rate were also logged and accessed from data in the public domain from the Financial Times, the Office for National Statistics and the Bank of England respectively.¹⁸¹⁻¹⁸³

7.2.4 Statistical analyses

All analysis was performed using IBM SPSS version 22 (Armonk, NY, USA). Organisational health scores were considered as the latent sum scores of the eight subscales of the *Healthcare-OH* survey (reflecting the dimensionality of the instrument as presented in detail in *Chapter 2*): *Strategy, Resilience, Leadership & Management, Staff Wellbeing, Finance & Investment, Patient Safety, Efficiency and Communication*.

Differences in organisational health scores over time were analysed using one-way analysis of variance (ANOVA) testing. When significance was found (at $p < 0.05$), differences were explored using post hoc testing, carried out using Tukey's test.

Statistically significant changes in organisational health were then considered alongside contemporaneous qualitative events.

7.3 Results

7.3.1 Sample description

A total of 1,433 participants completed the survey during the study period: 389 took part in Round 1, 597 in Round 2, 241 in Round 3 and 206 in Round 4 (*Figure 7-1*). Sampling error ranged from 4-7% (at a 95% level of confidence) for the four rounds of data collection.

Round	Month	n	Response rate (%)	% Sampling error (at 95% Confidence)
1	Dec – Jan	389	4.4	4.9
2	Mar – Apr	597	6.7	3.9
3	Jun – Jul	241	2.7	6.2
4	Sep – Oct	206	2.3	6.8

Figure 7-1 – Participants grouped by survey round showing response rate and associated level of sampling error

Participant demographics are listed in *Figure 7-2*, broken down by survey round. As with previous use of the *Healthcare-OH* WebApp these questions are optional so raw numbers do not sum to give the total sample size for each round. In keeping with the use of the survey in an identical context (presented in *Chapter 2*), participants were predominantly female (71-76%). Demographics are seen to be consistent across the four rounds with no noticeably aberrant results for the categories of gender, age or length of employment. Data on job role and department is more fragmented, given the large number of categories available for these two domains. The core departments of Medicine (range 35-37%) and Surgery (range 11-21%) show relatively consistent representation across the four rounds however, as do the job roles of Staff Nurse (range 15-22%), Sister/Nurse Specialist (12-14%) and Administration e.g. Secretary/PA/Clerk (range 9-14%).

Figure 7-2 – Participant demographics by survey round (Round 1 denotes data collected December-January, 2 March-April, 3 June-July and 4 September-October)

Round	1		2		3		4	
Gender	n	%	n	%	n	%	n	%
Female	148	71.2	233	70.8	90	73.2	85	75.9
Male	60	28.8	96	29.2	33	26.8	27	24.1
Total	208	100	329	100	123	100	112	100
Round	1		2		3		4	
Age	n	%	n	%	n	%	n	%
18-30 years	24	11.6	41	12.3	23	18.0	14	12.4
31-40 years	53	25.6	84	25.2	31	24.2	46	25.7
41-50 years	62	30.0	124	37.2	49	38.3	38	33.6
51-60 years	58	28.0	70	21.0	23	18.0	11	24.7
61-70 years	10	4.8	14	4.2	2	1.6	4	3.5
Total	207	100	333	100	128	100	113	100
Round	1		2		3		4	
Length of employment at trust	n	%	n	%	n	%	n	%
Less than 1 year	15	7.2	6	1.8	10	7.8	14	11.9
1-2 years	39	18.8	62	18.6	42	32.8	21	17.8
3-5 years	63	30.3	97	29.0	42	32.8	43	36.4
6-10 years	35	16.8	63	18.9	14	10.9	11	9.3
11-20 years	34	16.3	62	18.6	11	8.6	27	22.9
More than 20 years	22	10.6	44	13.2	9	7.0	2	1.7
Total	208	100	334	100	128	100	118	100
Round	1		2		3		4	
Department	n	%	n	%	n	%	n	%
Medicine	92	36.1	138	37.4	49	34.5	49	34.8
Surgery	29	11.4	52	14.1	23	16.2	29	20.6
Anaesthetics	9	3.5	10	2.7	3	2.1	8	5.7
Corporate (Finance/HR)	15	5.9	26	7.0	18	12.7	5	3.5
Dentistry	-	-	1	0.3	-	-	-	-
Dietetics	1	0.4	3	0.8	2	1.4	0	0.0
Emergency Department	13	5.1	9	2.4	7	4.9	2	1.4
ICT	9	3.5	18	4.9	4	2.8	2	1.4
Paediatrics	6	2.4	14	3.8	7	4.9	5	3.5
Labs	12	4.7	13	3.5	2	1.4	4	2.8
Obstetrics and Gynaecology	13	5.1	19	5.1	8	5.6	17	12.1
Occupational Therapy	3	1.2	2	0.5	-	-	1	0.7
Outpatient Department	6	2.4	7	1.9	2	1.4	8	5.7
Pathology	17	6.7	12	3.3	2	1.4	2	1.4
Pharmacy	9	3.5	12	3.3	1	0.7	3	2.1

Physiotherapy	9	3.5	5	1.4	3	2.1	2	1.4
Mental health	-	-	-	-	1	0.7	-	-
Radiology	10	3.9	20	5.4	9	6.3	2	1.4
Speech and Language Therapy	-	-	1	0.3	-	-	-	-
Support (eg. security/porters/estates)	2	0.8	7	1.9	1	0.7	2	1.4
Total	255	100	369	100	142	100	141	100
Round	1		2		3		4	
Job Role	n	%	n	%	n	%	n	%
Doctor in training	9	3.4	7	1.9	4	2.7	6	4.4
Staff Grade/Associate Specialist	2	0.8	2	0.6	1	0.7	-	-
Consultant	4	1.5	31	8.5	11	7.5	9	6.6
Midwife	7	2.7	8	2.2	4	2.7	6	4.4
Matron/Nurse Consultant	1	0.4	5	1.4	3	2.0	4	2.9
Staff Nurse	44	16.9	56	15.4	32	21.8	25	18.4
Sister/Nurse Specialist	36	13.8	51	14.0	17	11.6	16	11.8
Dietician	1	0.4	3	0.8	2	1.4	-	-
Occupational Therapist	3	1.1	2	0.6	-	-	1	0.7
Operating Department Practitioner	1	0.4	4	1.1	-	-	5	3.7
Pharmacist	7	2.7	9	2.5	1	0.7	3	2.2
Physiotherapist	9	3.4	6	1.7	3	2.0	2	1.5
Psychologist/Psychotherapist	-	-	1	0.3	-	-	-	-
Radiographer	8	3.1	13	3.6	6	4.1	2	1.5
Speech and Language Therapist	-	-	1	0.3	-	-	-	-
Health Care Assistant	18	6.9	21	5.8	9	6.1	13	9.6
Healthcare Scientist	12	4.6	22	6.1	5	3.4	3	2.2
Middle Management (Band 5-7)	27	10.3	32	8.8	6	4.1	10	7.4
Senior Management (Band 8+)	18	6.9	16	4.4	9	6.1	9	6.6
Very Senior Management/Director	-	-	1	0.3	2	1.4	-	-
Administration (eg. Secretary/PA/Clerk)	33	12.6	39	10.7	20	13.6	12	8.8
Clinical Support Staff (eg. Phlebotomist/Social Worker)	2	0.8	5	1.4	4	2.7	1	0.7
Corporate services (eg Finance/HR)	10	3.8	11	3.0	4	2.7	6	4.4
Dentist	-	-	1	0.3	-	-	-	-
ICT/Health Informatics	9	3.4	16	4.4	4	2.7	3	2.2
Total	261	100	363	100	147	100	136	100

Descriptive statistics are listed for each item, again grouped by survey round, in *Figure 7-3*. Negatively phrased items, such as item *S13: We have different aims from the other departments or teams we work with*, have been reversed scored prior to tabulation. Only values for item mean and standard deviation are presented for purposes of clarity.

7.3.2 Missing data

The items with the greatest proportion of both missing data and ‘*not applicable*’ responses were *E5: There are frequent cancellations in the operating theatres* and *E6: Patients wait a long time for emergency surgery* (listed in full in *Appendix F3*). This is reflective of the department and job specific nature of these items and is, again, consistent with responses seen in the use of the *Healthcare-OH* survey within *Chapter 2*. Item skip rate can be seen to increase with progression through the survey, suggesting a degree of survey fatigue.

Figure 7-3 – Descriptive statistics for *Healthcare-OH* survey, by survey round (1 denotes data collected December-January, 2 March-April, 3 June-July and 4 September-October) and by item (mean and standard deviation [SD])

Round		1		2		3		4	
Ref	Item	Mean	[SD]	Mean	[SD]	Mean	[SD]	Mean	[SD]
S1	Everyone is committed to a common goal	4.27	[1.73]	4.34	[1.85]	4.51	[1.91]	4.70	[1.80]
S2	Management and clinical teams work closely together	3.91	[1.69]	3.92	[1.83]	4.25	[2.00]	3.89	[1.78]
S3	Management and clinical teams have the same aims	3.66	[1.73]	3.82	[1.88]	4.04	[1.99]	4.00	[1.97]
S4	Everyone has the shared value of delivering high quality care	4.61	[1.86]	4.66	[1.86]	4.99	[1.81]	4.93	[1.74]
S5	The strategic direction of this organisation is not clear	4.43	[1.84]	4.09	[1.85]	4.46	[1.93]	4.38	[1.95]
S6	The strategic direction of this organisation is not realistic	4.29	[1.79]	4.08	[1.78]	4.44	[1.82]	4.42	[1.80]
S7	I am frequently reminded of the mission / vision statement	3.97	[1.86]	3.80	[1.82]	3.83	[1.93]	3.70	[1.92]
S8	Where I work, people put the patients first	5.56	[1.52]	5.50	[1.62]	5.49	[1.63]	5.80	[1.61]
S9	Where I work, people understand why we are here	5.32	[1.60]	5.22	[1.73]	5.39	[1.54]	5.63	[1.56]
S10	I put the needs of the patients above everything else	6.06	[1.18]	6.25	[1.03]	6.14	[1.19]	6.42	[0.97]
S11	There is friction or confrontation within my team	4.58	[2.05]	4.26	[2.10]	4.66	[1.95]	4.84	[2.11]
S12	There is friction or confrontation with other departments or teams	4.08	[1.90]	3.81	[1.90]	4.07	[1.98]	3.89	[2.09]
S13	We have different aims from the other departments or teams we work with	4.20	[1.90]	3.90	[1.85]	3.97	[2.00]	3.79	[2.14]
R1	It attracts the best quality nurses	4.22	[1.56]	4.23	[1.69]	4.38	[1.83]	4.38	[1.60]
R2	It attracts the best quality doctors	4.78	[1.43]	4.75	[1.51]	5.13	[1.34]	5.04	[1.42]
R3	It attracts the best quality clerical and secretarial staff	3.78	[1.60]	3.89	[1.70]	3.93	[1.74]	4.00	[1.69]
R4	It has a good reputation for administration and management	3.67	[1.71]	3.60	[1.81]	3.80	[1.86]	3.91	[1.81]

Round		1		2		3		4	
Ref	Item	Mean	[SD]	Mean	[SD]	Mean	[SD]	Mean	[SD]
R5	It lacks a long term strategic plan	4.35	[1.80]	4.07	[1.77]	4.43	[1.83]	4.04	[1.87]
R6	It lacks a long term financial plan	4.33	[1.73]	4.04	[1.84]	4.50	[1.84]	4.00	[1.82]
R7	It is not very innovative	4.84	[1.75]	4.49	[1.81]	4.99	[1.93]	4.65	[1.89]
R8	It rarely puts new things in place to improve quality	4.84	[1.68]	4.46	[1.90]	5.10	[1.76]	4.65	[1.85]
R9	If there was a sudden unforeseen incident e.g. fire, deep snowfall or power cut, it would cope very well	4.52	[1.58]	4.43	[1.74]	4.77	[1.62]	4.35	[1.89]
R10	If there as a sudden major medical incident e.g. multiple casualties or influenza pandemic, it would cope very well	4.68	[1.62]	4.68	[1.71]	4.82	[1.60]	4.61	[1.86]
R11	If there was a sudden change in legislation e.g. a cut in funding, it would cope very well	3.02	[1.75]	2.80	[1.77]	2.93	[1.53]	2.58	[1.71]
LM1	I feel well supported by my manager*	4.60	[1.93]	4.64	[2.04]	5.02	[1.93]	5.15	[1.82]
LM2	I feel motivated by my manager*	4.34	[1.94]	4.38	[2.05]	4.83	[1.97]	5.05	[1.89]
LM3	My manager* praises good work	4.56	[1.97]	4.61	[2.04]	5.09	[1.91]	5.22	[1.88]
LM4	My manager* sets clearly defined objectives	4.33	[1.92]	4.49	[1.97]	4.71	[1.96]	5.12	[1.84]
LM5	I trust the senior managers to make the right decisions	3.66	[1.87]	3.81	[2.01]	4.20	[1.89]	4.26	[2.04]
LM6	The senior managers are approachable	4.03	[1.94]	4.15	[2.03]	4.35	[2.06]	4.49	[1.94]
LM7	The senior managers drive staff motivation	3.41	[1.86]	3.56	[1.94]	3.86	[2.10]	3.82	[2.06]
LM8	The senior managers have had little experience of patient care	4.08	[1.91]	4.15	[1.98]	4.32	[1.91]	4.57	[1.97]
LM9	Leaders in this organisation have a vision	4.37	[1.60]	4.23	[1.71]	4.35	[1.68]	4.43	[1.81]
LM10	Leaders appreciate staff	3.66	[1.85]	3.59	[1.92]	4.10	[1.94]	3.99	[2.07]
LM11	Leaders are committed to innovation	4.21	[1.69]	4.07	[1.73]	4.30	[1.66]	4.32	[1.95]
LM12	Leaders create a positive environment	3.68	[1.85]	3.65	[1.88]	3.97	[1.88]	4.01	[2.00]

Round		1		2		3		4	
Ref	Item	Mean	[SD]	Mean	[SD]	Mean	[SD]	Mean	[SD]
LM13	Clinical staff are involved in leadership	4.28	[1.73]	4.25	[1.79]	4.76	[1.67]	4.37	[1.81]
SW1	I find my work challenging	5.06	[1.77]	5.05	[1.70]	4.86	[1.97]	5.19	[1.65]
SW2	I am bored at work	5.57	[1.81]	5.44	[1.89]	5.46	[1.88]	5.63	[1.84]
SW3	I am unhappy with my work	5.03	[1.97]	4.93	[1.98]	5.29	[1.76]	5.15	[1.93]
SW4	I lack sufficient appraisal or feedback meetings to review my performance	5.05	[1.95]	4.74	[2.03]	5.33	[1.77]	4.97	[1.86]
SW5	The right staff are in the right place	3.79	[1.82]	3.57	[1.86]	3.71	[1.79]	3.49	[1.83]
SW6	The right people are appointed rather than someone to fill a post	3.81	[1.92]	3.55	[1.92]	3.94	[1.93]	3.46	[1.91]
SW7	People are appointed because they really want to do that job	4.03	[1.70]	3.82	[1.79]	4.21	[1.81]	3.70	[1.81]
SW8	People act in a professional manner	4.85	[1.63]	4.53	[1.77]	4.89	[1.60]	4.61	[1.79]
SW9	It is difficult to get time off to attend training / education courses	4.45	[2.16]	4.35	[2.05]	4.69	[2.06]	4.22	[2.03]
SW10	Training and education is a low priority	4.61	[2.06]	4.39	[2.15]	4.81	[2.00]	4.52	[2.10]
SW11	My daily workload is not achievable	4.39	[1.98]	4.31	[1.97]	4.68	[2.09]	4.69	[1.99]
SW12	I feel overly stressed	4.23	[2.03]	4.17	[2.05]	5.05	[1.90]	4.43	[1.88]
SW13	Patients here are treated with dignity	5.58	[1.46]	5.45	[1.63]	5.49	[1.56]	5.51	[1.62]
SW14	Patients have faith in this organisation	5.04	[1.54]	4.94	[1.58]	5.00	[1.69]	4.97	[1.72]
SW15	People here lack the right attitude to work with patients	5.13	[1.82]	5.01	[1.86]	5.15	[1.80]	5.19	[1.83]
SW16	If a close family member / friend needed medical care I would bring them here	5.09	[1.75]	4.66	[1.93]	4.53	[2.01]	4.84	[1.98]
SW17	There is too great a reliance on agency / locum staff	3.62	[1.93]	3.46	[1.85]	3.98	[1.91]	3.61	[1.94]
SW18	There is too great a reliance on bank staff	3.55	[1.84]	3.44	[1.76]	3.59	[1.97]	3.76	[1.88]

Round		1		2		3		4	
Ref	Item	Mean	[SD]	Mean	[SD]	Mean	[SD]	Mean	[SD]
F1	Money is wasted	3.36	[1.82]	3.36	[1.87]	3.60	[1.97]	3.37	[2.02]
F2	Money is used in the wrong areas	3.32	[1.73]	3.25	[1.83]	3.49	[1.94]	3.09	[1.84]
F3	People who manage the budget lack contact with clinical areas	2.98	[1.79]	3.16	[1.78]	3.48	[1.86]	3.16	[1.89]
F4	People here are compensated adequately for the job they do	2.91	[1.60]	3.01	[1.77]	3.19	[1.74]	3.21	[1.85]
F5	There is enough money invested in computer systems and technology	4.03	[1.99]	3.78	[1.99]	3.90	[2.15]	3.94	[2.02]
F6	There is enough money invested in patient care and clinical equipment	3.58	[1.85]	3.38	[1.79]	3.65	[1.88]	3.57	[1.96]
F7	There is enough money invested in buildings and renovations	2.97	[1.70]	3.08	[1.79]	2.82	[1.80]	3.42	[2.02]
F8	There is money available for innovation or new ideas	3.49	[1.61]	3.33	[1.66]	3.67	[1.76]	3.62	[1.80]
F9	People understand the cost of the equipment or tests they use	3.15	[1.81]	3.35	[1.84]	3.02	[1.80]	3.35	[1.96]
F10	All changes made are to cut costs	3.24	[1.83]	3.31	[1.82]	3.75	[1.90]	3.58	[1.69]
F11	Money saving ideas are not listened to	4.37	[1.84]	4.24	[1.76]	4.45	[1.67]	4.67	[1.76]
PS1	Absenteeism is a problem in this organisation	4.02	[1.73]	3.88	[1.79]	4.28	[1.70]	3.92	[1.71]
PS2	People take lots of sick leave where I work	4.37	[1.95]	4.34	[2.00]	4.82	[1.97]	4.67	[1.91]
PS3	Mistakes / critical incidents are reported here	5.27	[1.59]	5.32	[1.58]	5.14	[1.80]	5.49	[1.31]
PS4	Mistakes / critical incidents are learned from here	5.05	[1.59]	4.93	[1.73]	4.87	[1.66]	5.15	[1.62]
PS5	It is encouraged to report mistakes / critical incidents	5.63	[1.35]	5.39	[1.63]	5.48	[1.59]	5.58	[1.37]
PS6	Changes are made as a result of mistakes / critical incidents happening	5.15	[1.53]	4.91	[1.72]	4.95	[1.70]	5.13	[1.60]
PS7	There are sufficient nurses to look after patients out of hours (nights & weekends)	3.53	[1.80]	3.24	[1.78]	3.24	[1.73]	3.17	[1.69]
PS8	There are sufficient doctors to look after patients out of hours (nights & weekends)	3.95	[1.76]	3.43	[1.72]	3.70	[1.66]	3.62	[1.72]

Round		1		2		3		4	
Ref	Item	Mean	[SD]	Mean	[SD]	Mean	[SD]	Mean	[SD]
PS9	There are sufficient nurses to look after patients during weekdays	3.74	[1.85]	3.52	[1.79]	3.59	[1.66]	3.68	[1.81]
PS10	There are sufficient doctors to look after patients during weekdays	4.33	[1.74]	3.98	[1.76]	3.97	[1.67]	4.21	[1.75]
PS11	There is a weak safety culture here	5.09	[1.61]	4.71	[1.86]	5.49	[1.46]	5.31	[1.70]
PS12	We lack regular meetings to discuss the mistakes / critical incidents reported	4.75	[1.92]	4.24	[2.04]	4.76	[2.04]	4.73	[1.87]
PS13	Patient safety is prioritised by management	4.73	[1.69]	4.77	[1.71]	4.79	[1.72]	5.16	[1.57]
PS14	There is a 'no blame' culture here	3.73	[1.87]	3.79	[2.00]	3.54	[1.84]	4.10	[1.99]
E1	It is haphazard and things work out by chance rather than by proper planning	4.66	[1.78]	4.42	[1.75]	4.76	[1.65]	4.87	[1.76]
E2	There are often last minute changes to staffing	3.71	[1.91]	3.51	[1.83]	3.80	[1.83]	3.71	[1.80]
E3	This organisation is efficient	3.91	[1.68]	3.76	[1.71]	3.72	[1.62]	3.44	[1.75]
E4	The processes in place are archaic and based on historical changes	4.21	[1.55]	4.08	[1.58]	4.26	[1.53]	4.13	[1.39]
E5	There are frequent cancellations in the operating theatres	3.92	[1.67]	3.91	[1.54]	3.86	[1.59]	3.63	[1.73]
E6	Patients wait a long time for emergency surgery	4.43	[1.59]	4.15	[1.57]	4.52	[1.77]	4.34	[1.88]
E7	There are delays in discharging patients	3.32	[1.73]	3.14	[1.66]	3.37	[1.91]	3.12	[1.80]
E8	Patient's notes are often unavailable	4.16	[1.91]	3.90	[1.92]	4.18	[1.98]	4.10	[2.03]
E9	Decisions are made based on patient care data collected	4.55	[1.24]	4.43	[1.52]	4.47	[1.48]	4.26	[1.72]
E10	Quality of patient care data collected is fed back to staff	4.13	[1.63]	3.95	[1.78]	3.93	[1.85]	3.95	[1.83]
E11	There is accurate data collected to assess the quality of patient care	4.35	[1.53]	4.15	[1.70]	3.99	[1.78]	4.17	[1.80]
E12	Innovations to help patients e.g. text messaging are embraced	4.43	[1.56]	4.01	[1.69]	4.42	[1.70]	4.12	[1.68]
E13	There are too many senior managers	3.11	[1.82]	3.14	[1.87]	3.53	[1.83]	3.18	[1.94]

Round		1		2		3		4	
Ref	Item	Mean	[SD]	Mean	[SD]	Mean	[SD]	Mean	[SD]
E14	There are too many junior / middle managers	3.41	[1.87]	3.65	[1.92]	3.85	[1.83]	3.82	[1.93]
E15	There is too much bureaucracy to get something done	2.78	[1.70]	2.62	[1.73]	3.21	[1.88]	2.82	[1.81]
C1	Information flows from frontline staff up to Board level	3.49	[1.68]	3.15	[1.74]	3.60	[1.75]	3.53	[1.84]
C2	Information flows from the Board to all levels of the organisation	4.14	[1.64]	3.98	[1.79]	3.98	[1.78]	4.24	[1.80]
C3	There is transparency so it is easy to see what is being planned by the organisation	3.65	[1.69]	3.52	[1.85]	3.55	[1.71]	3.81	[1.84]
C4	Senior staff communicate with their teams in person	4.00	[1.81]	3.91	[1.96]	4.21	[2.10]	4.57	[1.88]
C5	Communication between nurses and doctors is poor	5.07	[1.65]	4.83	[1.78]	4.85	[1.67]	5.35	[1.68]
C6	Communication between medical staff and patients is poor	5.18	[1.63]	5.02	[1.70]	5.08	[1.68]	5.25	[1.72]
C7	Communication between medical staff and management staff is poor	4.39	[1.75]	4.20	[1.76]	4.11	[1.95]	4.81	[1.64]
C8	Patients with communication challenges e.g. deafness or non-native speaking are well catered for	4.74	[1.62]	4.40	[1.70]	4.14	[1.73]	4.41	[1.85]
C9	People here are polite to patients	5.55	[1.24]	5.36	[1.48]	5.32	[1.43]	5.52	[1.54]
C10	People here ignore patients	5.76	[1.52]	5.78	[1.63]	5.76	[1.48]	6.02	[1.51]
C11	People here talk in their own languages excluding others	4.75	[1.88]	4.79	[1.98]	4.67	[2.04]	4.84	[1.92]
C12	Patient complaint information is regularly fed back to staff	4.44	[1.75]	4.36	[1.87]	4.09	[1.80]	4.82	[1.82]
C13	Thank you or praise from patients is regularly fed back to staff	4.61	[1.83]	4.46	[1.90]	4.44	[1.92]	4.95	[1.91]
C14	There are inconsistent messages from senior levels	4.03	[1.89]	3.85	[1.84]	4.33	[1.81]	3.98	[1.80]
C15	Decisions are made behind closed doors	3.22	[1.73]	3.21	[1.83]	3.71	[1.85]	3.23	[1.62]
C16	Information is out of date by the time I get it	4.40	[1.67]	4.36	[1.84]	4.63	[1.67]	4.61	[1.71]
*manager means your line manager or nurse manager, or Consultant if you are a doctor									

7.3.3 Qualitative log

Whilst a full and detailed account of every event, in and around, the trust during the study period is beyond the scope of this work, a number of particularly pertinent events are discussed succinctly below.

Figure 7-4a catalogues a series of internal events which occurred contemporaneously to organisational health data collection. To briefly summarise this figure:

- At the beginning of the study, the trust was in a position of significant debt and a number of urgent measures were implemented at the turn of the year to focus on frugal management of funds. These included freezing non-clinical vacancies and reducing the use of agency staff. When agency staff were used, their rate was capped. By September, and so towards the end of the study, it was announced that the trust was “on track” to meet its financial targets.
- A raft of changes in the leadership of the trust were made between January and March. This involved an organisational restructure with the creation of a larger number of directorates (each representing a combination of associated clinical services) with the aim of increased accountability. Additionally, three senior clinicians were added to the executive board.
- The first half of 2016 saw a major investment in the development and introduction of a fully electronic patient record (EPR), accompanied by a shift to electronic prescribing. By June 2016, this had been introduced across all sites and departments and by September, EPR systems had been linked with those at a neighbouring trust.
- There were a series of initiatives aimed at improving the wellbeing of staff throughout the year. These included the running of weekly Schwartz rounds (which are forums for staff

to discuss any emotional or social challenges they have faced in the course of their work),¹⁸⁴ as well as the provision of exercise classes, vaccinations and the ingenious concept of a “randomised coffee trial” in which enrolled staff members are randomly allocated to meet socially, over a randomly assigned hot beverage, with another trust employee.¹⁸⁵

- In July, it was announced that the trust was to be the focus of a new BBC documentary series: “Hospital”. The same month also brought more negative attention with the news of a major patient safety incident within the trust. Towards the end of the study, the trust was gearing itself up for a CQC inspection of its outpatient services and diagnostic imaging.

Figure 7-4b catalogues a number of external events hypothesised to have a potential bearing of the organisational health of the trust:

- The majority of the lower pane of this figure relates to the long running dispute over the junior doctors’ contract. Whilst NHS Employers and the British Medical Association (BMA) had been in contract negotiations for a number of years, November 2015 (just prior to the start of the data collection period) saw BMA members voting to begin strike action the following month. Acas (the Advisory, Conciliation and Arbitration Service) acted as mediator in these talks and, following some progress in subsequent negotiations, the December strikes were called off. Unfortunately, an acceptable outcome was not reached and so junior doctors across the country took strike action on the 12th January 2016. Further strikes were called on 10th February, from 9-11th March and from 6-8th April, again involving the withdrawal of routine care. On 26th May, an “all-out” strike was held, with the withdrawal of all services (including the provision of emergency care) for a period of 48 hours. Whilst the BMA negotiation team reached a negotiated deal in June 2016, this

proposal was rejected by ballot the following month, prompting the resignation of BMA President Johann Malawana. Faced with the ongoing threat of contract imposition, further strike action was planned across September, October and November but was cancelled due to patient safety concerns. The contract was imposed on junior doctors from August 2016 onwards.

- April 2016 saw the first batch of registered nurses and midwives undergo revalidation through the Nursing and Midwifery Council (NMC).
- Much of UK news during the study period was dominated by the UK European Union (EU) In-Out “Brexit” Referendum. The referendum was announced in February and took place on 23rd June. Following the result of the vote (and the decision to withdraw from the EU), David Cameron resigned as Prime Minister on 24th June. This prompted further upheaval with Theresa May elected as Prime Minister on 11th July. Other political events saw Jeremy Corbyn re-elected as Labour leader in September 2016.
- Major world news over the study period ranged from the global atrocities, such as terrorist attack in Nice in July 2016, to sporting celebrations with the Rio Olympics and Paralympics (beginning in August), and major electronic developments such as launch of the new version of the Apple iPhone in September.
- A number of metrics reflecting the UK’s position of the country were also recorded alongside data collection. Inflation rose steadily over the study period from a figure of 0.2% in December 2015 to 1.0% in October 2016. Similarly, economic growth increased on from 1.7% (2015 Q4) to 2.3 (2016 Q3). UK interest rate was more stable but did decrease to 0.25% in September 2016.

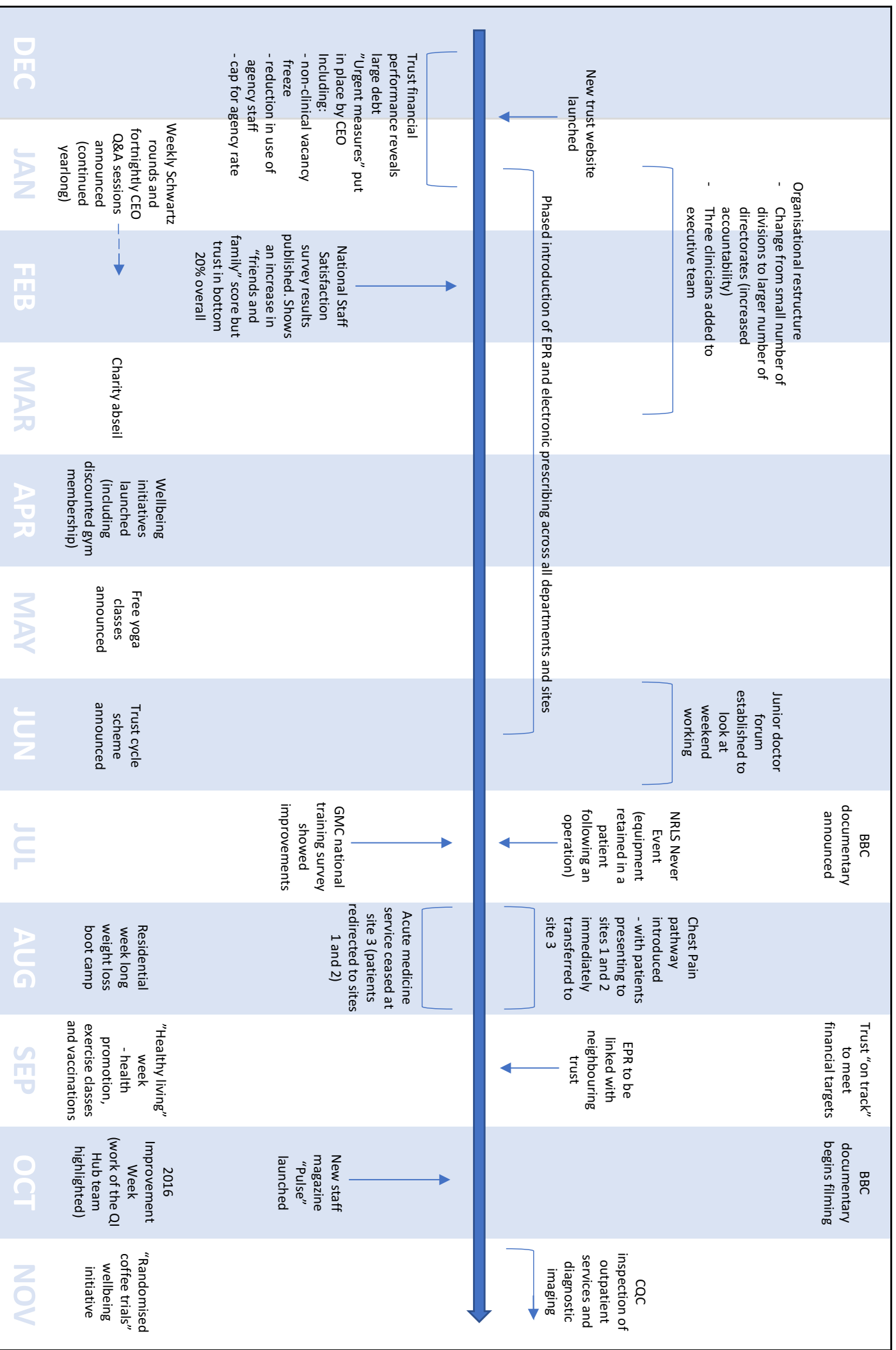


Figure 7-4a – Qualitative log of events during survey period: Internal events

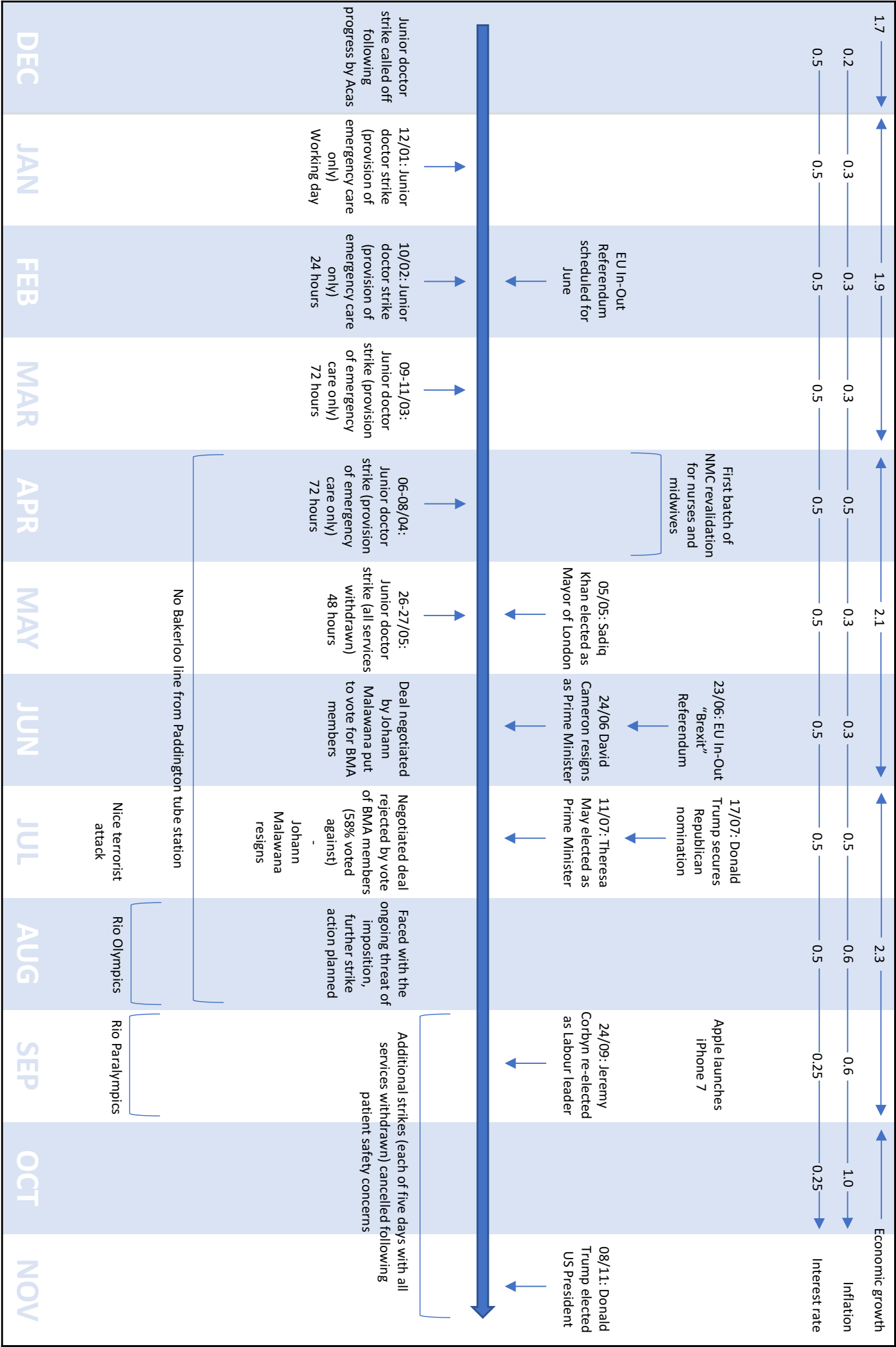


Figure 7-4b – Qualitative log of events during survey period: external events

7.3.4 Changes in organisational health with time

Organisational health was considered in terms of latent sum scores for each construct of the *Healthcare-OH* survey and is tabulated, by round, in *Figure 7-5* and illustrated graphically in *Figure 7-6*. Initial inspection of the raw data presented in these two figures shows the fluctuations in scores across the calendar year, with data from Round 2 (data collected March-April 2016) showing the lowest score for the majority of constructs. Higher scores tend to be found towards the end of the survey period in Rounds 3 and 4 (reflecting data collected June-October 2016).

Prerequisite assumptions of normality were checked through inspection of Q-Q plots and histograms for each latent construct. Homogeneity of variance was confirmed using Levene's test ($p > 0.05$ for each latent construct; *Figure 7-5*). Analysis using one-way ANOVA revealed a statistically significant difference between survey rounds, as determined by one-way ANOVA, for the latent constructs of *Resilience* ($p = 0.046$), *Leadership & Management* ($p = 0.020$), *Staff Wellbeing* ($p = 0.037$), *Patient Safety* ($p = 0.041$) and *Communication* ($p = 0.000$) (*Figure 7-5*). The latent constructs of *Strategy* ($p = 0.092$), *Finance & Investment* ($p = 0.577$), *Efficiency* ($p = 0.083$) and *Communication* ($p = 0.058$) did not alter significantly with time (*Figure 7-5*).

Post hoc analysis was subsequently performed for those constructs found to vary with time, the results of which are presented in *Figure 7-7*. This shows a specific statistically significant change in the perceived *Resilience* of the organisation between survey rounds 2 and 3 ($p = 0.041$; marked with an asterisk "*" in *Figure 7-6*).

	Mean sum score [S.D.]				Levene's test	one way ANOVA
Round	1	2	3	4	p-value	p-value
Strategy	4.54 [1.06]	4.43 [1.11]	4.64 [1.15]	4.65 [1.05]	0.406	0.092
Resilience	4.26 [1.08]	4.14 [1.05]	4.44 [1.06]	4.19 [1.08]	0.992	0.046*
Leadership & Management	4.09 [1.40]	4.10 [1.51]	4.45 [1.45]	4.52 [1.49]	0.130	0.020*
Staff Wellbeing	4.60 [1.07]	4.44 [1.01]	4.71 [0.96]	4.56 [0.96]	0.490	0.037*
Finance & Investment	3.42 [1.00]	3.40 [1.03]	3.52 [1.06]	3.53 [1.07]	0.744	0.577
Patient Safety	4.57 [0.97]	4.37 [1.02]	4.56 [1.10]	4.60 [0.90]	0.395	0.041*
Efficiency	3.93 [0.98]	3.76 [0.94]	3.96 [1.03]	3.82 [0.93]	0.932	0.083
Communication	4.44 [1.02]	4.28 [1.06]	4.43 [1.04]	4.60 [0.98]	0.919	0.058
* significant at level $p < 0.05$						

Figure 7-5 – Healthcare-OH latent constructs: mean sum score, Levene's test (of homogeneity of variance) and one way ANOVA mean comparison testing

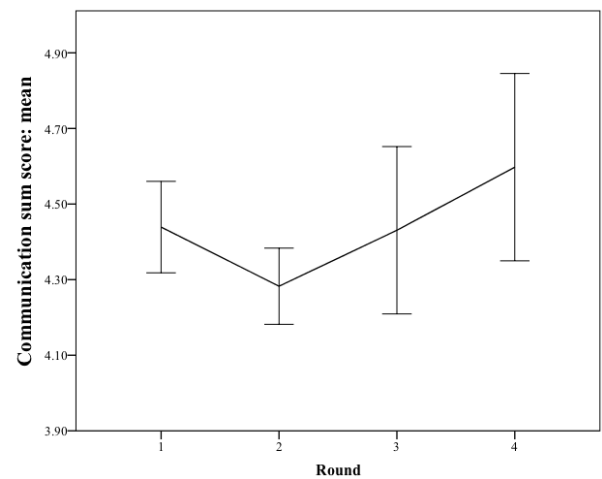
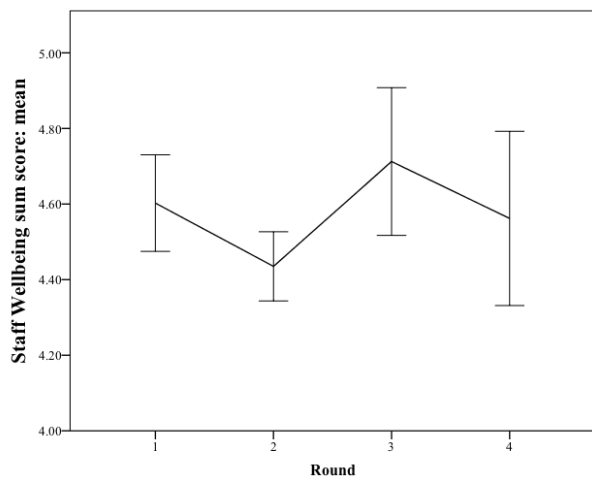
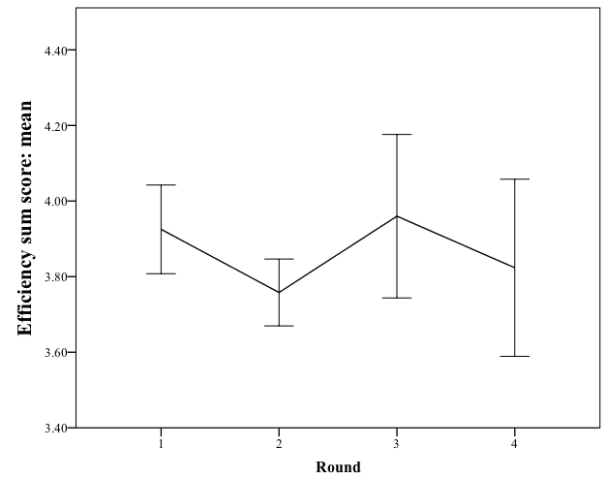
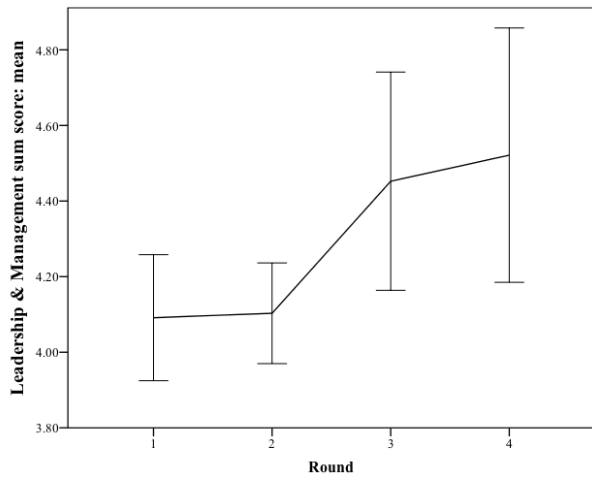
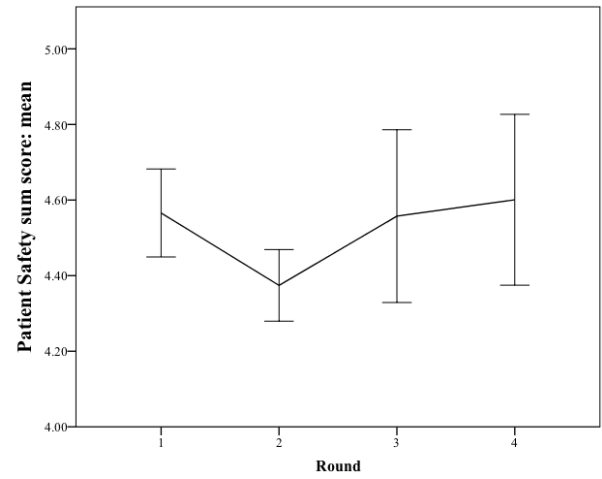
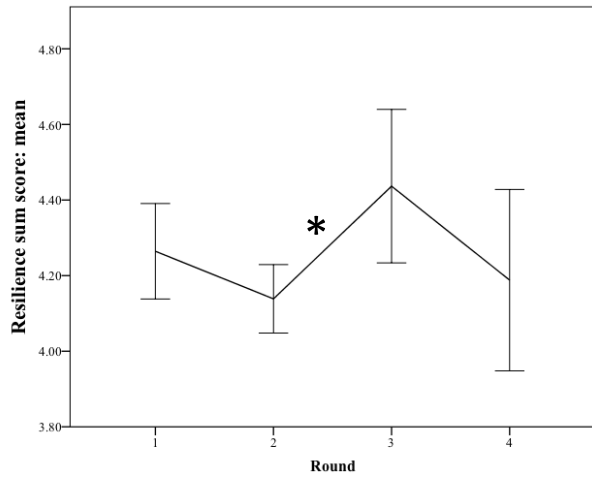
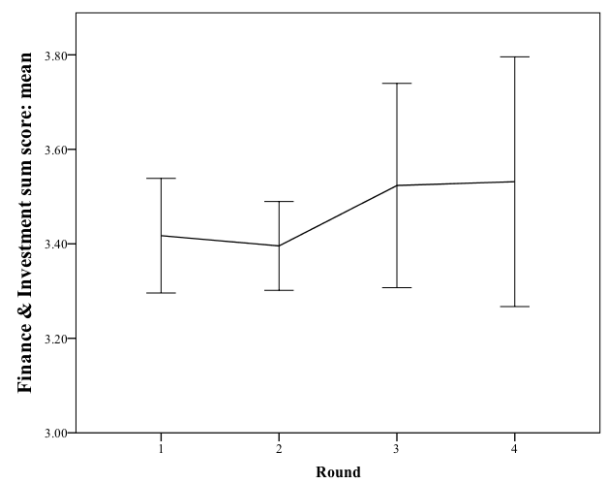
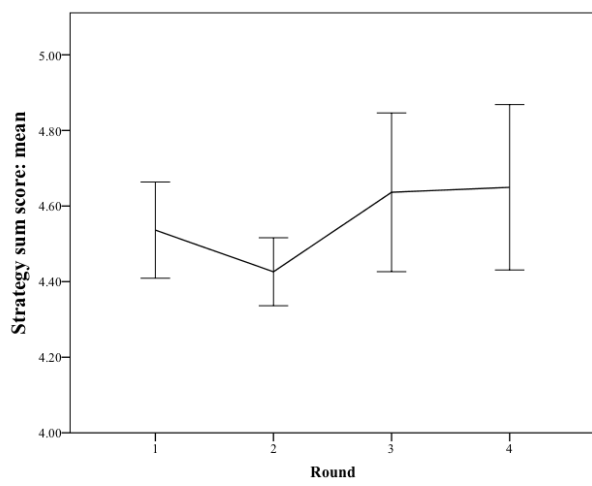


Figure 7-6 – Healthcare-OH construct sum scores (y-axis) plotted by survey round (x-axis)

		Tukey multiple comparisons <i>p</i> -value			
Construct sum score	Round	1	2	3	4
Strategy	1	one way ANOVA non-significant			
	2				
	3				
	4				
Resilience	1				
	2	0.378			
	3	0.482	0.041*		
	4	0.941	0.980	0.388	
Leadership & Management	1				
	2	1.000			
	3	0.154	0.134		
	4	0.104	0.092	0.990	
Staff Wellbeing	1				
	2	0.137			
	3	0.801	0.073		
	4	0.991	0.770	0.787	
Finance & Investment	1	one way ANOVA non-significant			
	2				
	3				
	4				
Patient Safety	1				
	2	0.066			
	3	1.000	0.388		
	4	0.995	0.332	0.994	
Efficiency	1	one way ANOVA non-significant			
	2				
	3				
	4				
Communication	1	one way ANOVA non-significant			
	2				
	3				
	4				
* significant at <i>p</i> <0.05					

Figure 7-7 – Post hoc multiple comparisons of group means for constructs showing significant variation

7.3.5 Comparison of changes in organisational health with contemporaneous events

In an attempt to further ‘drill down’ and unpick the changes seen within the domain organisational *Resilience* between survey round 2 (March-April) and survey round 3 (June-July), differences in individual item scores were considered in terms of effect size. These results are presented in *Figure 7-8*, with effect size expressed as Cohen’s *d*, calculated as:

$$d = \frac{\bar{x}_1 - \bar{x}_2}{S_{pooled}}$$

Where:

d = effect size

$\bar{x}_1$ = mean for sample 1

$\bar{x}_2$ = mean for sample 2

S_{pooled} = pooled standard deviation (for total population)

Whilst items relating the quality of staffing (Item Ref R1-R4) and the organisation’s capability to withstand sudden changes (Item Ref R9-R11) were all relatively constant (R1-R4 *d*=0.04-0.36; R9-R11 *d*=0.12-0.32), more pronounced changes are seen in scores relating to innovation and quality improvement (Item Ref R7: *It is not very innovative*, *d*=0.47; Item Ref R8: *It rarely puts new things in place to improve quality*, *d*=0.60). Considering these findings alongside contemporaneous events from the qualitative log (presented in *Figure 7-4*), the interval between these two survey rounds saw the initial benefits for the organisation diminishing, the phased introduction of EPR and the introduction of a junior doctor forum to look at weekend working patterns.

Figure 7-8 also shows a notably effect size for item R6: *It lacks a long term financial plan* (*d*=0.43). The log of internal events, presented in *Figure 7-4a*, notes the raft of financial

measures introduced by the trust's Chief Executive at the start of the study period. These can be seen to yield positive results (as the trust comment on being well placed to meet financial targets by September) and this prudent financial planning appears to be borne out in the results to this survey item.

Ref	Item	Round		Cohen's <i>d</i> *
		2	3	
R1	It attracts the best quality nurses	4.23	4.38	0.14
R2	It attracts the best quality doctors	4.75	5.13	0.36
R3	It attracts the best quality clerical and secretarial staff	3.89	3.93	0.04
R4	It has a good reputation for administration and management	3.60	3.80	0.19
R5	It lacks a long term strategic plan	4.07	4.43	0.34
R6	It lacks a long term financial plan	4.04	4.50	0.43
R7	It is not very innovative	4.49	4.99	0.47
R8	It rarely puts new things in place to improve quality	4.46	5.10	0.60
R9	If there was a sudden unforeseen incident e.g. fire, deep snowfall or power cut, it would cope very well	4.43	4.77	0.32
R10	If there as a sudden major medical incident e.g. multiple casualties or influenza pandemic, it would cope very well	4.68	4.82	0.13
R11	If there was a sudden change in legislation e.g. a cut in funding, it would cope very well	2.80	2.93	0.12
*pooled S.D. = 1.06				

Figure 7-8 – Effect size calculation (expressed as Cohen's *d*) for the construct of *Resilience* between data collection rounds 2 and 3

7.4 Discussion

7.4.1 Summary of main findings

This is the first study to consider organisational health as a dynamic entity, with the potential to be influenced by events occurring both within and around an organisation. Organisational health was measured using the *Healthcare-OH* survey on a quarterly basis within a single large acute NHS trust based in London. Throughout the 12-month study period, fluctuations, albeit small in size, were seen across all of the survey domains (*Figures 7-5 and 7-6*). Events both internal and external to the trust were recorded contemporaneously to data collection (*Figure 7-4*) and mapped to variation in *Healthcare-OH* sum scores.

Leadership & Management score was seen to steadily increase over the four survey rounds and it is intriguing that this appears to follow the large organisational reconfiguration implemented between January and March 2016 (*Figure 7-4a*). *Finance & Investment* score also trended in an upwards direction and could potentially reflect the success of the measures implemented by the trust at the start of the study to curb unnecessary financial expenditures. Similarly, increases in *Communication* score could demonstrate the impact of regular Q&A sessions with the trust Chief Executive or the launch of a staff magazine later in the year.

Scores for the majority of other domains were more stable across the twelve months of data collection. Despite a number of changes to clinical pathways and the phased introduction of EPR across trust sites, *Efficiency* score was relatively homogenous across survey rounds. This may reflect the period of adaptation which follows such large scale organisational change. Scores within the domain of *Patient Safety* were also relatively consistent with no apparent changes following the major patient safety incident which was noted midway through the

data collection period. Similarly, despite a succession of HWB initiatives throughout the year, *Staff Wellbeing* score did not appear to increase with successive survey rounds. Admittedly, such initiatives will only benefit those who attend or engage in these programmes and they should be weighed alongside events which will negatively impact on *Staff Wellbeing*, such as the inconvenience which followed closure of the nearest tube line closest to the main trust site and the disruption this put on the majority of staff who commute to work. There has been much written in the aftermath of the junior doctor strikes about the crisis in staff morale within the NHS and how this series of events only served to deepen these problems.^{186,187} As such, one could reason that whilst HWB initiatives did not appear to increase *Staff Wellbeing* scores within the trust, that their impact was to oppose a series of negatively impacting events and that, without them, a downward trend would otherwise have been observed.

The only statistically significant variation seen in organisational health during the study period was that observed between survey rounds 2 and 3 (between March/April and June/July 2016) in organisational *Resilience* ($p=0.041$; *Figure 7-7*). Whilst this could be a reflection of the innovations and financial planning which was implemented at this time, it is noticeable that the score falls back to a similar level in survey round 4 (comparison of *Resilience* mean sum scores between survey rounds 2 and 4 non-significant at $p=0.980$). This regression back toward the mean could suggest that staff completing the *Healthcare-OH* survey at this point have put past events behind them and are now contemplating more temporally prescient matters, such as the impending CQC inspection towards the end of 2016.

Essentially, when appraising the results presented here there are, arguably, two conclusions one can form. One could suggest that given only one of the eight constructs of organisational

health was seen to vary over the twelve-month period to a statistically significant degree, and that even this construct was seen to regress to the mean in the following round of data collection, that organisational health does not significantly vary with time. Alternatively, it could be countered that organisational health does vary with time but these variations were not adequately captured here in this study. There are a series of reasons why this may be the case.

Firstly, that the myriad of internal and external events (both those in *Figure 7-4* and beyond) alter scores with such frequency that the resultant fluctuations average out with time and are not seen when data is collected on a quarterly basis. For example, July 2016 saw both the news of a major patient safety incident within the trust (the *Never Event* from equipment retained in a patient following an operation) and the announcement of the BBC documentary “Hospital”. Trust employees’ perceptions of their hospital both as a place to work and a place to be treated as a patient may be negatively affected by the *Never Event* but may be boosted by news of widespread media recognition of the work done across the trust. With both of these internal events coming to light in the same month it is impossible to unpick the composite effect of each with data collection performed at relatively sparse quarterly time intervals.

Secondly, it could be that whilst organisational health does not vary at trust level, that if one were to consider scores at a smaller level of analysis (such as directorate or even departmental or ward level) that changes may be seen. Finally, any changes may only be seen over a longer time period than the twelve-month analysis constrained to here.

7.4.2 Comparison with existing literature

As has been discussed earlier in this thesis, what sets organisational health apart from other conceptions of healthcare performance is the breadth of domains it considers; previously intangible elements which have been too often neglected in pursuit of more demonstrable but short term down-stream targets. As such, it is difficult to source many studies which consider the elements of *Strategy*, *Resilience*, *Efficiency* and *Communication* within any form of repeated-measure design such as that presented here.

Staff Wellbeing, as an element, has been considered in a similar manner elsewhere however, most notably in the National Staff Satisfaction survey (NSSS).⁸⁶ This is a large scale, cross-sectional survey involving all trusts operating within NHS England and has run annually since 2003. Whilst NSSS primarily considers *Staff Wellbeing*, it also touches on aspects of *Leadership & Management* and *Patient Safety*. However, the output published each year by NHS England is purely descriptive in nature for the purposes of comparative benchmarking between trusts.¹⁸⁸ Furthermore, major analyses based on this work focus on how components of *Staff Wellbeing*, such as engagement, act as antecedents of other performance metrics, rather than considering them as the product of other drivers.¹⁸⁹

Other studies considering repeated-measures of Staff Wellbeing at the trust level include the work of Blake *et al.*, who analysed the impact of a multi-modal set of wellbeing interventions run across the whole organisation.¹⁹⁰ However, data collection only occurred twice over a five-year time period making it is even harder to ascribe any degree of causality to the initiatives considered.

Patient Safety has also been examined by a variety of different groups in studies with repeated-measure design.^{191,192} Most notably, Benn and colleagues conducted a longitudinal study across nineteen sites, all of which were acute NHS trusts.¹⁹³ Whilst *Patient Safety* did not significantly vary in the results presented for ICHT here, Benn *et al.* found a significant, albeit small, increase in safety score across their sites (as measured with the Patient Safety Climate and Capability scale). However, all these sites were engaged in a large scale collaborative patient safety programme and so it should come as no surprise that, within ICHT, no significant fluctuations were seen in the domain of *Patient Safety* during this study, given the trust was not engaged in such an initiative during the period of data collection.

7.4.3 Limitations

The limitations incurred through the use of the *Healthcare-OH* survey have been discussed in full previously in this thesis (*Chapters 2-4*) and work presented in this study remains open to the same potential sources of measurement, coverage, non-response and sampling error.

Measurement error (that which results from inadequacies within the survey itself), in particular, remains consistent with each use of the survey in its present form.

At the start of the study, the ICHT organisational development team provided an up to date list of the email addresses of all staff in the trust. Staff were then randomly allocated to receive the survey once over the four survey rounds. In order to preserve this randomisation, no allowance was made for staff members leaving or joining the trust during the twelve-month study period. Whilst introducing new employees into later rounds of the study would

lead to an over-representation of new starters at these time points (and so become a source of bias itself), not updating staff contact lists remains a potential source of coverage error.

Many web-based surveys utilise email invitations containing single use URL weblinks. This allows participation to be tracked at an individual level and reminder emails to be tailored and sent only to those who have yet to participate. To prevent invitation emails falling foul of trust firewalls and spam filters, they were sent internally from a customised trust email account (organisational.health@imperial.nhs.uk). However, this unfortunately limited the ability to use single use URLs and so a multi-use weblink was used instead. Whilst staff were randomly allocated into one of the four survey rounds, there is nothing to prevent staff forwarding the email internally to then be completed by colleagues who would otherwise be in another survey round. This could lead to unintended clustering of responses within wards, departments or job roles and present another source of coverage error. This could be limited by the use of single use weblinks if the survey is to be repeated again in the future.

As a staff member within ICHT, enhanced access to mailing lists made it considerably easier to control distribution of the survey and to send serial reminders until minimum sample size was reached for each round. Although each round involved invitations being sent to a quarter of trust staff, analysis was performed at trust level so sampling error calculations were made based on total staff size (n=8,919). Sampling error was found to be <7% (3.9-6.8%; 95% confidence level) throughout the survey and so each sample round was considered representative for the trust population as a whole.

Whilst organisational health scores have been considered alongside internal and external events throughout this chapter, it remains important to reiterate that all discussion should be considered as speculative, particularly when considering trends in the data without statistically significant differences. Furthermore, given only one NHS trust was involved in this study, results may not be generalisable to all other acute NHS trusts in the UK.

7.4.4 Conclusion

This study presents a twelve-month period of near continuous organisational health data collection within a single acute NHS trust. Whilst the trust was subject to a relative maelstrom of effectors (from both outside and from within) during the data collection period, organisational health scores were found to be largely stable. Whilst these findings would benefit from repetition on a larger scale elsewhere, one can tentatively propose that such a study should consider data collection over a series of years as results seem to suggest that for a large change in organisational health may take more than twelve months to both drive and sustain.

Chapter 8: Final thoughts

Healthcare organisations, in all settings and in all countries, find themselves under increasing levels of external scrutiny from agencies such as the Care Quality Commission (CQC), usually working to predefined standards set by bodies such as the National Institute for Healthcare Care Excellence (NICE). In the current state of play, downstream outcome measures are equated with quality, and this data is broadly used for one of two purposes: internal quality improvement (QI) or external reporting. The first of these aims to harness a process of internal audit to prompt continuous QI initiatives either through comparison with historic internal controls or benchmarking data from other, similar, healthcare organisations. In the latter, external reporting is usually a consequence of an imposed monitoring programme, from an external agency, for accountability and performance management purposes. This can prompt further investigation, loss of internal autonomy and, on occasion, sanctions or penalties being issued. The use of data in this way has been referred to as “*data for judgement*” and concerns exist about the credibility of this process given the limitations of these outcome datasets.⁵⁹ Indeed, the danger of searching for quality improvement through data for judgement is that the stigma associated with the risk of, often capricious, sanctions and the threat of financial penalty instils something of a culture of fear within an organisation.¹⁹⁴ This can significantly hinder QI programmes in a counterproductive manner.

Outcomes measures can be affected by a myriad of factors, of which the quality of care is but one.⁵⁹ This has led many to champion the adoption of process measures, for both reduction in the case-mix bias seen in many downstream outcome datasets and to also attempt to

unearth actionable learning points.¹⁹⁵ The use of process measures is fraught with challenges however, as this requires the identification of a series of links between specific processes and specific outcomes with the validity of any such process measure resting on the strength of these associations.¹⁹⁶ Continuously recording process measures, as a barometer of quality, also risks attributing undue significance to the finding of a rare singular event which is also somewhat problematic. Attempts to move away from both outcome and process measures and take a more systemic approach to consider the ubiquitous, yet more intangible, elements within a healthcare organisation which reflect quality (such as *Resilience*, *Staff Wellbeing*, *Communication* or *Capacity for change*) are what has generated this thesis.

There is a growing recognition of the impact of organisational elements on healthcare quality with organisational health being but one of a series of metaphors found within the management literature for considering how organisations behave and function. Other concepts, such as the application of organisational culture within healthcare, should also interest both healthcare researchers and policy makers.^{152,197} In this thesis, organisational health is considered as a concept separate to terms such as organisational climate and organisational culture. Whilst there are a number of similarities between these concepts, they all have their own banks of literature within management science and there exists a number of different and often either competing or contrasting definitions for each.¹⁹⁸ I have deliberately eschewed discussion of the overlap between health, culture and climate for these very reasons and one should not underestimate the difficulty in attempting to marry together different and often disparate ways of considering how an organisation behaves. Many of the elements described within each are similar however and reflect the intangible and somewhat nebulous elements required for any organisation to be effective.

In their discussion of organisational health, Shoaf *et al.* (2004) define an *organisational health work system model* which encompasses both organisational climate and organisational culture (Figure 9-1).³⁴ They consider culture to be determined by both the central values within the individual and the goals of the organisation. If these two are aligned then, hereafter, performance is driven by the organisational climate, which is shaped by working practices and demand and limited by the resources available. The output of this whole system is considered to be what represents the health of the organisation.

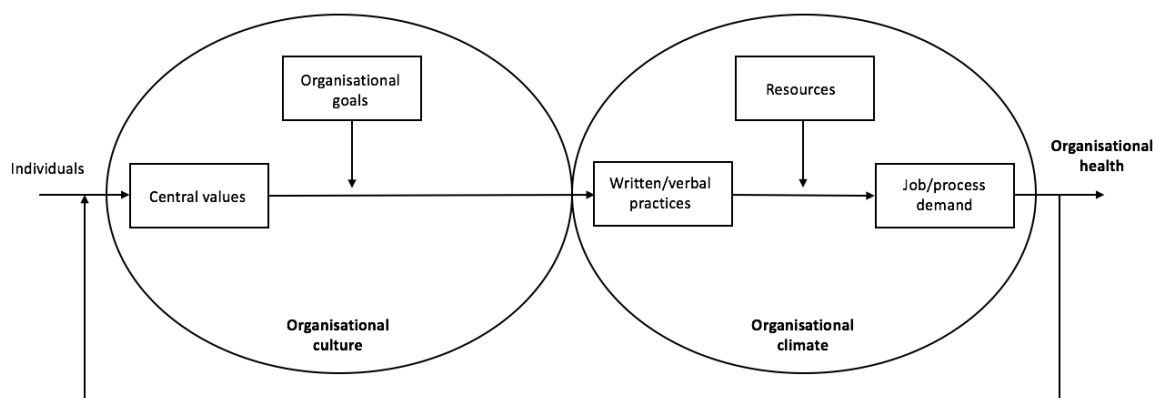


Figure 8-1 Organisational health work system model (from Shoaf C, Genaidy A, Karwowski W, Huang AH. Improving performance and quality of working life: a model for organizational health assessment in emerging enterprises. *Human Factors and Ergonomics in Manufacturing* 2004;14(1):81-95)³⁴

There is intuitive appeal in any framework which allows us to consider these often ambiguously defined concepts alongside, and in this case under the umbrella of, organisational health. However, there is a risk in being a slave to the use of predefined and generic cross-sector operational terminology given the purpose here was to apply a comparatively little studied concept within a new context.

The central aim of organisational health, as with all of these concepts, is to attempt to shift focus away from purely considering down-stream metrics in isolation and to look outside of structural changes for gains in performance. At the very least, this thesis demonstrates the applicability of considering organisational elements when examining healthcare performance and presents empirical data to propose the use of organisational health measurements as a feasible method of achieving this.

The overarching aim of this thesis was to examine whether metrics (such as the *Healthcare-OH* survey) could be used to understand the mechanisms that drive organisational health, accepting the internal and external factors within different healthcare settings. To achieve this aim, this body of work has attempted to address limitations found within the current literature on organisational health in healthcare organisations, providing a series of empirical studies including work in a variety of different healthcare contexts. In doing so, it has answered a series of sequential research questions (as originally outlined in the *Aims* section at the start of the thesis) and stands as a compendium of studies which hope to propagate the wider application of this concept within healthcare.

Chapter 2 and *Chapter 3* present evidence to support the validity and reliability of the *Healthcare-OH* survey when used within acute sector healthcare organisations. Work was extended to the independent healthcare sector in *Chapter 4*, with the validity of the *Healthcare-OH* measure again examined in detail. *Chapter 5* and *Chapter 6* focused on primary care and the generation of a new measure for organisational health in GP practices (the *GP-OH* survey) whilst *Chapter 7* explored ways in which organisational health could be

subject to change, through the collection of data over a year and with analysis performed alongside contemporaneous events.

The importance of internal and external factors as confounders for a given healthcare organisation's organisational health score cannot be overemphasised however. As per the original definitions of Miles and Schein (see *Chapter 1*),^{15,16} healthy organisations are held to be those which respond well to these factors but the financial strain under which the NHS finds itself is unwavering and must take a toll on the reserves to which trusts can do this.¹⁹⁹ This may begin to explain why results of the nationwide survey of organisational health were relatively homogenous across trusts, with sustained external pressures simply grinding down high performance. Notably, none of trusts in the nationwide study were in special measures (and one can reasonably surmise that the scores of such trusts could well have been significantly lower than what was seen in *Chapter 2* and *Chapter 3*). One only has to look at the clear disparity between scores obtained from NHS trusts, in the public sector, and those in the private sector (*Chapter 4*) to witness the impact of these factors, as when taken away, organisational health scores increase significantly across all domains (as was found in ISPs). This is acknowledged in *Chapter 4* in the discussion of these results to serve as a caveat to those who would wish to use comparative data such as this to admonish those organisations with lower scores, without the requisite appraisal of the environmental constraints these trusts must operate under. Indeed, it could be suggested that organisational health measurement is what allows us to quantitatively observe and so better appreciate the effects of these constraints.

Determination of these internal and external factors is a challenging process, though the *Discussion* section of each chapter attempts to provide an evidenced rationale as to why analysis yielded the differences found between organisations. However, such reasoning is, at best, generic to the organisational context (e.g. acute trusts or GP practices) being considered and lacks an appreciation of elemental factors which may well be unique to an individual organisation. Specific identification of these factors is particularly difficult in studies simultaneously conducted across a number of different organisations, such as those reported in *Chapters 3, 4 and 6* (noting that these involved data collection across 211 different healthcare organisations in total). This is exactly what *Chapter 7* attempted to address, with an in-depth exploration within a single organisation and, it must be said, one in which I worked on site the majority of my days. The results of this study were intriguing but disappointingly failed to isolate a sustained change in any of the elements of organisational health, likely due to the complexity of both the organisation and the dense web of internal and external events with the capacity to influence results (*Figure 7-4*).

It was hoped that it would be possible to examine differences between the sum scores for a particular trust to attempt to understand the relative importance of the different elements of organisational health. It was surprising that results were so consistent between elements, with organisations scoring comparatively highly for one element (such as *Resilience*) also tending towards high scores across all elements, and vice versa (see *Figures 3-8a – 3-8h*). Whilst this could indeed be a reflection of the organisation's actual health, it could also be reasoned that, at a time when some studies report that 88% of NHS workers are overly stressed (and that 21% report serious mental health problems as a result)²⁰⁰ that such unhappiness filters in as a confounder, significantly impacting an individual's response to

attitudinal Likert-like items about their organisation across all domains. This would suggest that the *Healthcare-OH* survey could well be predominantly capturing the wellbeing of participants and might explain how homogenous results are between themes for a given trust. Indeed, other conceptions of organisational health, particularly those from the occupational health literature, place a strong focus on wellbeing as its principle driver. In Hart and Cooper's heuristic model of organisational health (2001),²⁰¹ employee wellbeing is identified as the central element, with other organisational characteristics influencing performance largely through their effects they have on wellbeing rather than independently (*Figure 8-2*). This model also finds place for the external factors which can also influence organisational health (identified here as *Government, Customers, Share Holders* and *Partners*).

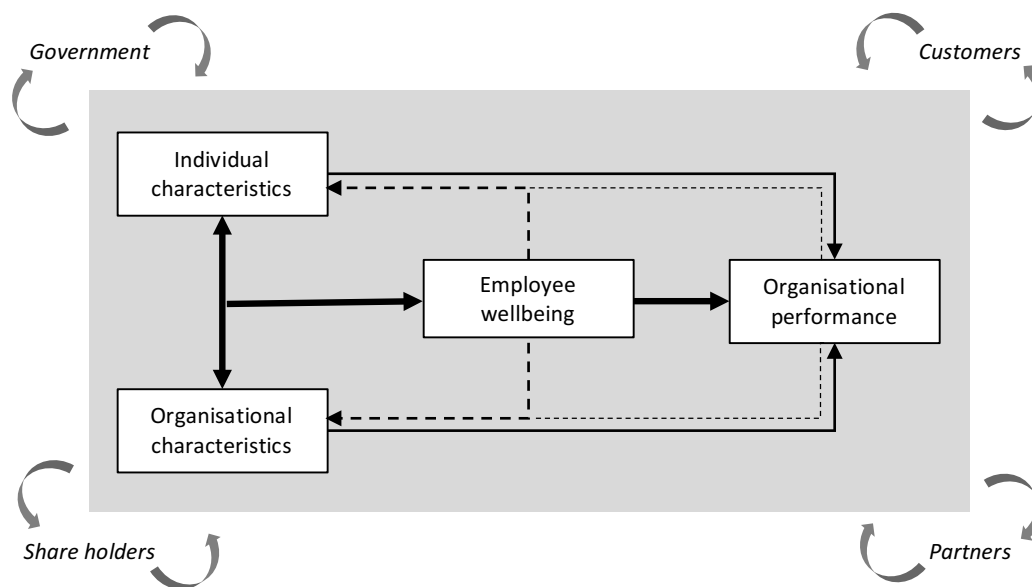


Figure 8.2 Heuristic model of organisational health (from Hart PM, Cooper CL. *Occupational stress: Toward a more integrated framework*. In: *Handbook of Industrial, Work & Organisational Psychology*. Sage 2001)²⁰¹

Whilst this would suggest that *Staff Wellbeing* is the core element of organisational health, it could, alternatively, simply be the element that is most subject to change. NHS trusts function under the severe constraints of fixed tariff structures, low salaries and ever increasing demand (especially those involving emergency services or reliant on novel pharmaceuticals). This significantly limits how much control senior figures in these organisations actually have to shape their *Strategy*, manage their *Finances* or have a chance at impacting upon *Resilience* or *Efficiency*. All this will likely lead to predictably negative effects on staff views on *Leadership*. Given these conditions are relatively consistent across all NHS trusts, they could also well explain the lack of variation seen between elements.

This poses an ongoing theoretical question as to the relative importance of the elements within organisational health. Both the pre-existing definition of organisational health in acute trusts (*Figure 2-1*)³⁸ and that laid out in the theoretical framework in *Figure 5-1* for GP practices, regard elements as equal to one another and the statistical models tested in *Chapter 2* and *Chapter 6* were built accordingly (*Figure 2-4*, *Figure 2-15* and *Figure 6-9*). This thesis has enhanced our conceptual understanding of organisational health in healthcare, particular in finding that *Leadership*, *Strategy*, *Resources* and *Staff Wellbeing* are constants in both primary and secondary care. It still remains unclear, however, as to whether there exists a true hierarchy between these elements or whether it is simply external confounders limiting the variation expected across other domains. This warrants further work and qualitative methods may be best suited to address this in the future. This would allow for the theoretical framework that underpins organisational health to be revisited and would allow for evolution of the definitions considered in this thesis.

In conclusion, whilst down-stream outcomes have their faults, they remain important indicators of performance and to claim otherwise would be somewhat myopic. The risk lies in considering these outcomes in isolation and this is where we must challenge current precepts and shift our focus to the broader and more long-term picture. Organisational health measurement offers a different way of considering long term high performance and I believe work presented within this thesis, more than anything, should simply aim to increase dialogue within organisations about these elements. We need something of a paradigm shift in the way we consider QI in healthcare. Were any such initiative to consider organisational health specifically, I would hope that the body of work presented here would now allow the use of established measures, shown to be valid and reliable within a variety of different healthcare settings. Results could help shape subsequent QI projects, whether that includes the use of initiatives designed to improve *Staff Wellbeing* or even the reconfiguration of the trust's leadership hierarchy for *Leadership & Management*. The opportunity to recognise relative strengths and weaknesses in such important, though arguably unappreciated domains, and direct targeted organisational change represents an exciting opportunity for any healthcare organisation.

8.1 Limitations

There are a number of limitations to the work presented here and they have been discussed, at length, within each data chapter. Looking at the thesis as a whole, a number of choices were made, either consciously or unconsciously, which impacted the preceding results: the majority of data collection was performed using surveys, when organisational visits or individual organisational-level case reports could have been utilised; quantitative methods were favoured, in the main, when hypotheses could have been addressed though purely

qualitative means; healthcare specific measures were either utilised or designed *de novo* rather than transposing existing tools from other organisational sectors. Each of these, and innumerable other, choices have shaped the work presented within this thesis. The majority of these decisions were made at the point of inception when the structure of this work was being planned. Looking back to that point, the key driver behind many of these choices was a need to approach application of this concept through a variety of different strategies, as a rigorous examination is a likely prerequisite if organisational health is to be adopted, and accepted, elsewhere on a large-scale basis. As such, to best advance the field of organisational health within healthcare organisations, a range of different healthcare contexts were considered.

Whilst work began initially within the context of secondary care acute NHS trusts (in keeping with the established body of work and to re-confirm and consolidate current knowledge), applications were extended to the independent healthcare sector and to primary care. A large component of the organisational health literature concerns itself with the business sector and, with the majority of these organisations being private companies, the idea to consider organisational health within private sector healthcare providers was a logical one. Similarly, with the vast majority of healthcare provision within the UK falling on the shoulders of primary care,⁶² moving from acute sector healthcare to GP practices was also a rational next step. Initial plans also considered extension from physical to mental health providers and to healthcare providers outside of the UK. Such work proved challenging, with much mental health provision in the UK delivered by trusts providing a combination of mental health and community care or, on occasion, secondary physical health. Progress has been made with the dissemination of the *Healthcare-OH* survey beyond the UK though the complexity involved in

running international level projects has presented many hurdles. Organisational health application in both these settings is, unfortunately, beyond the scope of this thesis but future work will continue to pursue measurement through these channels.

Amongst the statistical techniques employed during this thesis, factor analysis features prominently, principally CFA. Factor analysis represents a complex array of statistical procedures concerned with the inter-relationships within a set of variables. CFA was used throughout the preceding chapters and utilised the statistical modelling programme Mplus to comprehensively analyse covariance structures, largely to test hypotheses concerning the linear structural relationships between underlying theory and observed item responses. Exploration of the internal structure of measures in this way, using latent trait measurement models (such as that performed for the *Healthcare-OH* survey in *Chapter 2* and *Chapter 4* and the *GP-OH* survey in *Chapter 6*), allows for the demonstration of content validity – a crucial step in the development of any such tool. CFA is not the only way to achieve these goals however, and techniques such as item-response theory have been used by other groups for similar means.²⁰¹

Particular reference should be made to the use of CFA, rather than EFA, for item reduction within *Chapter 6*. As is noted within the *Discussion* section of that chapter, there exists considerable conflict within the literature as to the relative strengths and weaknesses of each approach.^{174,177,178} As such, there will be some who read this particular chapter and strongly disagree with the statistical methods employed. Throughout this thesis, all statistical analysis is used, not to definitively confirm or refute existing theory, but to provide evidence to be considered alongside either current theory or theory derived from other means – such as the

qualitative data presented in *Chapter 5* and *Chapter 7*. Indeed, it was the limitations of quantitative and statistical methods which led to the adoption of a qualitative approach within these studies with this more expansive and flexible methodology able to better understand the myriad, nuanced organisational and system processes that contribute to an organisation's health.

When considering a concept as potentially nebulous as organisational health it would be rather imprudent on my part to claim that the work presented here represents all that there is to be known on this topic but rather that it provides the next link in a chain which will either continue on hereafter or, potentially, branch in a different direction in the future.

8.2 Concluding remarks

My experience producing this thesis has been something of a paradox, in that it has simultaneously been everything I expected it would be and everything I thought it would not be. The opportunity to immerse myself within a topic and attempt to drill-down to the core of it, to establish and test new theory, was one of my main drivers when embarking on this research project. Since first qualifying as a doctor, I have continually found myself drawn to the topics of both leadership and management and whilst I have taken a keen interest, and at times involvement, within this field (through enrolment in the *Management in Medicine* scheme within Oxford Foundation School, membership of the Association of Surgeons in Training, the Association of Otolaryngologists in training and the Faculty of Medical Management and Leadership, a plethora of training courses and workshops, and, more latterly, assuming leadership positions within my deanery's Specialist Training Education Committee and Imperial's Postgraduate Education Committee), the chance to take a

dedicated period out of surgical training and pursue a new and exciting research project on a subject matter so aligned with my current thinking was one not to be missed.

The research projects I had involved myself in prior to this, both during my time at medical school and since, have been, obviously, much more limited in their scope but also very different in their means and largely confined either to basic or clinical science. I was a complete novice within the world of management science and, during my time at Imperial, I have been able to assimilate and use both qualitative and quantitative analysis techniques which would have all but bamboozled me in times past! Having garnered such invaluable experience with the use of grounded theory methodology and latent trait measurement models there is no doubt that I will continue to apply these techniques in both my further work on organisational health and my work in other fields in the future.

There have been many aspects of the last four years which have been stratospherically different to my expectations however. I knew of both the formidable reputation of my research group and the impact of the research previous fellows had delivered during their time at Imperial. I knew that my project would seek to apply exciting and new concepts from the management literature to the healthcare sector. I did not know that this would involve and indeed often hinge on meetings with Chief Executives, Chief Operating Officers, Directors and Research leads from NHS trusts, large independent healthcare providers, NHS regional conglomerates and the external agencies which lead on performance metrics within the UK. I did not imagine the reach that my studies would take and the huge number of total research participants work would involve (cumulative $n \approx 8000$). The opportunity to 'lift the curtain'

and not just observe but involve myself in the higher echelons of healthcare management has been an opportunity I would have never thought possible and have deeply valued.

My thesis has been ambitious in approach, with a large number of studies within it. There has been frustration and disappointment at times, alongside the reported successes. I would like to reiterate my thanks to my dedicated team of supervisors: Prof the Lord Ara Darzi, Mr Sanjay Purkayastha and Dr Sankalp Chaturvedi. Having three such experienced, and complementary, supervisors such as these has meant I have always had a shining beacon of light to turn to in the dark. Similarly, the guidance of Dr Karen Kerr, Dr Jonathan Benn and Prof Paul Aylin has also been invaluable to my progress.

I would like to conclude by thanking you, the reader, for your interest in my work. I would like to think that the studies and discussions above present a comprehensive and reasoned analysis of the applicability of organisational health within healthcare. My research into performance within healthcare organisations will continue on after this thesis and I hope that the work of others also continues to develop this fledgling but exciting field.

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Appendix A: Chapter 2 supplementary figures

Appendix A1 – Healthcare-OH survey

Ref	Item	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
S1	Everyone is committed to a common goal	0	0	0	0	0
S2	Management and clinical teams work closely together	0	0	0	0	0
S3	Management and clinical teams have the same aims	0	0	0	0	0
S4	Everyone has the shared value of delivering high quality care	0	0	0	0	0
S5	The strategic direction of this organisation is not clear	0	0	0	0	0
S6	The strategic direction of this organisation is not realistic	0	0	0	0	0
S7	I am frequently reminded of the mission / vision statement	0	0	0	0	0
S8	Where I work, people put the patients first	0	0	0	0	0
S9	Where I work, people understand why we are here	0	0	0	0	0
S10	I put the needs of the patients above everything else	0	0	0	0	0
S11	There is friction or confrontation within my team	0	0	0	0	0
S12	There is friction or confrontation with other departments or teams	0	0	0	0	0
S13	We have different aims from the other departments or teams we work with	0	0	0	0	0
R1	It attracts the best quality nurses	0	0	0	0	0
R2	It attracts the best quality doctors	0	0	0	0	0
R3	It attracts the best quality clerical and secretarial staff	0	0	0	0	0
R4	It has a good reputation for administration and management	0	0	0	0	0
R5	It lacks a long term strategic plan	0	0	0	0	0
R6	It lacks a long term financial plan	0	0	0	0	0
R7	It is not very innovative	0	0	0	0	0
R8	It rarely puts new things in place to improve quality	0	0	0	0	0
R9	If there was a sudden unforeseen incident e.g. fire, deep snowfall or power cut, it would cope very well	0	0	0	0	0
R10	If there as a sudden major medical incident e.g. multiple casualties or influenza pandemic, it would cope very well	0	0	0	0	0
R11	If there was a sudden change in legislation e.g. a cut in funding, it would cope very well	0	0	0	0	0

LM1	I feel well supported by my manager*	0	0	0	0	0	0	0
LM2	I feel motivated by my manager*	0	0	0	0	0	0	0
LM3	My manager* praises good work	0	0	0	0	0	0	0
LM4	My manager* sets clearly defined objectives	0	0	0	0	0	0	0
LM5	I trust the senior managers to make the right decisions	0	0	0	0	0	0	0
LM6	The senior managers are approachable	0	0	0	0	0	0	0
LM7	The senior managers drive staff motivation	0	0	0	0	0	0	0
LM8	The senior managers have had little experience of patient care	0	0	0	0	0	0	0
LM9	Leaders in this organisation have a vision	0	0	0	0	0	0	0
LM10	Leaders appreciate staff	0	0	0	0	0	0	0
LM11	Leaders are committed to innovation	0	0	0	0	0	0	0
LM12	Leaders create a positive environment	0	0	0	0	0	0	0
LM13	Clinical staff are involved in leadership	0	0	0	0	0	0	0
SW1	I find my work challenging	0	0	0	0	0	0	0
SW2	I am bored at work	0	0	0	0	0	0	0
SW3	I am unhappy with my work	0	0	0	0	0	0	0
SW4	I lack sufficient appraisal or feedback meetings to review my performance	0	0	0	0	0	0	0
SW5	The right staff are in the right place	0	0	0	0	0	0	0
SW6	The right people are appointed rather than someone to fill a post	0	0	0	0	0	0	0
SW7	People are appointed because they really want to do that job	0	0	0	0	0	0	0
SW8	People act in a professional manner	0	0	0	0	0	0	0
SW9	It is difficult to get time off to attend training / education courses	0	0	0	0	0	0	0
SW10	Training and education is a low priority	0	0	0	0	0	0	0
SW11	My daily workload is not achievable	0	0	0	0	0	0	0
SW12	I feel overly stressed	0	0	0	0	0	0	0
SW13	Patients here are treated with dignity	0	0	0	0	0	0	0
SW14	Patients have faith in this organisation	0	0	0	0	0	0	0
SW15	People here lack the right attitude to work with patients	0	0	0	0	0	0	0
SW16	If a close family member / friend needed medical care I would bring them here	0	0	0	0	0	0	0

SW17	There is too great a reliance on agency / locum staff	0	0	0	0	0	0	0
SW18	There is too great a reliance on bank staff	0	0	0	0	0	0	0
F1	Money is wasted	0	0	0	0	0	0	0
F2	Money is used in the wrong areas	0	0	0	0	0	0	0
F3	People who manage the budget lack contact with clinical areas	0	0	0	0	0	0	0
F4	People here are compensated adequately for the job they do	0	0	0	0	0	0	0
F5	There is enough money invested in computer systems and technology	0	0	0	0	0	0	0
F6	There is enough money invested in patient care and clinical equipment	0	0	0	0	0	0	0
F7	There is enough money invested in buildings and renovations	0	0	0	0	0	0	0
F8	There is money available for innovation or new ideas	0	0	0	0	0	0	0
F9	People understand the cost of the equipment or tests they use	0	0	0	0	0	0	0
F10	All changes made are to cut costs	0	0	0	0	0	0	0
F11	Money saving ideas are not listened to	0	0	0	0	0	0	0
PS1	Absenteeism is a problem in this organisation	0	0	0	0	0	0	0
PS2	People take lots of sick leave where I work	0	0	0	0	0	0	0
PS3	Mistakes / critical incidents are reported here	0	0	0	0	0	0	0
PS4	Mistakes / critical incidents are learned from here	0	0	0	0	0	0	0
PS5	It is encouraged to report mistakes / critical incidents	0	0	0	0	0	0	0
PS6	Changes are made as a result of mistakes / critical incidents happening	0	0	0	0	0	0	0
PS7	There are sufficient nurses to look after patients out of hours (nights & weekends)	0	0	0	0	0	0	0
PS8	There are sufficient doctors to look after patients out of hours (nights & weekends)	0	0	0	0	0	0	0
PS9	There are sufficient nurses to look after patients during weekdays	0	0	0	0	0	0	0
PS10	There are sufficient doctors to look after patients during weekdays	0	0	0	0	0	0	0
PS11	There is a weak safety culture here	0	0	0	0	0	0	0
PS12	We lack regular meetings to discuss the mistakes / critical incidents reported	0	0	0	0	0	0	0
PS13	Patient safety is prioritised by management	0	0	0	0	0	0	0
PS14	There is a 'no blame' culture here	0	0	0	0	0	0	0
E1	It is haphazard and things work out by chance rather than by proper planning	0	0	0	0	0	0	0
E2	There are often last minute changes to staffing	0	0	0	0	0	0	0

E3	This organisation is efficient	0	0	0	0	0	0	0
E4	The processes in place are archaic and based on historical changes	0	0	0	0	0	0	0
E5	There are frequent cancellations in the operating theatres	0	0	0	0	0	0	0
E6	Patients wait a long time for emergency surgery	0	0	0	0	0	0	0
E7	There are delays in discharging patients	0	0	0	0	0	0	0
E8	Patient notes are often unavailable	0	0	0	0	0	0	0
E9	Decisions are made based on patient care data collected	0	0	0	0	0	0	0
E10	Quality of patient care data collected is fed back to staff	0	0	0	0	0	0	0
E11	There is accurate data collected to assess the quality of patient care	0	0	0	0	0	0	0
E12	Innovations to help patients e.g. text messaging are embraced	0	0	0	0	0	0	0
E13	There are too many senior managers	0	0	0	0	0	0	0
E14	There are too many junior / middle managers	0	0	0	0	0	0	0
E15	There is too much bureaucracy to get something done	0	0	0	0	0	0	0
C1	Information flows from frontline staff up to Board level	0	0	0	0	0	0	0
C2	Information flows from the Board to all levels of the organisation	0	0	0	0	0	0	0
C3	There is transparency so it is easy to see what is being planned by the organisation	0	0	0	0	0	0	0
C4	Senior staff communicate with their teams in person	0	0	0	0	0	0	0
C5	Communication between nurses and doctors is poor	0	0	0	0	0	0	0
C6	Communication between medical staff and patients is poor	0	0	0	0	0	0	0
C7	Communication between medical staff and management staff is poor	0	0	0	0	0	0	0
C8	Patients with communication challenges e.g. deafness or non-native speaking are well catered for	0	0	0	0	0	0	0
C9	People here are polite to patients	0	0	0	0	0	0	0
C10	People here ignore patients	0	0	0	0	0	0	0
C11	People here talk in their own languages excluding others	0	0	0	0	0	0	0
C12	Patient complaint information is regularly fed back to staff	0	0	0	0	0	0	0
C13	Thank you or praise from patients is regularly fed back to staff	0	0	0	0	0	0	0
C14	There are inconsistent messages from senior levels	0	0	0	0	0	0	0
C15	Decisions are made behind closed doors	0	0	0	0	0	0	0
C16	Information is out of date by the time I get it	0	0	0	0	0	0	0

*manager means your line manager or nurse manager, or Consultant if you are a doctor

Appendix A2 – CFA for subscale models ('ref' denotes individual items, β = standardised factor loadings, SE = standard error, B = unstandardised factor loadings, R^2 = percentage of variance explained by model)

Sub-scale	Latent construct	Observed variable (ref)	β	SE	two-tailed p -value	B	SE	two-tailed p -value	R^2
Strategy	Alignment	S1	0.86	0.01	<0.01	1.46	0.03	<0.01	0.74
		S2	0.75	0.01	<0.01	1.30	0.03	<0.01	0.56
		S3	0.74	0.01	<0.01	1.32	0.03	<0.01	0.54
		S4	0.78	0.02	<0.01	1.35	0.03	<0.01	0.61
	Direction	S5	0.43	0.03	<0.01	0.79	0.06	<0.01	0.18
		S6	0.40	0.03	<0.01	0.70	0.05	<0.01	0.16
		S7	0.45	0.03	<0.01	0.83	0.05	<0.01	0.20
	Patients first	S8	0.84	0.01	<0.01	1.27	0.03	<0.01	0.71
		S9	0.86	0.01	<0.01	1.35	0.03	<0.01	0.75
		S10	0.39	0.02	<0.01	0.42	0.03	<0.01	0.15
	Teamwork	S11	0.59	0.02	<0.01	1.23	0.05	<0.01	0.35
		S12	0.79	0.02	<0.01	1.48	0.04	<0.01	0.63
		S13	0.59	0.02	<0.01	1.11	0.04	<0.01	0.35
Resilience	Staff attraction	R1	0.81	0.02	<0.01	1.26	0.04	<0.01	0.66
		R2	0.71	0.02	<0.01	1.07	0.04	<0.01	0.50
		R3	0.81	0.02	<0.01	1.25	0.03	<0.01	0.66
		R4	0.71	0.02	<0.01	1.18	0.04	<0.01	0.50
	Future survival	R5	0.61	0.03	<0.01	1.08	0.05	<0.01	0.37
		R6	0.60	0.03	<0.01	1.07	0.05	<0.01	0.36
		R7	0.83	0.03	<0.01	1.48	0.06	<0.01	0.69
		R8	0.77	0.03	<0.01	1.39	0.06	<0.01	0.60
	Adversity coping	R9	0.86	0.01	<0.01	1.47	0.03	<0.01	0.74
		R10	0.88	0.01	<0.01	1.48	0.03	<0.01	0.77
		R11	0.53	0.02	<0.01	0.93	0.04	<0.01	0.28
Leadership	Effective management	LM1	0.92	0.01	<0.01	1.86	0.03	<0.01	0.84
		LM2	0.95	0.01	<0.01	1.95	0.02	<0.01	0.89
		LM3	0.91	0.01	<0.01	1.83	0.03	<0.01	0.83
		LM4	0.91	0.01	<0.01	1.80	0.03	<0.01	0.83
	Effective senior management	LM5	0.90	0.01	<0.01	1.76	0.02	<0.01	0.82
		LM6	0.89	0.01	<0.01	1.77	0.02	<0.01	0.78
		LM7	0.91	0.01	<0.01	1.80	0.02	<0.01	0.83
		LM8	0.35	0.02	<0.01	0.67	0.04	<0.01	0.12
	Effective leadership	LM9	0.75	0.01	<0.01	1.24	0.03	<0.01	0.56
		LM10	0.91	0.01	<0.01	1.74	0.02	<0.01	0.83
		LM11	0.84	0.01	<0.01	1.43	0.03	<0.01	0.71
		LM12	0.94	0.01	<0.01	1.77	0.02	<0.01	0.89
		LM13	0.69	0.01	<0.01	1.19	0.03	<0.01	0.48

Staff Wellbeing	Staff satisfaction	SW1	0.19	0.02	<0.01	0.30	0.04	<0.01	0.03
		SW2	0.49	0.03	<0.01	0.85	0.05	<0.01	0.24
		SW3	0.91	0.04	<0.01	1.90	0.07	<0.01	0.84
		SW4	0.73	0.04	<0.01	1.44	0.07	<0.01	0.54
	Staff appointment	SW5	0.75	0.02	<0.01	1.33	0.03	<0.01	0.56
		SW6	0.75	0.02	<0.01	1.42	0.04	<0.01	0.57
		SW7	0.73	0.02	<0.01	1.27	0.03	<0.01	0.54
		SW8	0.70	0.02	<0.01	1.15	0.03	<0.01	0.50
	Training and workload	SW9	0.55	0.03	<0.01	1.12	0.06	<0.01	0.30
		SW10	0.61	0.03	<0.01	1.23	0.06	<0.01	0.38
		SW11	0.52	0.03	<0.01	1.01	0.05	<0.01	0.27
		SW12	0.74	0.03	<0.01	1.48	0.07	<0.01	0.55
	Patient interaction	SW13	0.66	0.02	<0.01	0.91	0.04	<0.01	0.44
		SW14	0.72	0.02	<0.01	1.06	0.04	<0.01	0.52
		SW15	0.41	0.03	<0.01	0.72	0.05	<0.01	0.17
		SW16	0.73	0.02	<0.01	1.29	0.04	<0.01	0.53
	Temporary staff	SW17	0.88	0.03	<0.01	1.65	0.05	<0.01	0.78
		SW18	0.91	0.03	<0.01	1.63	0.05	<0.01	0.82
Finance & Investment	Efficient use of funds	F1	0.68	0.02	<0.01	1.24	0.05	<0.01	0.47
		F2	0.79	0.02	<0.01	1.38	0.04	<0.01	0.62
		F3	0.75	0.02	<0.01	1.34	0.04	<0.01	0.57
		F4	0.31	0.03	<0.01	0.52	0.05	<0.01	0.09
	Investment	F5	0.47	0.03	<0.01	0.88	0.05	<0.01	0.22
		F6	0.74	0.02	<0.01	1.31	0.04	<0.01	0.55
		F7	0.56	0.03	<0.01	1.00	0.05	<0.01	0.31
		F8	0.65	0.02	<0.01	1.04	0.04	<0.01	0.43
		F9	0.39	0.03	<0.01	0.69	0.05	<0.01	0.15
		F10	0.23	0.03	<0.01	0.42	0.06	<0.01	0.05
		F11	0.30	0.03	<0.01	0.51	0.06	<0.01	0.09
Patient Safety	Presenteeism	PS1	0.82	0.04	<0.01	1.41	0.07	<0.01	0.66
		PS2	0.80	0.04	<0.01	1.56	0.07	<0.01	0.64
	Error reporting and feedback	PS3	0.76	0.02	<0.01	1.11	0.04	<0.01	0.58
		PS4	0.86	0.01	<0.01	1.36	0.03	<0.01	0.74
		PS5	0.77	0.02	<0.01	1.08	0.04	<0.01	0.60
		PS6	0.83	0.02	<0.01	1.29	0.03	<0.01	0.68
	Staffing levels	PS7	0.88	0.02	<0.01	1.53	0.04	<0.01	0.77
		PS8	0.84	0.02	<0.01	1.45	0.05	<0.01	0.71
		PS9	0.91	0.02	<0.01	1.61	0.04	<0.01	0.82
		PS10	0.84	0.03	<0.01	1.45	0.05	<0.01	0.70
	Safety culture	PS11	0.48	0.03	<0.01	0.82	0.05	<0.01	0.23
		PS12	0.42	0.02	<0.01	0.83	0.05	<0.01	0.18
		PS13	0.61	0.02	<0.01	1.03	0.04	<0.01	0.37

		PS14	0.55	0.02	<0.01	1.04	0.05	<0.01	0.30
Efficiency	Planning and processes	E1	0.69	0.02	<0.01	1.20	0.04	<0.01	0.48
		E2	0.52	0.02	<0.01	0.96	0.04	<0.01	0.27
		E3	0.65	0.02	<0.01	1.07	0.04	<0.01	0.42
		E4	0.53	0.02	<0.01	0.89	0.04	<0.01	0.29
	Patient delays	E5	0.71	0.03	<0.01	1.10	0.05	<0.01	0.50
		E6	0.63	0.03	<0.01	0.99	0.06	<0.01	0.39
		E7	0.55	0.03	<0.01	0.92	0.05	<0.01	0.30
		E8	0.49	0.03	<0.01	0.91	0.06	<0.01	0.24
	Data collection	E9	0.53	0.03	<0.01	0.76	0.04	<0.01	0.28
		E10	0.78	0.02	<0.01	1.35	0.04	<0.01	0.61
		E11	0.86	0.02	<0.01	1.37	0.04	<0.01	0.73
		E12	0.45	0.03	<0.01	0.77	0.05	<0.01	0.21
	Bureaucracy	E13	0.61	0.02	<0.01	1.14	0.05	<0.01	0.38
		E14	0.57	0.02	<0.01	1.06	0.04	<0.01	0.33
		E15	0.93	0.02	<0.01	1.64	0.05	<0.01	0.86
Communication	Information flow	C1	0.79	0.01	<0.01	1.37	0.03	<0.01	0.63
		C2	0.71	0.02	<0.01	1.25	0.04	<0.01	0.51
		C3	0.80	0.01	<0.01	1.41	0.03	<0.01	0.64
		C4	0.70	0.02	<0.01	1.37	0.04	<0.01	0.49
	Staff communication	C5	0.80	0.02	<0.01	1.29	0.04	<0.01	0.64
		C6	0.85	0.02	<0.01	1.35	0.04	<0.01	0.72
		C7	0.57	0.02	<0.01	0.95	0.04	<0.01	0.33
	Patient communication	C8	0.58	0.03	<0.01	0.94	0.05	<0.01	0.33
		C9	0.66	0.03	<0.01	0.88	0.04	<0.01	0.44
		C10	0.50	0.03	<0.01	0.69	0.05	<0.01	0.25
		C11	0.33	0.03	<0.01	0.65	0.06	<0.01	0.11
	Information feedback	C12	0.74	0.02	<0.01	1.37	0.04	<0.01	0.54
		C13	0.77	0.02	<0.01	1.40	0.04	<0.01	0.60
	Openness	C14	0.75	0.02	<0.01	1.35	0.04	<0.01	0.57
		C15	0.80	0.01	<0.01	1.45	0.03	<0.01	0.64
		C16	0.75	0.02	<0.01	1.33	0.04	<0.01	0.56

Appendix A3 – CFA for eight factor model ('ref' denotes individual items, β = standardised factor loadings, SE

= standard error, B = unstandardised factor loadings, R^2 = percentage of variance explained by model)

Latent construct	Observed variable (ref)	β	SE	two-tailed p -value	B	SE	two-tailed p -value	R^2
Strategy	S1	0.79	0.01	<0.01	1.34	0.03	<0.01	0.63
	S2	0.79	0.01	<0.01	1.38	0.03	<0.01	0.63
	S3	0.76	0.01	<0.01	1.36	0.03	<0.01	0.57
	S4	0.74	0.01	<0.01	1.28	0.03	<0.01	0.54
	S5	0.45	0.02	<0.01	0.83	0.04	<0.01	0.20
	S6	0.42	0.02	<0.01	0.73	0.04	<0.01	0.17
	S7	0.49	0.02	<0.01	0.91	0.04	<0.01	0.24
	S8	0.61	0.02	<0.01	0.92	0.03	<0.01	0.38
	S9	0.66	0.02	<0.01	1.03	0.03	<0.01	0.44
	S10	0.27	0.02	<0.01	0.29	0.03	<0.01	0.08
	S11	0.32	0.02	<0.01	0.67	0.04	<0.01	0.10
	S12	0.36	0.02	<0.01	0.67	0.04	<0.01	0.13
	S13	0.31	0.02	<0.01	0.59	0.04	<0.01	0.10
Resilience	R1	0.68	0.02	<0.01	1.04	0.03	<0.01	0.47
	R2	0.60	0.02	<0.01	0.91	0.03	<0.01	0.36
	R3	0.70	0.02	<0.01	1.07	0.03	<0.01	0.49
	R4	0.72	0.01	<0.01	1.22	0.03	<0.01	0.52
	R5	0.40	0.02	<0.01	0.70	0.04	<0.01	0.16
	R6	0.37	0.03	<0.01	0.66	0.05	<0.01	0.14
	R7	0.46	0.02	<0.01	0.83	0.04	<0.01	0.21
	R8	0.46	0.02	<0.01	0.83	0.04	<0.01	0.21
	R9	0.55	0.02	<0.01	0.94	0.03	<0.01	0.30
	R10	0.54	0.02	<0.01	0.91	0.03	<0.01	0.29
	R11	0.54	0.02	<0.01	0.94	0.04	<0.01	0.29
Leadership	LM1	0.63	0.02	<0.01	1.28	0.04	<0.01	0.40
	LM2	0.65	0.02	<0.01	1.35	0.04	<0.01	0.43
	LM3	0.61	0.02	<0.01	1.23	0.04	<0.01	0.38
	LM4	0.65	0.02	<0.01	1.28	0.04	<0.01	0.42
	LM5	0.83	0.01	<0.01	1.62	0.02	<0.01	0.69
	LM6	0.79	0.01	<0.01	1.58	0.03	<0.01	0.63
	LM7	0.82	0.01	<0.01	1.62	0.03	<0.01	0.67
	LM8	0.32	0.02	<0.01	0.63	0.05	<0.01	0.10
	LM9	0.75	0.01	<0.01	1.25	0.03	<0.01	0.57
	LM10	0.87	0.01	<0.01	1.67	0.02	<0.01	0.76
	LM11	0.82	0.01	<0.01	1.40	0.03	<0.01	0.68
	LM12	0.90	0.01	<0.01	1.68	0.02	<0.01	0.80
	LM13	0.69	0.01	<0.01	1.20	0.03	<0.01	0.48

Staff Wellbeing	SW1	0.25	0.02	<0.01	0.40	0.04	<0.01	0.06
	SW2	0.31	0.02	<0.01	0.54	0.04	<0.01	0.10
	SW3	0.45	0.02	<0.01	0.84	0.04	<0.01	0.21
	SW4	0.40	0.02	<0.01	0.79	0.04	<0.01	0.16
	SW5	0.70	0.01	<0.01	1.24	0.03	<0.01	0.49
	SW6	0.72	0.01	<0.01	1.34	0.03	<0.01	0.52
	SW7	0.67	0.02	<0.01	1.16	0.03	<0.01	0.45
	SW8	0.67	0.02	<0.01	1.09	0.03	<0.01	0.44
	SW9	0.34	0.02	<0.01	0.69	0.05	<0.01	0.11
	SW10	0.47	0.02	<0.01	0.93	0.04	<0.01	0.22
	SW11	0.31	0.02	<0.01	0.60	0.04	<0.01	0.10
	SW12	0.43	0.02	<0.01	0.84	0.04	<0.01	0.18
	SW13	0.53	0.02	<0.01	0.73	0.03	<0.01	0.28
	SW14	0.59	0.02	<0.01	0.87	0.03	<0.01	0.35
	SW15	0.38	0.02	<0.01	0.67	0.04	<0.01	0.14
	SW16	0.61	0.02	<0.01	1.07	0.04	<0.01	0.37
	SW17	0.26	0.02	<0.01	0.48	0.04	<0.01	0.07
	SW18	0.24	0.02	<0.01	0.44	0.04	<0.01	0.06
Finance & Investment	F1	0.68	0.02	<0.01	1.23	0.04	<0.01	0.46
	F2	0.75	0.02	<0.01	1.31	0.04	<0.01	0.57
	F3	0.67	0.02	<0.01	1.20	0.04	<0.01	0.45
	F4	0.37	0.02	<0.01	0.64	0.04	<0.01	0.14
	F5	0.20	0.03	<0.01	0.38	0.05	<0.01	0.04
	F6	0.49	0.02	<0.01	0.86	0.05	<0.01	0.24
	F7	0.31	0.03	<0.01	0.55	0.05	<0.01	0.09
	F8	0.43	0.03	<0.01	0.69	0.04	<0.01	0.19
	F9	0.32	0.03	<0.01	0.57	0.05	<0.01	0.10
	F10	0.40	0.02	<0.01	0.74	0.05	<0.01	0.16
	F11	0.53	0.02	<0.01	0.90	0.04	<0.01	0.28
Patient Safety	PS1	0.23	0.03	<0.01	0.40	0.05	<0.01	0.05
	PS2	0.28	0.02	<0.01	0.54	0.05	<0.01	0.08
	PS3	0.41	0.03	<0.01	0.60	0.04	<0.01	0.17
	PS4	0.65	0.02	<0.01	0.99	0.04	<0.01	0.42
	PS5	0.59	0.02	<0.01	0.81	0.04	<0.01	0.35
	PS6	0.64	0.02	<0.01	1.00	0.04	<0.01	0.41
	PS7	0.46	0.02	<0.01	0.80	0.04	<0.01	0.21
	PS8	0.43	0.02	<0.01	0.74	0.04	<0.01	0.19
	PS9	0.47	0.02	<0.01	0.84	0.04	<0.01	0.22
	PS10	0.44	0.02	<0.01	0.77	0.04	<0.01	0.20
	PS11	0.49	0.02	<0.01	0.83	0.04	<0.01	0.24
	PS12	0.44	0.02	<0.01	0.87	0.05	<0.01	0.20
	PS13	0.63	0.02	<0.01	1.07	0.04	<0.01	0.40

	PS14	0.60	0.02	<0.01	1.13	0.04	<0.01	0.36
Efficiency	E1	0.63	0.02	<0.01	1.09	0.04	<0.01	0.40
	E2	0.47	0.02	<0.01	0.86	0.04	<0.01	0.22
	E3	0.70	0.02	<0.01	1.17	0.03	<0.01	0.49
	E4	0.48	0.02	<0.01	0.80	0.04	<0.01	0.23
	E5	0.34	0.03	<0.01	0.52	0.05	<0.01	0.12
	E6	0.30	0.03	<0.01	0.47	0.05	<0.01	0.09
	E7	0.32	0.03	<0.01	0.52	0.05	<0.01	0.10
	E8	0.35	0.03	<0.01	0.65	0.05	<0.01	0.12
	E9	0.27	0.03	<0.01	0.38	0.04	<0.01	0.07
	E10	0.50	0.02	<0.01	0.85	0.04	<0.01	0.25
	E11	0.54	0.02	<0.01	0.87	0.04	<0.01	0.29
	E12	0.41	0.02	<0.01	0.69	0.04	<0.01	0.16
	E13	0.47	0.02	<0.01	0.87	0.04	<0.01	0.22
	E14	0.40	0.02	<0.01	0.74	0.04	<0.01	0.16
	E15	0.57	0.02	<0.01	1.01	0.04	<0.01	0.33
Communication	C1	0.65	0.02	<0.01	1.13	0.03	<0.01	0.43
	C2	0.55	0.02	<0.01	0.97	0.04	<0.01	0.31
	C3	0.65	0.02	<0.01	1.14	0.04	<0.01	0.42
	C4	0.69	0.02	<0.01	1.33	0.03	<0.01	0.47
	C5	0.30	0.03	<0.01	0.48	0.04	<0.01	0.09
	C6	0.31	0.03	<0.01	0.48	0.04	<0.01	0.09
	C7	0.44	0.02	<0.01	0.73	0.04	<0.01	0.19
	C8	0.39	0.02	<0.01	0.65	0.04	<0.01	0.16
	C9	0.42	0.02	<0.01	0.56	0.03	<0.01	0.18
	C10	0.35	0.02	<0.01	0.48	0.04	<0.01	0.12
	C11	0.27	0.02	<0.01	0.52	0.05	<0.01	0.07
	C12	0.47	0.02	<0.01	0.88	0.04	<0.01	0.22
	C13	0.51	0.02	<0.01	0.93	0.04	<0.01	0.26
	C14	0.58	0.02	<0.01	1.03	0.04	<0.01	0.33
	C15	0.63	0.02	<0.01	1.14	0.04	<0.01	0.40
	C16	0.59	0.02	<0.01	1.04	0.04	<0.01	0.34

Appendix A4 – CFA for higher order model ('ref' denotes individual items, β = standardised factor loadings,

SE = standard error, B = unstandardised factor loadings, R^2 = percentage of variance explained by model)

Latent construct	Observed variable (ref)	β	SE	two-tailed p -value	B	SE	two-tailed p -value	R^2
Strategy	S1	0.79	0.01	<0.01	0.63	0.03	<0.01	0.63
	S2	0.79	0.01	<0.01	0.65	0.03	<0.01	0.63
	S3	0.76	0.01	<0.01	0.64	0.03	<0.01	0.58
	S4	0.74	0.01	<0.01	0.60	0.03	<0.01	0.54
	S5	0.45	0.02	<0.01	0.39	0.02	<0.01	0.21
	S6	0.42	0.02	<0.01	0.34	0.02	<0.01	0.18
	S7	0.49	0.02	<0.01	0.43	0.02	<0.01	0.24
	S8	0.61	0.02	<0.01	0.43	0.02	<0.01	0.37
	S9	0.66	0.02	<0.01	0.48	0.02	<0.01	0.43
	S10	0.27	0.02	<0.01	0.14	0.01	<0.01	0.07
	S11	0.32	0.02	<0.01	0.32	0.02	<0.01	0.10
	S12	0.36	0.02	<0.01	0.32	0.02	<0.01	0.13
	S13	0.32	0.02	<0.01	0.29	0.02	<0.01	0.10
Resilience	R1	0.68	0.02	<0.01	0.47	0.03	<0.01	0.47
	R2	0.60	0.02	<0.01	0.41	0.03	<0.01	0.36
	R3	0.70	0.02	<0.01	0.48	0.03	<0.01	0.49
	R4	0.72	0.02	<0.01	0.55	0.03	<0.01	0.52
	R5	0.39	0.02	<0.01	0.32	0.02	<0.01	0.15
	R6	0.37	0.02	<0.01	0.30	0.02	<0.01	0.13
	R7	0.46	0.02	<0.01	0.37	0.02	<0.01	0.21
	R8	0.46	0.02	<0.01	0.38	0.02	<0.01	0.21
	R9	0.56	0.02	<0.01	0.44	0.03	<0.01	0.31
	R10	0.55	0.02	<0.01	0.42	0.03	<0.01	0.30
	R11	0.54	0.02	<0.01	0.43	0.03	<0.01	0.29
Leadership	LM1	0.63	0.02	<0.01	0.58	0.02	<0.01	0.40
	LM2	0.65	0.02	<0.01	0.61	0.02	<0.01	0.42
	LM3	0.61	0.02	<0.01	0.56	0.02	<0.01	0.37
	LM4	0.65	0.02	<0.01	0.58	0.02	<0.01	0.42
	LM5	0.83	0.01	<0.01	0.73	0.02	<0.01	0.69
	LM6	0.79	0.01	<0.01	0.71	0.02	<0.01	0.62
	LM7	0.82	0.01	<0.01	0.73	0.02	<0.01	0.67
	LM8	0.32	0.02	<0.01	0.28	0.02	<0.01	0.10
	LM9	0.76	0.01	<0.01	0.57	0.02	<0.01	0.57
	LM10	0.87	0.01	<0.01	0.75	0.02	<0.01	0.76
	LM11	0.83	0.01	<0.01	0.63	0.02	<0.01	0.68
	LM12	0.90	0.01	<0.01	0.76	0.03	<0.01	0.81
	LM13	0.69	0.01	<0.01	0.54	0.02	<0.01	0.48

Staff Wellbeing	SW1	0.24	0.02	<0.01	0.13	0.02	<0.01	0.06
	SW2	0.31	0.02	<0.01	0.18	0.02	<0.01	0.10
	SW3	0.45	0.02	<0.01	0.27	0.02	<0.01	0.20
	SW4	0.40	0.02	<0.01	0.26	0.02	<0.01	0.16
	SW5	0.70	0.01	<0.01	0.41	0.03	<0.01	0.49
	SW6	0.72	0.01	<0.01	0.44	0.03	<0.01	0.52
	SW7	0.67	0.02	<0.01	0.38	0.03	<0.01	0.45
	SW8	0.66	0.02	<0.01	0.35	0.03	<0.01	0.44
	SW9	0.34	0.02	<0.01	0.23	0.02	<0.01	0.12
	SW10	0.47	0.02	<0.01	0.31	0.02	<0.01	0.22
	SW11	0.31	0.02	<0.01	0.20	0.02	<0.01	0.10
	SW12	0.43	0.02	<0.01	0.28	0.02	<0.01	0.19
	SW13	0.53	0.02	<0.01	0.24	0.02	<0.01	0.28
	SW14	0.59	0.02	<0.01	0.28	0.02	<0.01	0.35
	SW15	0.39	0.02	<0.01	0.22	0.02	<0.01	0.15
	SW16	0.60	0.02	<0.01	0.35	0.02	<0.01	0.36
	SW17	0.27	0.02	<0.01	0.16	0.02	<0.01	0.07
	SW18	0.25	0.02	<0.01	0.15	0.02	<0.01	0.06
Finance	F1	0.67	0.02	<0.01	0.76	0.04	<0.01	0.44
	F2	0.75	0.02	<0.01	0.81	0.04	<0.01	0.56
	F3	0.67	0.02	<0.01	0.74	0.04	<0.01	0.45
	F4	0.39	0.03	<0.01	0.41	0.03	<0.01	0.15
	F5	0.20	0.03	<0.01	0.24	0.03	<0.01	0.04
	F6	0.50	0.02	<0.01	0.55	0.03	<0.01	0.25
	F7	0.31	0.03	<0.01	0.34	0.03	<0.01	0.09
	F8	0.44	0.03	<0.01	0.43	0.02	<0.01	0.19
	F9	0.32	0.03	<0.01	0.36	0.03	<0.01	0.10
	F10	0.40	0.03	<0.01	0.46	0.03	<0.01	0.16
	F11	0.53	0.02	<0.01	0.56	0.03	<0.01	0.28
Patient Safety	PS1	0.23	0.03	<0.01	0.19	0.02	<0.01	0.05
	PS2	0.28	0.02	<0.01	0.25	0.02	<0.01	0.08
	PS3	0.40	0.03	<0.01	0.28	0.03	<0.01	0.16
	PS4	0.64	0.02	<0.01	0.46	0.03	<0.01	0.41
	PS5	0.58	0.02	<0.01	0.37	0.03	<0.01	0.34
	PS6	0.64	0.02	<0.01	0.46	0.03	<0.01	0.40
	PS7	0.46	0.02	<0.01	0.38	0.03	<0.01	0.22
	PS8	0.44	0.02	<0.01	0.35	0.03	<0.01	0.19
	PS9	0.48	0.02	<0.01	0.40	0.03	<0.01	0.23
	PS10	0.45	0.02	<0.01	0.36	0.03	<0.01	0.20
	PS11	0.49	0.02	<0.01	0.39	0.03	<0.01	0.24
	PS12	0.44	0.02	<0.01	0.40	0.03	<0.01	0.19
	PS13	0.64	0.02	<0.01	0.50	0.03	<0.01	0.40

	PS14	0.60	0.02	<0.01	0.53	0.03	<0.01	0.36
Efficiency	E1	0.64	0.02	<0.01	0.43	0.03	<0.01	0.40
	E2	0.46	0.02	<0.01	0.33	0.03	<0.01	0.21
	E3	0.72	0.02	<0.01	0.47	0.03	<0.01	0.52
	E4	0.47	0.02	<0.01	0.31	0.03	<0.01	0.22
	E5	0.33	0.03	<0.01	0.20	0.03	<0.01	0.11
	E6	0.28	0.03	<0.01	0.18	0.03	<0.01	0.08
	E7	0.30	0.03	<0.01	0.20	0.03	<0.01	0.09
	E8	0.33	0.03	<0.01	0.24	0.03	<0.01	0.11
	E9	0.27	0.03	<0.01	0.15	0.02	<0.01	0.07
	E10	0.50	0.02	<0.01	0.34	0.02	<0.01	0.25
	E11	0.55	0.02	<0.01	0.35	0.02	<0.01	0.30
	E12	0.41	0.02	<0.01	0.27	0.02	<0.01	0.17
	E13	0.45	0.02	<0.01	0.33	0.02	<0.01	0.20
	E14	0.39	0.02	<0.01	0.28	0.02	<0.01	0.15
	E15	0.56	0.02	<0.01	0.39	0.03	<0.01	0.31
Communication	C1	0.65	0.02	<0.01	0.34	0.03	<0.01	0.42
	C2	0.56	0.02	<0.01	0.30	0.03	<0.01	0.31
	C3	0.65	0.02	<0.01	0.35	0.03	<0.01	0.43
	C4	0.69	0.01	<0.01	0.41	0.04	<0.01	0.48
	C5	0.30	0.03	<0.01	0.15	0.02	<0.01	0.09
	C6	0.30	0.03	<0.01	0.15	0.02	<0.01	0.09
	C7	0.44	0.02	<0.01	0.22	0.02	<0.01	0.19
	C8	0.40	0.02	<0.01	0.20	0.02	<0.01	0.16
	C9	0.44	0.02	<0.01	0.18	0.02	<0.01	0.19
	C10	0.36	0.02	<0.01	0.15	0.02	<0.01	0.13
	C11	0.27	0.02	<0.01	0.16	0.02	<0.01	0.07
	C12	0.48	0.02	<0.01	0.27	0.03	<0.01	0.23
	C13	0.52	0.02	<0.01	0.28	0.03	<0.01	0.27
	C14	0.56	0.02	<0.01	0.31	0.03	<0.01	0.32
	C15	0.62	0.02	<0.01	0.34	0.03	<0.01	0.39
	C16	0.58	0.02	<0.01	0.31	0.03	<0.01	0.33
Organisational Health	Strategy*	0.88	0.01	<0.01	1.88	0.09	<0.01	0.78
	Resilience*	0.89	0.01	<0.01	1.95	0.13	<0.01	0.79
	Leadership*	0.89	0.01	<0.01	1.98	0.07	<0.01	0.80
	Staff Wellbeing*	0.95	0.01	<0.01	2.90	0.20	<0.01	0.89
	Finance*	0.78	0.02	<0.01	1.25	0.07	<0.01	0.61
	Patient Safety*	0.88	0.01	<0.01	1.89	0.13	<0.01	0.78
	Efficiency*	0.92	0.01	<0.01	2.34	0.17	<0.01	0.84
	Communication*	0.95	0.01	<0.01	3.14	0.28	<0.01	0.91
*lower order latent construct								

Appendix B: Invitation email for nationwide study

Dear Colleague,

‘Measuring Organisational Health in healthcare organisations’

You are being invited to complete an online research questionnaire by clicking on the link below:

healthy-hospitals.org/org-health

Please ask us if there is anything unclear or if you would like more information about this research.

What is the purpose of this study?

This is a research questionnaire being developed to measure the effective functioning of healthcare organisations so that changes may be possible to improve patient care. It is from a research team, *not* from the Trust and *not* from the NHS.

Why have I been invited?

Every employee within your Trust has been invited to complete the survey as we believe that that is the best way to assess the health of a Trust as a whole. Is it up to you whether or not to take part.

What do I have to do?

Simply answer the questions to the best of your ability. There are no ‘right’ or ‘wrong’ answers; we are interested in your perspective of working in this organisation.

Will my taking part in this study be kept confidential?

Your answers are **anonymous** and **confidential**: we will never reveal your answers to anyone in this organisation or anywhere else.

What are the possible benefits of taking part?

Your involvement may help in future healthcare management and improve patient care. There are no disadvantages envisaged, other than taking about 10 minutes out of your day.

Who is organising this research?

It had been organised by Imperial College London as a collaboration between the Faculty of Medicine and the Business School as part of a PhD research project. This study has been reviewed by an ethics committee.

Contact for further information.

Mr Stephen Williams (Research Fellow, NIHR Patient Safety Translational Research Centre)

Email: stephen.williams@imperial.ac.uk

Address: Room 1029, 10th Floor QEQM Building, St Mary’s Hospital, London , W2 1NY, UK

Research Team:

- Mr Stephen Williams (Research Fellow)
- Prof Ara Darzi (Professor of Surgery)
- Dr Sankalp Chaturvedi (Associate Professor, Imperial Business School)
- Mr Sanjay Purkayastha (Clinical Lecturer in Surgery)

Appendix C: Chapter 4 supplementary figures

Appendix C1 –CFA for eight factor model ('ref' denotes individual items, β = standardised factor loadings, SE = standard error, B = unstandardised factor loadings, R^2 = percentage of variance explained by model)

Latent construct	Observed variable (ref)	β	SE	two-tailed p-value	B	SE	two-tailed p-value	R^2
Strategy	S1	0.80	0.02	<0.01	1.26	0.05	<0.01	0.65
	S2	0.84	0.02	<0.01	1.49	0.04	<0.01	0.70
	S3	0.84	0.01	<0.01	1.52	0.04	<0.01	0.70
	S4	0.73	0.02	<0.01	1.20	0.05	<0.01	0.54
	S5	0.38	0.04	<0.01	0.70	0.07	<0.01	0.14
	S6	0.35	0.04	<0.01	0.60	0.07	<0.01	0.12
	S7	0.53	0.03	<0.01	0.96	0.06	<0.01	0.28
	S8	0.63	0.03	<0.01	0.90	0.06	<0.01	0.39
	S9	0.66	0.03	<0.01	0.99	0.06	<0.01	0.43
	S10	0.36	0.04	<0.01	0.40	0.05	<0.01	0.13
	S11	0.26	0.04	<0.01	0.54	0.08	<0.01	0.07
	S12	0.39	0.04	<0.01	0.73	0.07	<0.01	0.15
	S13	0.27	0.04	<0.01	0.51	0.07	<0.01	0.07
Resilience	R1	0.71	0.03	<0.01	1.15	0.06	<0.01	0.51
	R2	0.63	0.03	<0.01	0.94	0.05	<0.01	0.40
	R3	0.66	0.03	<0.01	1.04	0.06	<0.01	0.44
	R4	0.73	0.02	<0.01	1.27	0.05	<0.01	0.54
	R5	0.35	0.04	<0.01	0.61	0.08	<0.01	0.12
	R6	0.31	0.04	<0.01	0.53	0.08	<0.01	0.09
	R7	0.39	0.04	<0.01	0.68	0.07	<0.01	0.15
	R8	0.32	0.04	<0.01	0.57	0.08	<0.01	0.10
	R9	0.57	0.03	<0.01	0.92	0.06	<0.01	0.32
	R10	0.57	0.03	<0.01	0.92	0.06	<0.01	0.32
	R11	0.61	0.03	<0.01	1.10	0.06	<0.01	0.37
Leadership & Management	LM1	0.64	0.03	<0.01	1.21	0.07	<0.01	0.40
	LM2	0.68	0.03	<0.01	1.33	0.06	<0.01	0.46
	LM3	0.65	0.03	<0.01	1.24	0.06	<0.01	0.43
	LM4	0.69	0.02	<0.01	1.28	0.06	<0.01	0.47
	LM5	0.84	0.01	<0.01	1.61	0.04	<0.01	0.71
	LM6	0.80	0.02	<0.01	1.54	0.05	<0.01	0.64
	LM7	0.83	0.02	<0.01	1.67	0.05	<0.01	0.68
	LM8	0.33	0.04	<0.01	0.64	0.08	<0.01	0.11
	LM9	0.76	0.02	<0.01	1.22	0.05	<0.01	0.58
	LM10	0.86	0.02	<0.01	1.62	0.05	<0.01	0.73

	LM11	0.80	0.02	<0.01	1.29	0.05	<0.01	0.63
	LM12	0.88	0.02	<0.01	1.62	0.05	<0.01	0.78
	LM13	0.68	0.02	<0.01	1.16	0.06	<0.01	0.47
Staff Wellbeing	SW1	0.29	0.04	<0.01	0.47	0.07	<0.01	0.09
	SW2	0.35	0.03	<0.01	0.56	0.06	<0.01	0.12
	SW3	0.47	0.03	<0.01	0.81	0.06	<0.01	0.22
	SW4	0.42	0.04	<0.01	0.82	0.08	<0.01	0.17
	SW5	0.77	0.02	<0.01	1.36	0.05	<0.01	0.59
	SW6	0.71	0.03	<0.01	1.32	0.06	<0.01	0.50
	SW7	0.68	0.03	<0.01	1.13	0.05	<0.01	0.47
	SW8	0.69	0.03	<0.01	1.02	0.06	<0.01	0.47
	SW9	0.36	0.04	<0.01	0.73	0.08	<0.01	0.13
	SW10	0.49	0.03	<0.01	0.94	0.07	<0.01	0.24
	SW11	0.35	0.04	<0.01	0.65	0.08	<0.01	0.12
	SW12	0.43	0.04	<0.01	0.82	0.07	<0.01	0.19
	SW13	0.47	0.04	<0.01	0.51	0.04	<0.01	0.22
	SW14	0.57	0.03	<0.01	0.74	0.05	<0.01	0.32
	SW15	0.34	0.04	<0.01	0.57	0.07	<0.01	0.11
	SW16	0.59	0.03	<0.01	0.92	0.06	<0.01	0.35
	SW17	0.24	0.05	<0.01	0.44	0.09	<0.01	0.06
	SW18	0.25	0.04	<0.01	0.47	0.08	<0.01	0.06
Finance & Investment	F1	0.62	0.03	<0.01	1.13	0.07	<0.01	0.38
	F2	0.67	0.03	<0.01	1.19	0.07	<0.01	0.45
	F3	0.54	0.04	<0.01	1.01	0.08	<0.01	0.29
	F4	0.47	0.04	<0.01	0.84	0.08	<0.01	0.22
	F5	0.39	0.04	<0.01	0.75	0.08	<0.01	0.15
	F6	0.64	0.03	<0.01	1.17	0.07	<0.01	0.41
	F7	0.52	0.04	<0.01	1.01	0.08	<0.01	0.27
	F8	0.60	0.04	<0.01	1.00	0.07	<0.01	0.36
	F9	0.54	0.04	<0.01	1.00	0.08	<0.01	0.29
	F10	0.32	0.05	<0.01	0.57	0.09	<0.01	0.10
	F11	0.40	0.05	<0.01	0.66	0.08	<0.01	0.16
Patient Safety	PS1	0.30	0.05	<0.01	0.53	0.08	<0.01	0.09
	PS2	0.26	0.05	<0.01	0.49	0.09	<0.01	0.07
	PS3	0.39	0.04	<0.01	0.52	0.06	<0.01	0.15
	PS4	0.53	0.04	<0.01	0.77	0.07	<0.01	0.28
	PS5	0.50	0.04	<0.01	0.65	0.06	<0.01	0.25
	PS6	0.51	0.04	<0.01	0.73	0.07	<0.01	0.26
	PS7	0.74	0.04	<0.01	1.34	0.09	<0.01	0.55
	PS8	0.73	0.04	<0.01	1.32	0.08	<0.01	0.54
	PS9	0.74	0.04	<0.01	1.30	0.09	<0.01	0.54
	PS10	0.70	0.04	<0.01	1.18	0.08	<0.01	0.49

	PS11	0.45	0.04	<0.01	0.70	0.06	<0.01	0.20
	PS12	0.39	0.05	<0.01	0.74	0.09	<0.01	0.15
	PS13	0.65	0.03	<0.01	1.03	0.06	<0.01	0.42
	PS14	0.49	0.04	<0.01	0.96	0.09	<0.01	0.24
Efficiency	E1	0.55	0.03	<0.01	0.92	0.06	<0.01	0.30
	E2	0.47	0.04	<0.01	0.90	0.08	<0.01	0.22
	E3	0.72	0.03	<0.01	1.20	0.05	<0.01	0.52
	E4	0.36	0.05	<0.01	0.61	0.08	<0.01	0.13
	E5	0.35	0.05	<0.01	0.58	0.08	<0.01	0.12
	E6	0.35	0.05	<0.01	0.56	0.08	<0.01	0.12
	E7	0.44	0.04	<0.01	0.83	0.09	<0.01	0.19
	E8	0.35	0.04	<0.01	0.61	0.08	<0.01	0.12
	E9	0.36	0.05	<0.01	0.55	0.07	<0.01	0.13
	E10	0.51	0.04	<0.01	0.88	0.07	<0.01	0.26
	E11	0.59	0.04	<0.01	0.92	0.07	<0.01	0.34
	E12	0.35	0.04	<0.01	0.59	0.08	<0.01	0.12
	E13	0.49	0.04	<0.01	0.90	0.08	<0.01	0.24
	E14	0.44	0.04	<0.01	0.77	0.07	<0.01	0.19
	E15	0.59	0.04	<0.01	1.15	0.07	<0.01	0.35
Communication	C1	0.67	0.03	<0.01	1.16	0.06	<0.01	0.44
	C2	0.54	0.04	<0.01	0.93	0.07	<0.01	0.29
	C3	0.69	0.03	<0.01	1.26	0.06	<0.01	0.48
	C4	0.70	0.03	<0.01	1.30	0.06	<0.01	0.48
	C5	0.34	0.04	<0.01	0.52	0.07	<0.01	0.12
	C6	0.35	0.04	<0.01	0.52	0.06	<0.01	0.13
	C7	0.54	0.04	<0.01	0.89	0.07	<0.01	0.29
	C8	0.37	0.04	<0.01	0.60	0.07	<0.01	0.14
	C9	0.43	0.04	<0.01	0.48	0.05	<0.01	0.19
	C10	0.38	0.04	<0.01	0.45	0.05	<0.01	0.15
	C11	0.26	0.04	<0.01	0.51	0.09	<0.01	0.07
	C12	0.42	0.04	<0.01	0.77	0.07	<0.01	0.17
	C13	0.49	0.03	<0.01	0.87	0.07	<0.01	0.24
	C14	0.56	0.03	<0.01	1.01	0.07	<0.01	0.31
	C15	0.61	0.04	<0.01	1.12	0.08	<0.01	0.37
	C16	0.56	0.04	<0.01	0.95	0.07	<0.01	0.31

Appendix C2 – Model parameters for final partial measurement invariance *Model 3ae* (β = standardised factor loadings, SE = standard error, B = unstandardised factor loadings, R^2 = percentage of variance explained by model)

Latent construct	Observed variable (ref)	β	SE	two-tailed p -value	B	SE	two-tailed p -value	R^2
Strategy	S1	0.81	0.02	<0.01	1.35	0.02	<0.01	0.65
	S2	0.84	0.01	<0.01	1.58	0.06	<0.01	0.70
	S3	0.83	0.01	<0.01	1.61	0.06	<0.01	0.70
	S4	0.73	0.02	<0.01	1.28	0.03	<0.01	0.54
	S5	0.41	0.02	<0.01	0.81	0.04	<0.01	0.17
	S6	0.38	0.02	<0.01	0.70	0.03	<0.01	0.15
	S7	0.50	0.02	<0.01	0.93	0.03	<0.01	0.25
	S8	0.60	0.02	<0.01	0.90	0.03	<0.01	0.36
	S9	0.64	0.02	<0.01	1.00	0.03	<0.01	0.41
	S10	0.35	0.04	<0.01	0.41	0.05	<0.01	0.12
	S11	0.30	0.02	<0.01	0.65	0.04	<0.01	0.09
	S12	0.41	0.03	<0.01	0.81	0.07	<0.01	0.17
	S13	0.29	0.02	<0.01	0.58	0.04	<0.01	0.08
Resilience	R1	0.69	0.02	<0.01	1.07	0.03	<0.01	0.47
	R2	0.63	0.02	<0.01	0.91	0.03	<0.01	0.39
	R3	0.68	0.02	<0.01	1.05	0.03	<0.01	0.46
	R4	0.73	0.02	<0.01	1.23	0.03	<0.01	0.53
	R5	0.38	0.02	<0.01	0.64	0.04	<0.01	0.14
	R6	0.35	0.02	<0.01	0.60	0.04	<0.01	0.12
	R7	0.44	0.02	<0.01	0.77	0.04	<0.01	0.19
	R8	0.35	0.04	<0.01	0.62	0.07	<0.01	0.12
	R9	0.59	0.02	<0.01	0.95	0.03	<0.01	0.35
	R10	0.58	0.02	<0.01	0.93	0.03	<0.01	0.34
	R11	0.57	0.02	<0.01	0.99	0.03	<0.01	0.33
Leadership & Management	LM1	0.64	0.02	<0.01	1.28	0.03	<0.01	0.41
	LM2	0.67	0.02	<0.01	1.36	0.03	<0.01	0.45
	LM3	0.64	0.02	<0.01	1.25	0.03	<0.01	0.41
	LM4	0.68	0.02	<0.01	1.30	0.03	<0.01	0.46
	LM5	0.84	0.01	<0.01	1.64	0.02	<0.01	0.70
	LM6	0.80	0.01	<0.01	1.59	0.03	<0.01	0.64
	LM7	0.81	0.02	<0.01	1.66	0.02	<0.01	0.65
	LM8	0.31	0.02	<0.01	0.63	0.04	<0.01	0.10
	LM9	0.76	0.02	<0.01	1.28	0.02	<0.01	0.58
	LM10	0.86	0.01	<0.01	1.68	0.02	<0.01	0.73

	LM11	0.81	0.01	<0.01	1.40	0.02	<0.01	0.66
	LM12	0.89	0.01	<0.01	1.69	0.02	<0.01	0.78
	LM13	0.69	0.02	<0.01	1.21	0.03	<0.01	0.47
Staff Wellbeing	SW1	0.25	0.02	<0.01	0.41	0.04	<0.01	0.06
	SW2	0.33	0.02	<0.01	0.55	0.03	<0.01	0.11
	SW3	0.47	0.02	<0.01	0.86	0.04	<0.01	0.22
	SW4	0.39	0.02	<0.01	0.81	0.04	<0.01	0.15
	SW5	0.77	0.02	<0.01	1.44	0.05	<0.01	0.59
	SW6	0.70	0.02	<0.01	1.37	0.03	<0.01	0.48
	SW7	0.67	0.02	<0.01	1.18	0.03	<0.01	0.45
	SW8	0.69	0.02	<0.01	1.09	0.03	<0.01	0.48
	SW9	0.33	0.02	<0.01	0.70	0.04	<0.01	0.11
	SW10	0.46	0.02	<0.01	0.94	0.04	<0.01	0.22
	SW11	0.32	0.02	<0.01	0.63	0.04	<0.01	0.10
	SW12	0.43	0.02	<0.01	0.86	0.04	<0.01	0.18
	SW13	0.49	0.03	<0.01	0.58	0.04	<0.01	0.24
	SW14	0.60	0.02	<0.01	0.86	0.03	<0.01	0.36
	SW15	0.36	0.02	<0.01	0.64	0.04	<0.01	0.13
	SW16	0.62	0.02	<0.01	1.06	0.03	<0.01	0.39
	SW17	0.24	0.02	<0.01	0.49	0.04	<0.01	0.06
	SW18	0.23	0.02	<0.01	0.46	0.04	<0.01	0.05
Finance & Investment	F1	0.64	0.02	<0.01	1.12	0.04	<0.01	0.41
	F2	0.69	0.02	<0.01	1.16	0.04	<0.01	0.47
	F3	0.55	0.02	<0.01	0.97	0.04	<0.01	0.31
	F4	0.45	0.03	<0.01	0.75	0.04	<0.01	0.20
	F5	0.34	0.03	<0.01	0.61	0.04	<0.01	0.12
	F6	0.60	0.03	<0.01	1.01	0.04	<0.01	0.36
	F7	0.44	0.03	<0.01	0.78	0.04	<0.01	0.19
	F8	0.57	0.03	<0.01	0.86	0.03	<0.01	0.32
	F9	0.53	0.04	<0.01	0.92	0.07	<0.01	0.28
	F10	0.35	0.03	<0.01	0.60	0.04	<0.01	0.12
	F11	0.47	0.03	<0.01	0.75	0.04	<0.01	0.22
Patient Safety	PS1	0.27	0.02	<0.01	0.47	0.04	<0.01	0.07
	PS2	0.29	0.02	<0.01	0.55	0.04	<0.01	0.08
	PS3	0.38	0.03	<0.01	0.52	0.03	<0.01	0.14
	PS4	0.58	0.03	<0.01	0.90	0.04	<0.01	0.34
	PS5	0.53	0.02	<0.01	0.71	0.03	<0.01	0.28
	PS6	0.58	0.02	<0.01	0.87	0.03	<0.01	0.34
	PS7	0.70	0.04	<0.01	1.26	0.07	<0.01	0.49

	PS8	0.70	0.03	<0.01	1.27	0.07	<0.01	0.49
	PS9	0.67	0.04	<0.01	1.15	0.06	<0.01	0.45
	PS10	0.63	0.03	<0.01	1.04	0.05	<0.01	0.40
	PS11	0.48	0.03	<0.01	0.79	0.04	<0.01	0.23
	PS12	0.41	0.02	<0.01	0.81	0.04	<0.01	0.17
	PS13	0.66	0.02	<0.01	1.06	0.03	<0.01	0.43
	PS14	0.54	0.02	<0.01	1.09	0.04	<0.01	0.29
Efficiency	E1	0.59	0.02	<0.01	1.04	0.03	<0.01	0.35
	E2	0.45	0.02	<0.01	0.85	0.04	<0.01	0.20
	E3	0.71	0.02	<0.01	1.20	0.03	<0.01	0.51
	E4	0.42	0.02	<0.01	0.74	0.04	<0.01	0.18
	E5	0.32	0.03	<0.01	0.53	0.04	<0.01	0.10
	E6	0.30	0.03	<0.01	0.48	0.04	<0.01	0.09
	E7	0.42	0.04	<0.01	0.81	0.08	<0.01	0.17
	E8	0.35	0.02	<0.01	0.63	0.04	<0.01	0.12
	E9	0.29	0.03	<0.01	0.44	0.04	<0.01	0.08
	E10	0.50	0.02	<0.01	0.87	0.04	<0.01	0.25
	E11	0.57	0.02	<0.01	0.91	0.03	<0.01	0.33
	E12	0.39	0.02	<0.01	0.69	0.04	<0.01	0.15
	E13	0.50	0.02	<0.01	0.93	0.04	<0.01	0.25
	E14	0.43	0.02	<0.01	0.77	0.04	<0.01	0.18
	E15	0.55	0.02	<0.01	1.06	0.03	<0.01	0.31
Communication	C1	0.65	0.02	<0.01	1.16	0.03	<0.01	0.42
	C2	0.55	0.02	<0.01	0.99	0.03	<0.01	0.30
	C3	0.69	0.03	<0.01	1.31	0.06	<0.01	0.47
	C4	0.69	0.02	<0.01	1.34	0.03	<0.01	0.48
	C5	0.32	0.03	<0.01	0.50	0.04	<0.01	0.10
	C6	0.33	0.03	<0.01	0.50	0.04	<0.01	0.11
	C7	0.52	0.04	<0.01	0.91	0.07	<0.01	0.27
	C8	0.38	0.02	<0.01	0.64	0.04	<0.01	0.14
	C9	0.46	0.03	<0.01	0.54	0.03	<0.01	0.21
	C10	0.39	0.03	<0.01	0.48	0.03	<0.01	0.15
	C11	0.26	0.02	<0.01	0.53	0.04	<0.01	0.07
	C12	0.44	0.02	<0.01	0.85	0.04	<0.01	0.19
	C13	0.50	0.02	<0.01	0.92	0.04	<0.01	0.25
	C14	0.55	0.02	<0.01	1.05	0.04	<0.01	0.31
	C15	0.60	0.02	<0.01	1.14	0.04	<0.01	0.36
	C16	0.57	0.02	<0.01	1.03	0.03	<0.01	0.33

Appendix D: Invitation email for primary care interview study

Dear <insert name here>

'The measurement of Organisational Health within the healthcare organisations in the primary care sector'

We invite you to participate in a collaborative project between researchers within the Faculty of Medicine in Imperial College London (under the supervision of the Prof Ara Darzi) and the Imperial Business School. Your participation requires only a short interview (approx. 30 mins), which can be carried out at a time and place of your convenience.

Organisational health, as a concept, has been around since the later 1950s and there is increasing evidence from outside the sphere of healthcare (particularly from the world of business) that, to best facilitate high organisational performance, it is important to focus on the elements within an organisation that allow such performance to be created and maintained. An organisation with a strong provision of these elements can be considered a 'healthy' one. However, in comparison with other organisational sectors, there has been a relative dearth of research into the organisational health of healthcare organisations.

This project began originally in 2012 and used a series of semi-structured interviews and grounded theory methodology to isolate the eight main elements of the organisational health of an acute healthcare organisation; namely: Strategy, Resilience, Leadership & Management, Staff Wellbeing, Finance & Investment, Patient safety, Efficiency and Communication.

The interview coding data was used to formulate a questionnaire, which went through a series of pilot stages to establish reliability and validity prior to its distribution across 29 healthcare organisations in England (acute NHS Trusts). The results of this survey yielded over a million individual data points. Analysis of this data allowed us to generate scores for both organisational health overall, and for each of the eight elements listed above. We subsequently correlated these with hospital outcome measures: revealing that the healthiest organisations have improved patient outcomes, notably including a significantly lower mortality rate. This was the first project within the UK to seek to make the elements of organisational health tangible, observable and therefore potentially actionable.

Our current data suggests that organisational health measurement has the potential to become a new metric with which to assess the performance of acute NHS Trusts in the UK. Intuitively this should be true for other healthcare organisations, such as those in the primary care sector.

We plan to develop and validate a survey with which to measure organisational health within the primary care sector using GP practices within the Hammersmith and Fulham GP Federation as our research centres – their participation in this manner has been approved by Dr David Wingfield (Chairman) and Mr Chris Adams (Chief Executive).

First we must determine if the elements of organisational health in primary care are similar to those in acute services. This will again employ qualitative research methodology using semi-structured interviews. This interview data will also guide the modification of the survey.

We write to you today to invite you to participate in this study by way of a short (approx. 30 minute) interview with one of our researchers. This can be done at a time and place of your convenience. We are keen to hear the voices of employees at all levels within primary care.

A document with a more detailed description of our plans is attached to this email.

If you would like to be involved in this study, or simply to hear more at this point, please email (or simply hit reply):

stephen.williams@imperial.ac.uk

Best wishes,
Stephen

Stephen Williams – Clinical Research Fellow, Imperial College London

Sanjay Purkayastha – Senior Clinical Lecturer, Imperial College London

Sankalp Chaturvedi – Associate Professor (Organisational Behaviour and Leadership), Imperial Business School

Ara Darzi – Professor of Surgery, Imperial College London

Appendix E: Chapter 6 supplementary figures

Appendix E1 – Email invitation for GP-OH primary care study

Dear Colleague,

‘Measuring Organisational Health in GP practices’

You are being invited to complete an online research questionnaire by clicking on the link below:

https://imperial.eu.qualtrics.com/jfe/form/SV_e9k93rI3VMhp8H3

Please ask us if there is anything unclear or if you would like more information about this research.

What is the purpose of this study?

This is a research questionnaire being developed to measure the elements within a GP practice needed for it to function effectively for high performance in the long term.

We believe that focusing on downstream measures of performance can be short-sighted and that by considering these elements (such as the capacity for organisational change, the provision and allocation of resources, staff morale, leadership and the fundamental resilience of a practice) allow for appreciation of previously neglected yet vital components of sustainable success. We believe that the staff working within a practice are best placed to tell us about this, which is why we are emailing you today.

Why have I been invited?

Every employee within your practice has been invited to complete the survey as we believe that that is the best way to assess the ‘health’ of a practice as a whole. Is it up to you whether or not to take part. This survey is from a research team, *not* from the practice, *not* from the CCG and *not* from the NHS.

What do I have to do?

Simply answer the multiple-choice questions to the best of your ability. The whole process takes ***less than 5 minutes*** in total. There are no ‘right’ or ‘wrong’ answers; we are simply interested in your perspective of working in the practice.

Will my taking part in this study be kept confidential?

Your answers are ***anonymous*** and ***confidential***: we will never reveal your answers to anyone in the practice or anywhere else. All questions are optional. If you choose to enter your practice name at the end of the survey it will not be included in any reports or publications which follow from this work.

What are the possible benefits of taking part?

We will happily make reports (of averaged anonymised data) available to all practices which take part. This will include data from all the other practices participating in the study for benchmarking purposes (this will also be anonymised). There are no disadvantages envisaged, other than taking about 5 minutes out of your day.

Who is organising this research?

It had been organised by Imperial College London as a collaboration between the Faculty of Medicine and the Business School as part of a research project. This study is classified as service evaluation under NRES guidelines (NHS HRA) and so has not required formal ethics approval.

Contact for further information.

Mr Stephen Williams (Research Fellow, NIHR Patient Safety Translational Research Centre)

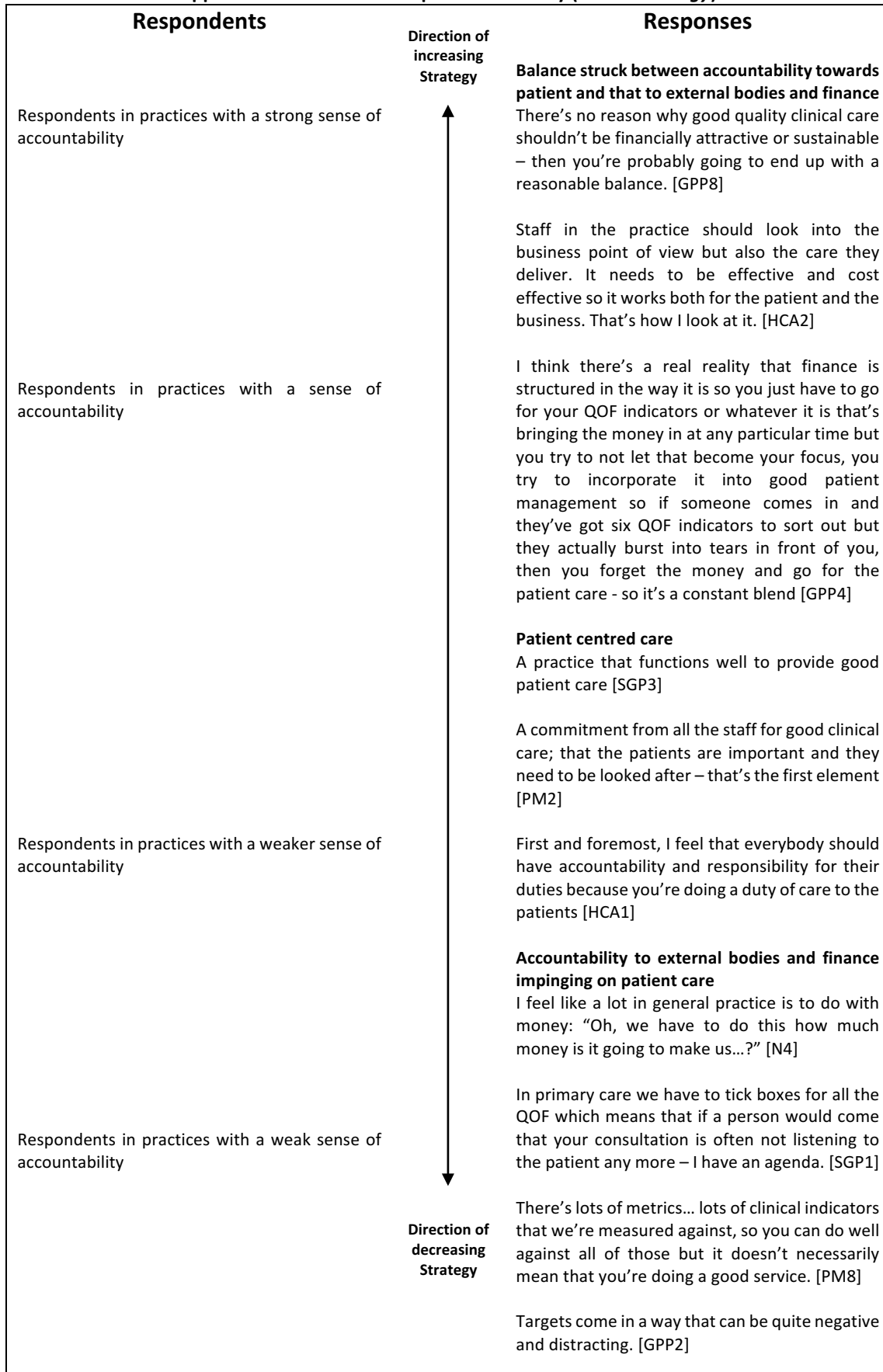
Email: stephen.williams@imperial.ac.uk

Address: Room 1029, 10th Floor QEQM Building, St Mary's Hospital, London, W2 1NY, UK

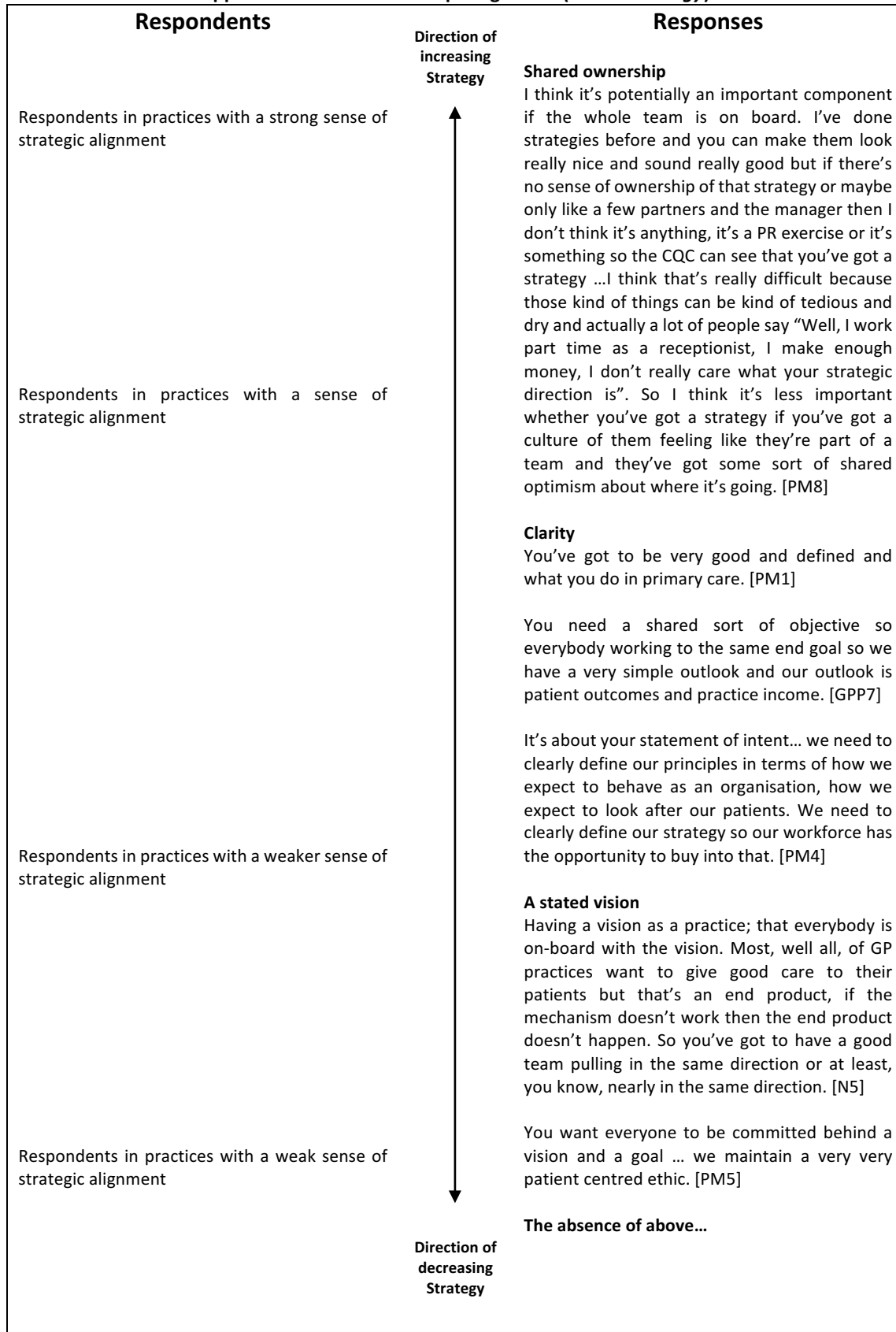
Research Team:

- Mr Stephen Williams (Research Fellow)
- Prof the Lord Ara Darzi (Professor of Surgery)
- Dr Sankalp Chaturvedi (Associate Professor, Imperial Business School)
- Mr Sanjay Purkayastha (Clinical Lecturer in Surgery)

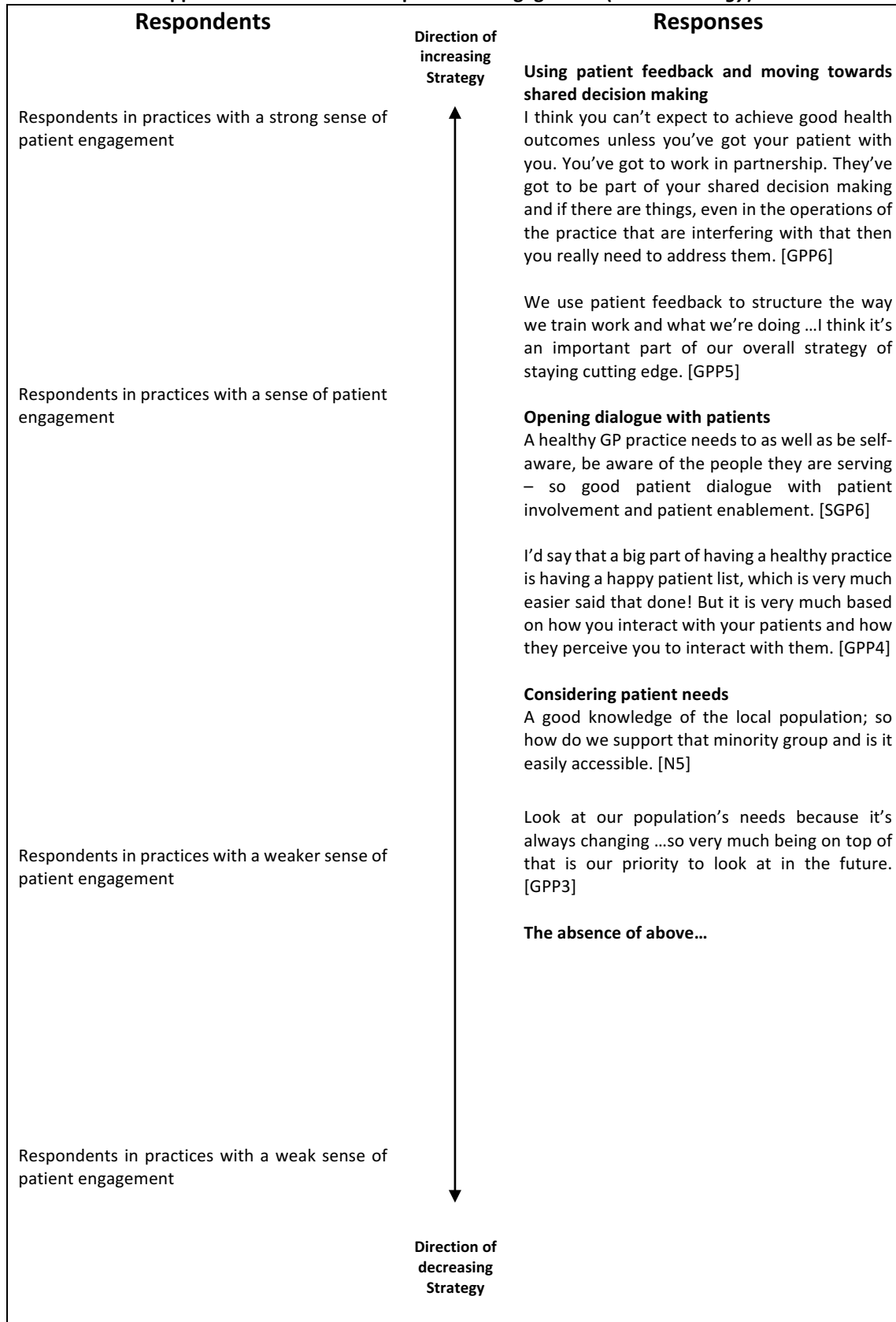
Appendix E2 – Construct map: Accountability (within Strategy)



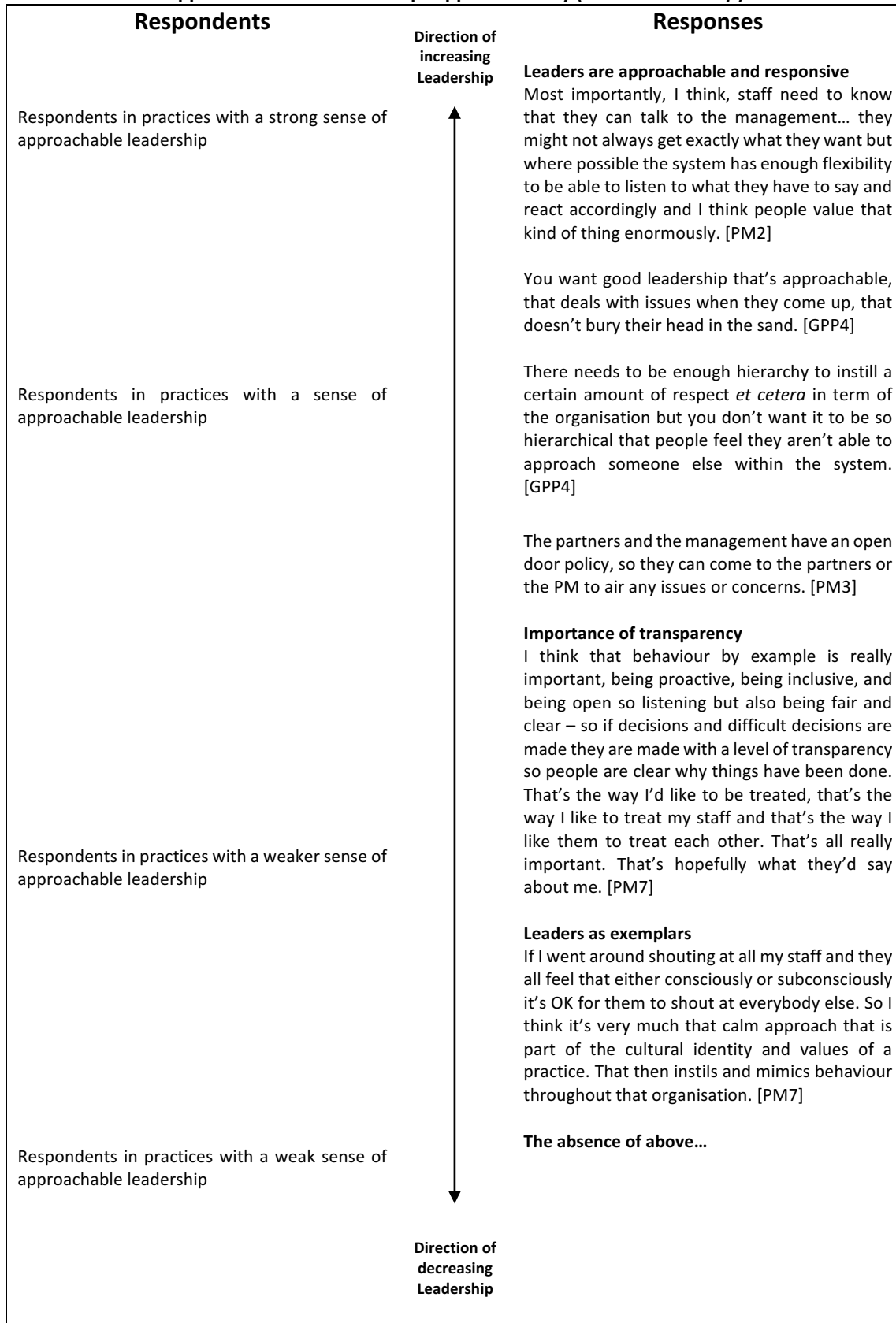
Appendix E3 – Construct map: Alignment (within Strategy)



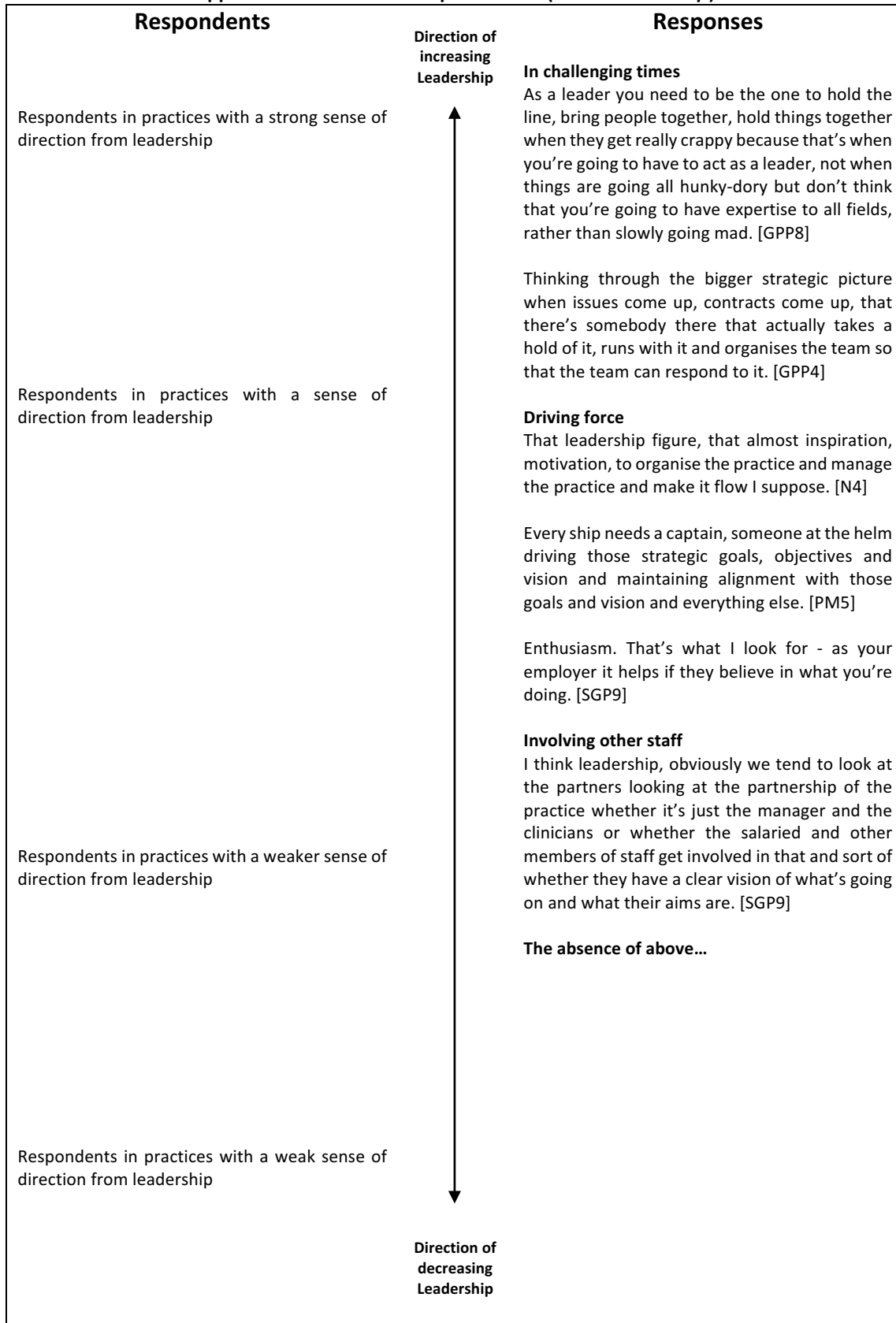
Appendix E4 – Construct map: Patient engagement (within Strategy)



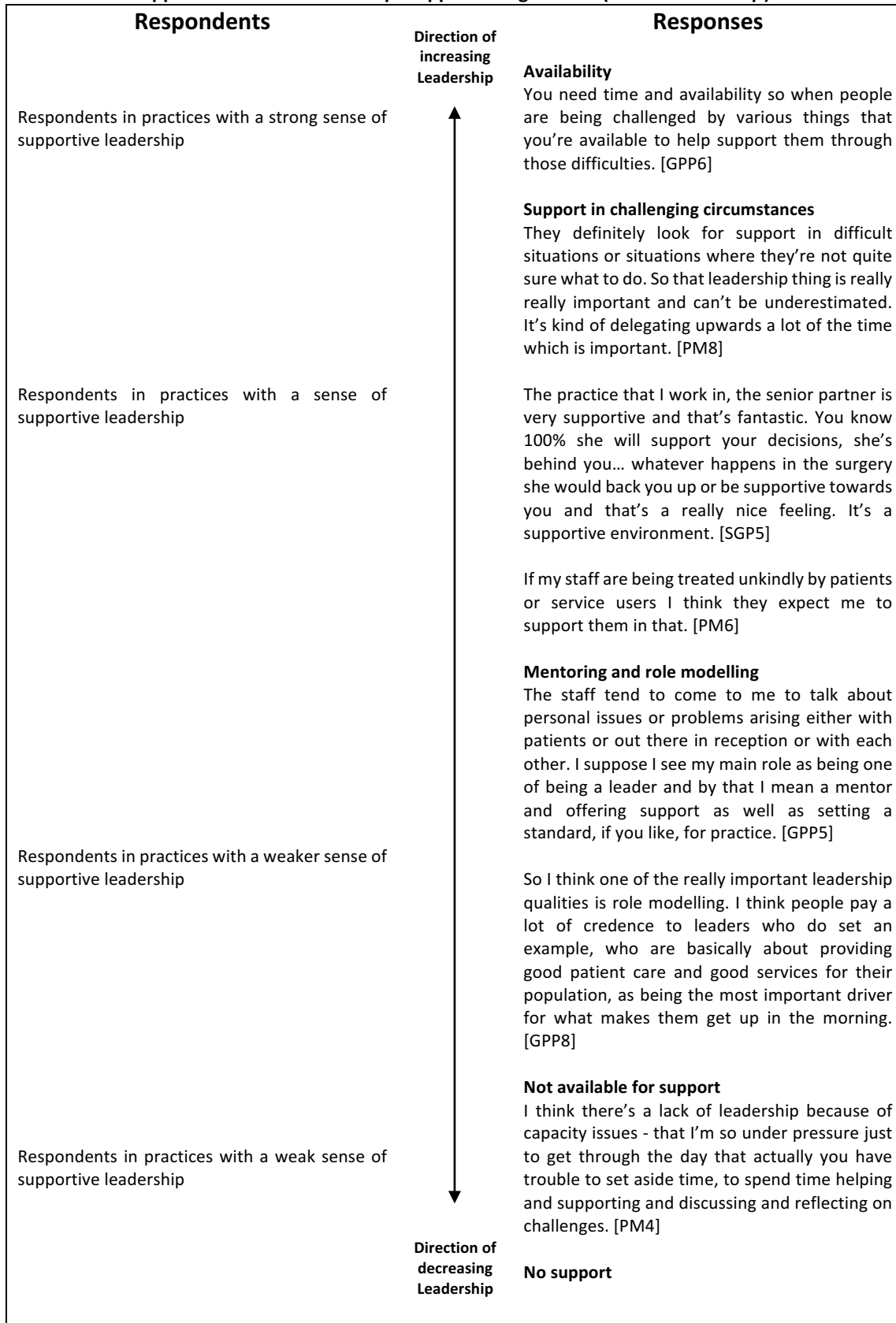
Appendix E5 – Construct map: Approachability (within *Leadership*)



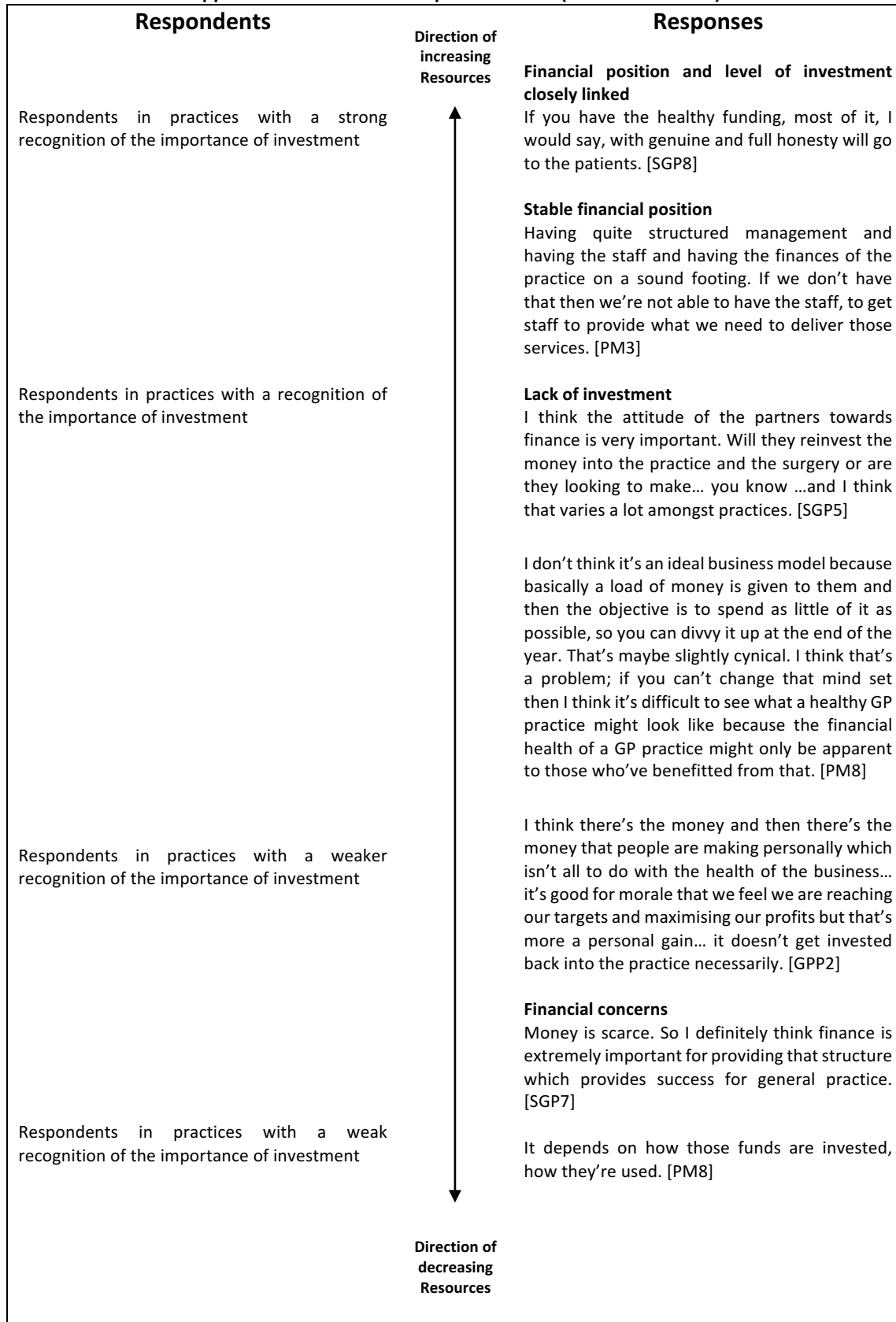
Appendix E6 – Construct map: Direction (within *Leadership*)



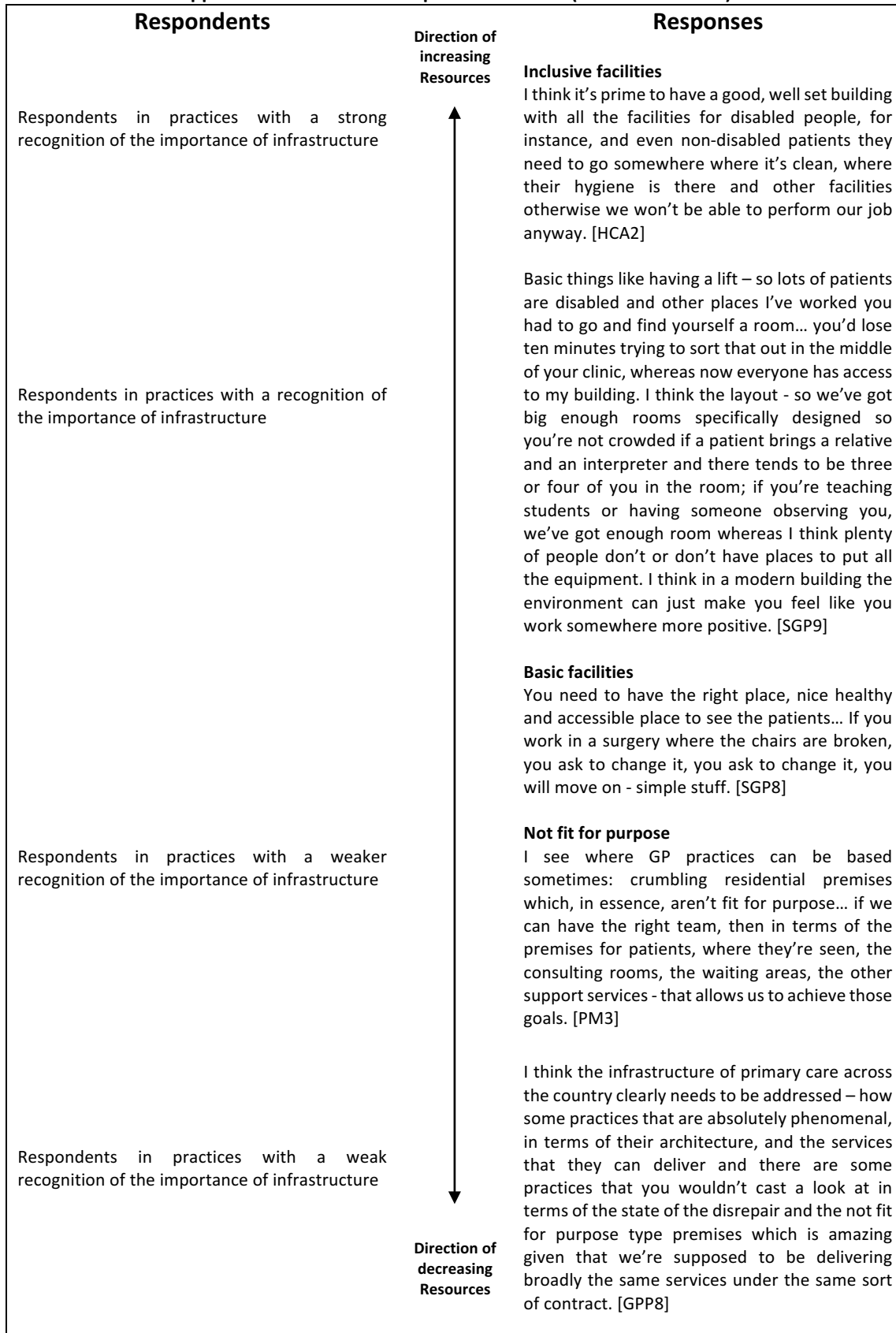
Appendix E7 – Construct map: Support and guidance (within *Leadership*)



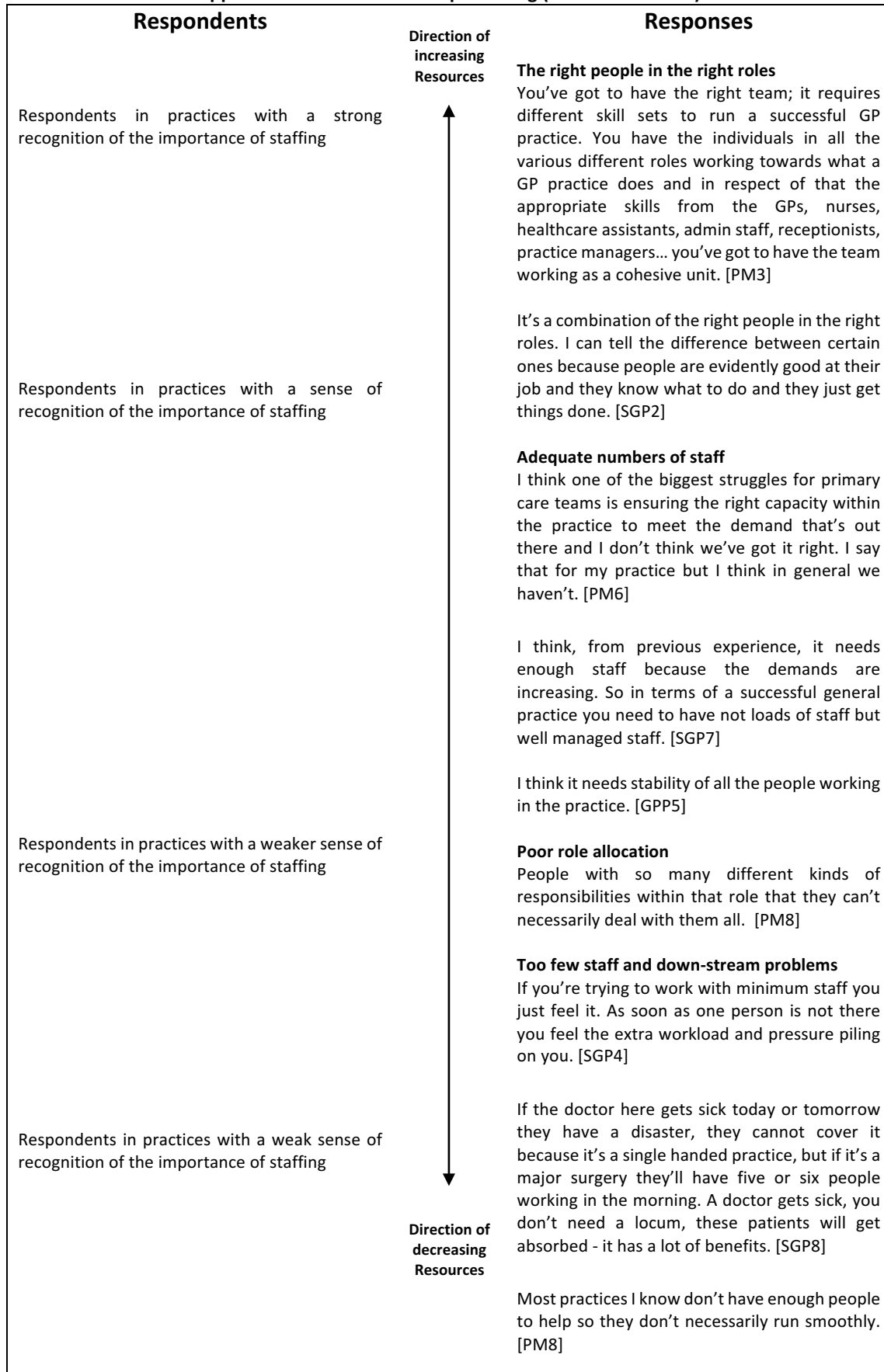
Appendix E8 – Construct map: Investment (within Resources)



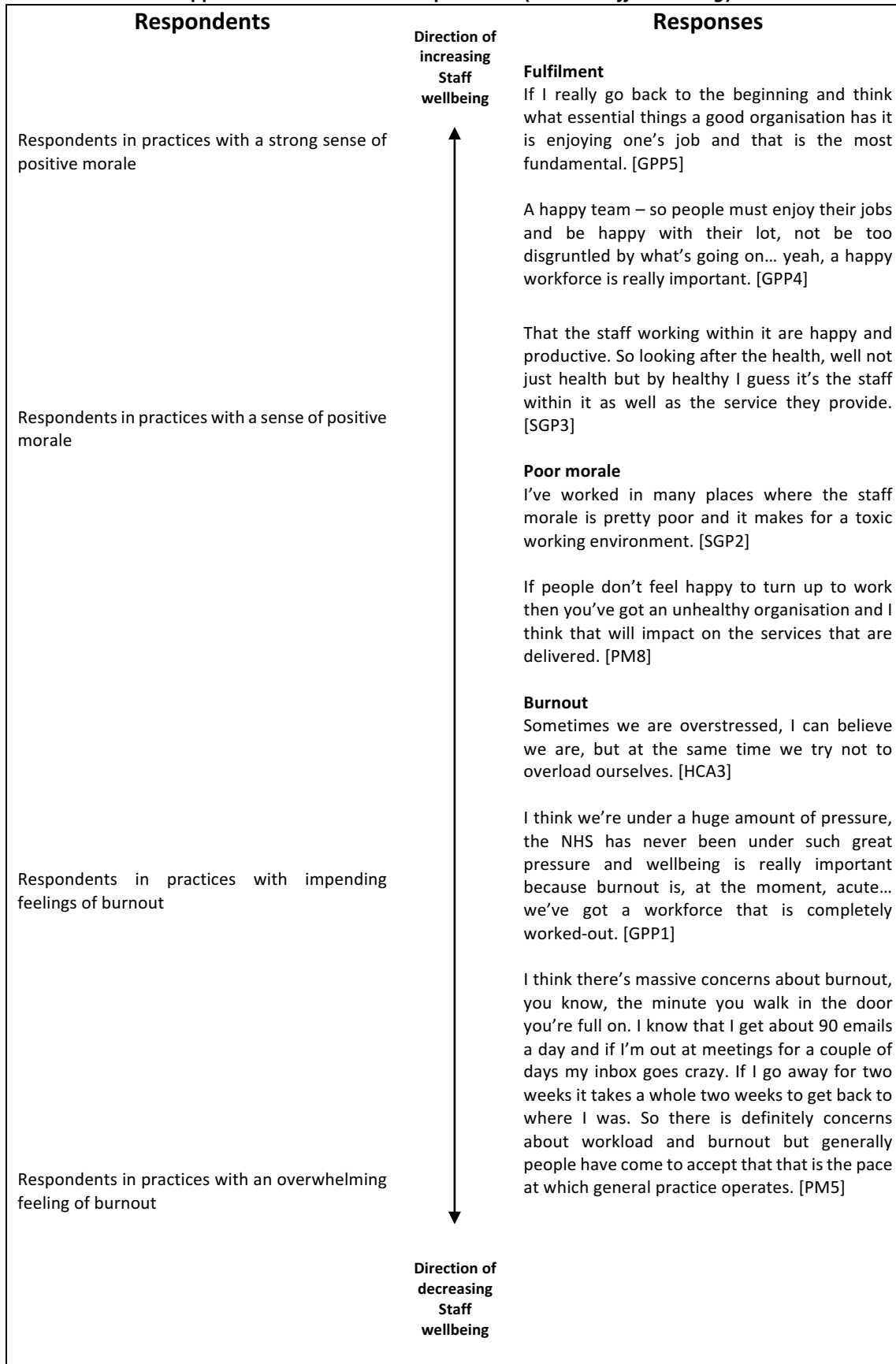
Appendix E9 – Construct map: Infrastructure (within *Resources*)



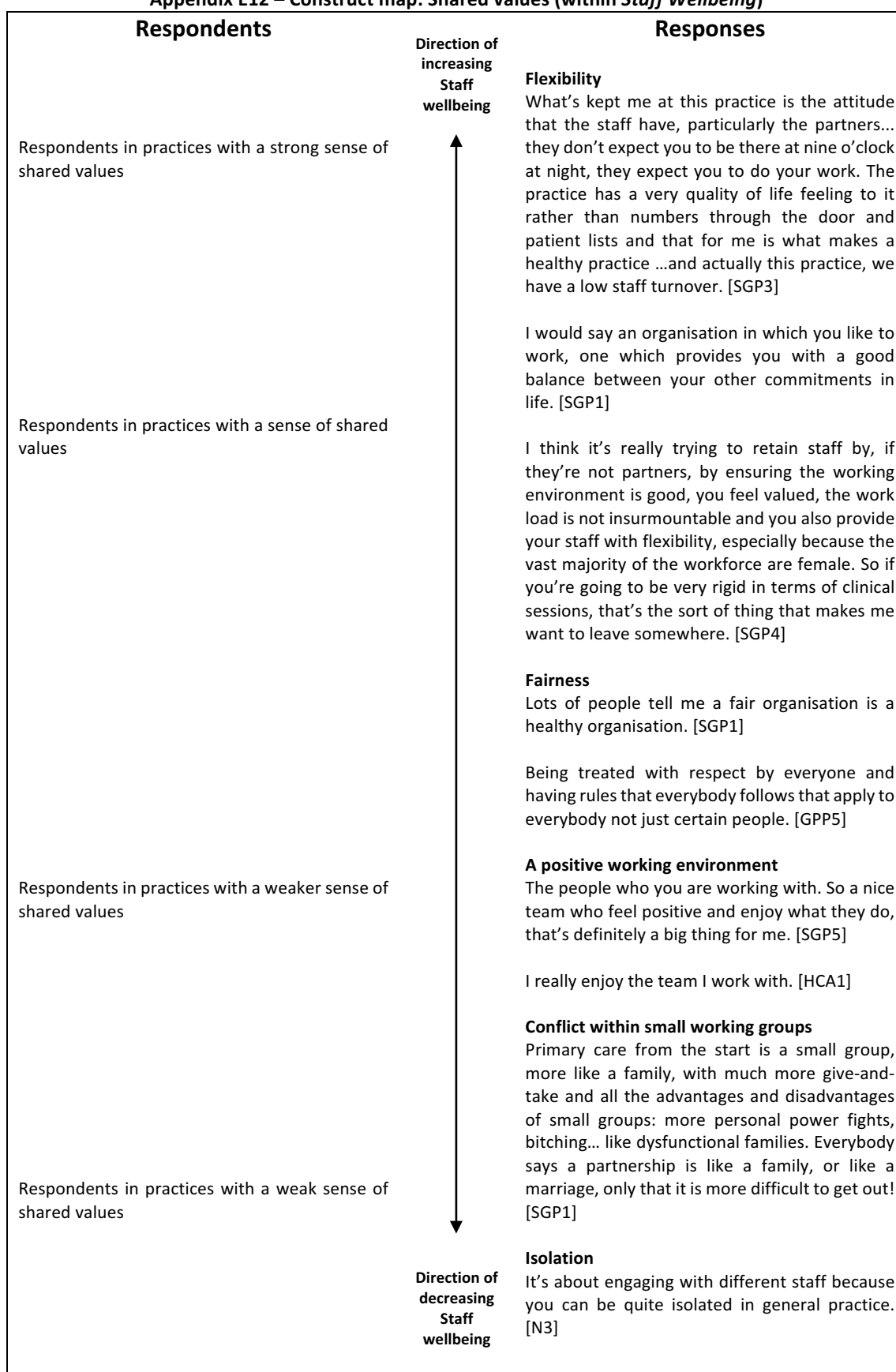
Appendix E10 – Construct map: Staffing (within Resources)



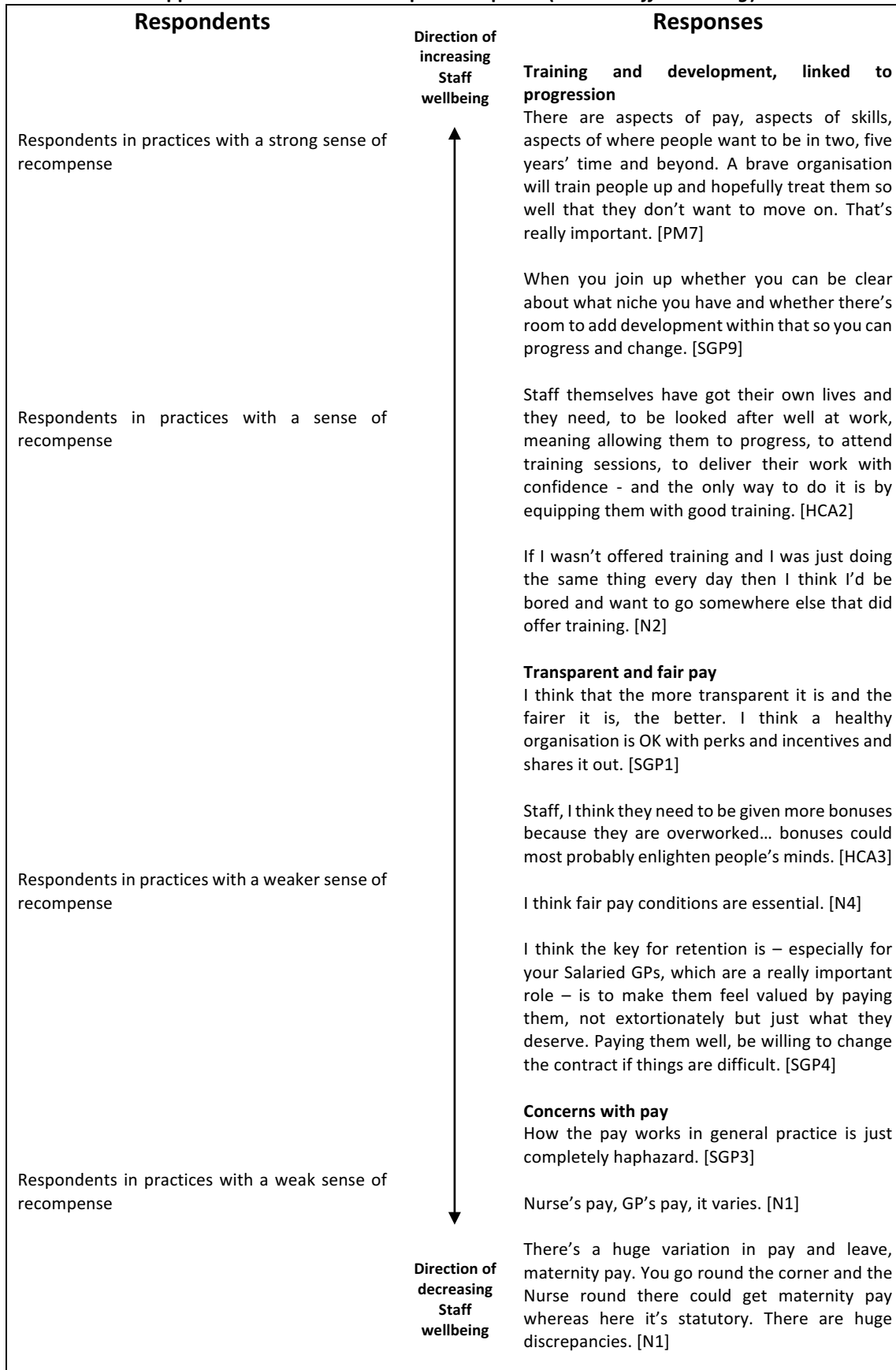
Appendix E11 – Construct map: Morale (within Staff Wellbeing)



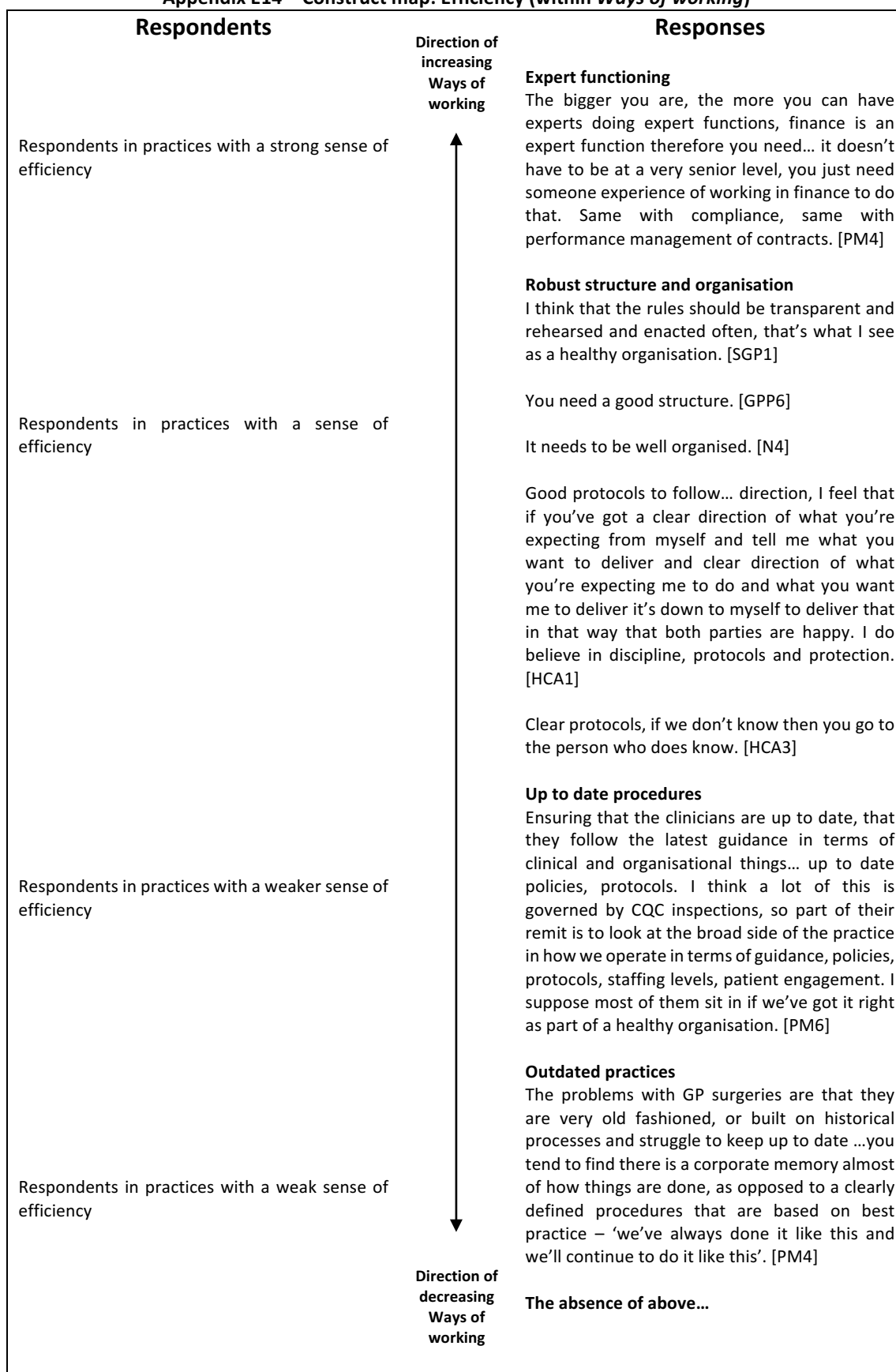
Appendix E12 – Construct map: Shared values (within *Staff Wellbeing*)



Appendix E13 – Construct map: Recompense (within *Staff Wellbeing*)



Appendix E14 – Construct map: Efficiency (within *Ways of working*)



Appendix E15 – Construct map: “No blame” culture (within *Ways of working*)

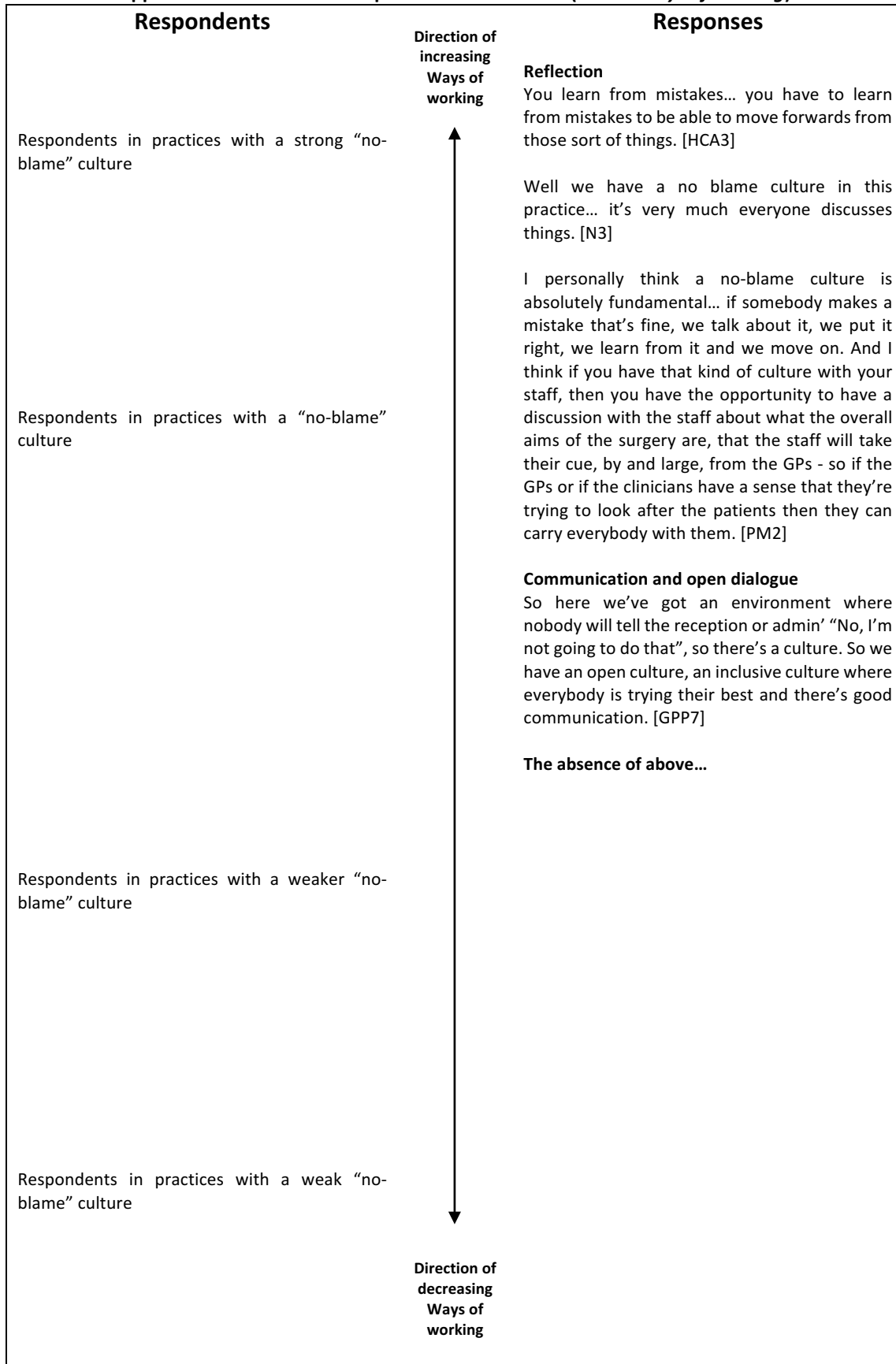
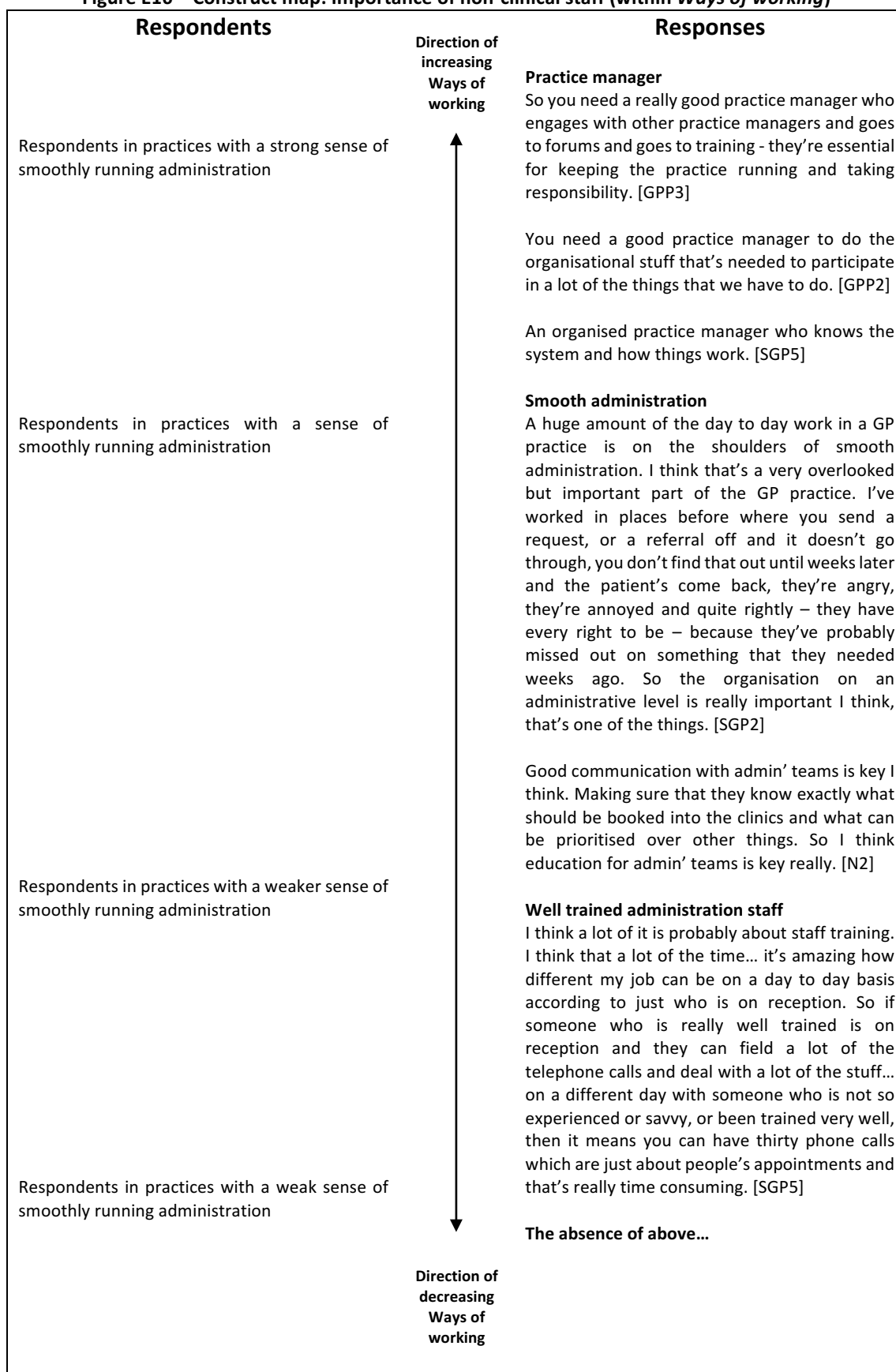
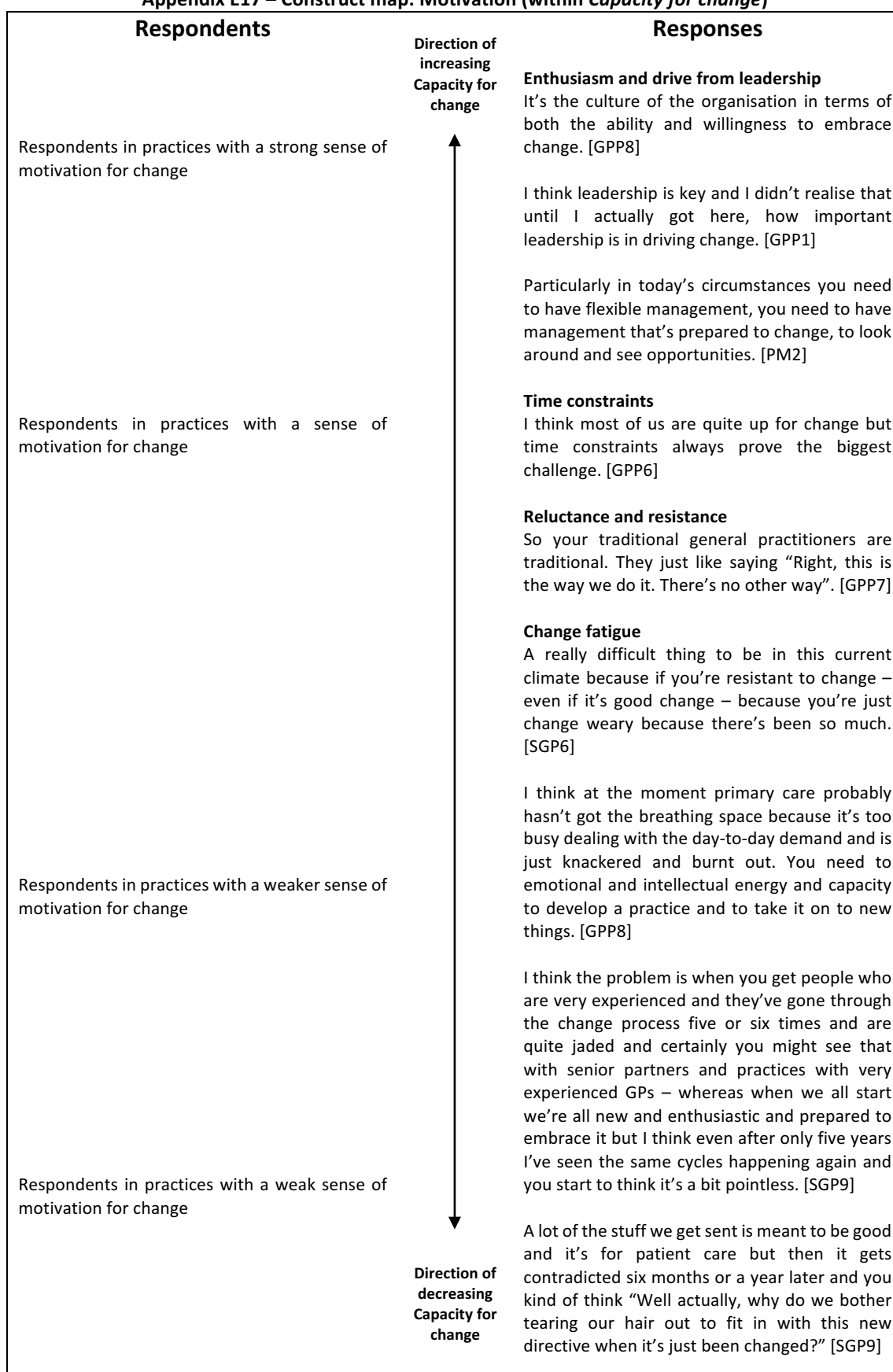


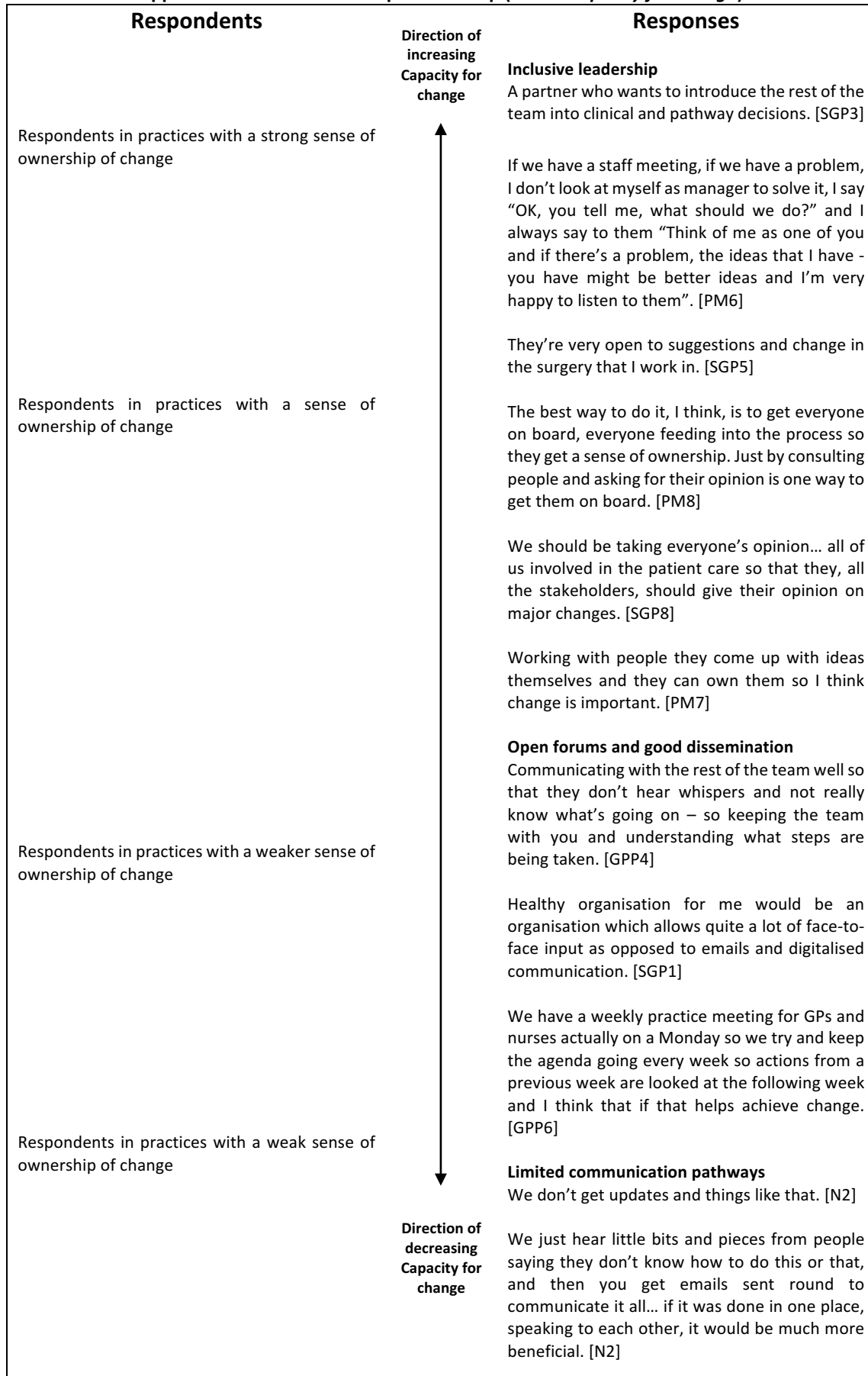
Figure E16 – Construct map: Importance of non-clinical staff (within *Ways of working*)



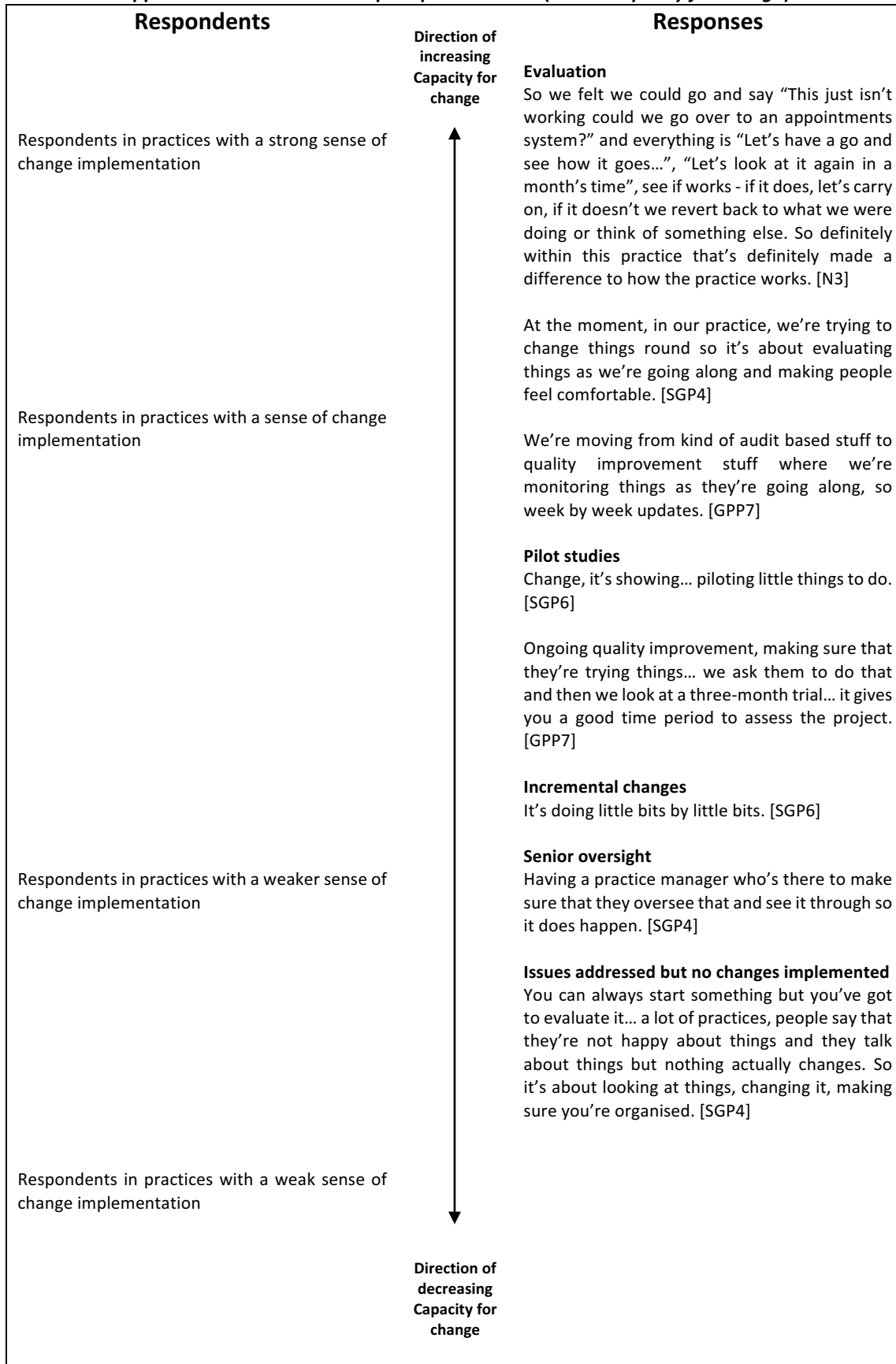
Appendix E17 – Construct map: Motivation (within *Capacity for change*)



Appendix E18 – Construct map: Ownership (within *Capacity for change*)



Appendix E19 – Construct map: Implementation (within *Capacity for change*)



Appendix E20 – CFA for final forty-seven item, six factor model (β = standardised factor loadings, SE = standard error, B = unstandardised factor loadings, R^2 = percentage of variance explained by model)

Factor	Observed variable (ref)	β	SE	two-tailed p -value	B	SE	two-tailed p -value	R^2
Strategy	S1	0.44	0.06	<0.01	0.18	0.03	<0.01	0.19
	S11	0.55	0.06	<0.01	0.29	0.06	<0.01	0.30
	S13	0.66	0.05	<0.01	0.53	0.06	<0.01	0.44
	S15	0.85	0.05	<0.01	0.78	0.08	<0.01	0.72
	S16	0.70	0.05	<0.01	0.59	0.08	<0.01	0.49
	S17	0.74	0.05	<0.01	0.59	0.06	<0.01	0.54
Leadership	L1	0.80	0.04	<0.01	0.55	0.08	<0.01	0.63
	L3	0.86	0.03	<0.01	0.56	0.06	<0.01	0.74
	L5	0.93	0.02	<0.01	0.86	0.07	<0.01	0.86
	L6	0.86	0.03	<0.01	0.69	0.07	<0.01	0.73
	L7	0.81	0.05	<0.01	0.60	0.08	<0.01	0.65
	L9	0.87	0.03	<0.01	0.82	0.09	<0.01	0.75
	L11	0.87	0.04	<0.01	0.68	0.08	<0.01	0.76
Resources	L12	0.83	0.04	<0.01	0.75	0.08	<0.01	0.70
	R2	0.39	0.05	<0.01	0.61	0.07	<0.01	0.15
	R8	0.47	0.06	<0.01	0.50	0.07	<0.01	0.22
	R13	0.34	0.06	<0.01	0.46	0.09	<0.01	0.12
	R17	0.56	0.05	<0.01	0.83	0.09	<0.01	0.31
	R18	0.54	0.06	<0.01	0.57	0.08	<0.01	0.29
	R19	0.51	0.06	<0.01	0.47	0.07	<0.01	0.26
	R26	0.68	0.05	<0.01	0.98	0.08	<0.01	0.46
Staff Wellbeing	R27	0.56	0.06	<0.01	0.47	0.07	<0.01	0.31
	R28	0.68	0.05	<0.01	0.82	0.09	<0.01	0.46
	SW4	0.33	0.04	<0.01	0.55	0.08	<0.01	0.11
	SW6	0.39	0.06	<0.01	0.50	0.08	<0.01	0.15
	SW7	0.62	0.06	<0.01	0.56	0.08	<0.01	0.39
	SW9	0.80	0.04	<0.01	0.91	0.08	<0.01	0.63
	SW10	0.87	0.03	<0.01	0.91	0.08	<0.01	0.76
	SW11	0.61	0.06	<0.01	0.45	0.07	<0.01	0.37
	SW15	0.54	0.04	<0.01	0.82	0.06	<0.01	0.29
Ways of Working	SW18	0.67	0.05	<0.01	0.83	0.08	<0.01	0.45
	SW19	0.61	0.06	<0.01	0.72	0.09	<0.01	0.37
	WW2	0.73	0.04	<0.01	0.57	0.05	<0.01	0.54
	WW4	0.76	0.03	<0.01	0.72	0.07	<0.01	0.57
	WW5	0.65	0.05	<0.01	0.57	0.07	<0.01	0.42
	WW6	0.57	0.06	<0.01	0.43	0.06	<0.01	0.32
	WW8	0.66	0.05	<0.01	0.50	0.07	<0.01	0.44
	WW10	0.63	0.05	<0.01	0.65	0.07	<0.01	0.39
Capacity for Change	WW12	0.73	0.04	<0.01	0.59	0.06	<0.01	0.53
	WW13	0.68	0.04	<0.01	0.60	0.06	<0.01	0.47
	CC1	0.62	0.05	<0.01	0.44	0.06	<0.01	0.39
	CC2	0.70	0.05	<0.01	0.70	0.07	<0.01	0.50
	CC8	0.72	0.04	<0.01	0.96	0.07	<0.01	0.51
	CC9	0.88	0.02	<0.01	0.71	0.06	<0.01	0.77
	CC13	0.82	0.04	<0.01	0.84	0.07	<0.01	0.67
	CC14	0.49	0.04	<0.01	0.82	0.07	<0.01	0.24
	CC16	0.64	0.04	<0.01	0.68	0.06	<0.01	0.41

Appendix F: Chapter 7 supplementary figures

Appendix F1 – Invitation email for cross sectional study

Dear Colleague,

**‘The longitudinal measurement of organisational health across Imperial College Healthcare
NHS trust’**

You are being invited to complete an online research questionnaire by clicking on the link below:

healthy-hospitals.org/org-health

Please ask us if there is anything unclear or if you would like more information about this research.

What is the purpose of this study?

This is a questionnaire looking to measure the effective functioning of healthcare organisations so that changes may be possible to improve patient care. It is from a research team, **not** from the Trust and **not** from the NHS.

Why have I been invited?

Everyone who works at Imperial College Healthcare NHS trust will be asked to complete the questionnaire at some point over the next 12 months. It is up to you whether you choose to take part or not.

What do I have to do?

Simply answer the questions to the best of your ability. There are no ‘right’ or ‘wrong’ answers; we are interested in your perspective of working in this organisation.

Will my taking part in this study be kept confidential?

Your answers are anonymous and confidential: we will never reveal your answers to anyone in this organisation or anywhere else.

What are the possible benefits of taking part?

Your involvement may help in further healthcare management and improve patient care. There are no disadvantages envisaged, other than taking about 10 minutes out of your day.

Who is organising this research?

This has been organised by Imperial College London, as a collaboration between the Faculty of Medicine and the Business School as part of a PhD research project. This study has been reviewed by an ethics committee.

Contact for further information

Mr Stephen Williams (Research Fellow, NIHR Imperial PSTRC)

Email: organisational.health@imperial.nhs.uk

Address: Room 1029, 10th Floor, QEQM Buidling, St Mary's Hospital, London, W2 1NY, UK

Research team:

Prof Ara Darzi (Professor of Surgery)

Mr Sanjay Purtkayastha (Senior Clinical Lecturer in Surgery)

Dr Sankalp Chaturvedi (Associate Professor of Organisational Behaviour, Imperial Business School)

Appendix F2 – Reminder email for cross sectional study

Dear Colleague,

**‘The longitudinal measurement of organisational health across Imperial College Healthcare
NHS trust’**

This is your last chance to complete an important online research questionnaire!

Your involvement may help in further healthcare management and improve patient care.

Access the survey by clicking the link below:

healthy-hospitals.org/org-health

Please ask us if there is anything unclear or if you would like more information about this research.

What is the purpose of this study?

This is a questionnaire looking to measure the effective functioning of healthcare organisations so that changes may be possible to improve patient care. It is from a research team, **not** from the Trust and **not** from the NHS.

Why have I been invited?

Everyone who works at Imperial College Healthcare NHS trust will be asked to complete the questionnaire at some point over the next 12 months. It is up to you whether you choose to take part or not.

What do I have to do?

Simply answer the questions to the best of your ability. There are no ‘right’ or ‘wrong’ answers; we are interested in your perspective of working in this organisation.

Will my taking part in this study be kept confidential?

Your answers are anonymous and confidential: we will never reveal your answers to anyone in this organisation or anywhere else.

What are the possible benefits of taking part?

Your involvement may help in further healthcare management and improve patient care. There are no disadvantages envisaged, other than taking about 10 minutes out of your day.

Who is organising this research?

This has been organised by Imperial College London, as a collaboration between the Faculty of Medicine and the Business School as part of a PhD research project. This study has been reviewed by an ethics committee.

Contact for further information

Mr Stephen Williams (Research Fellow, NIHR Imperial PSTRC)

Email: organisational.health@imperial.nhs.uk

Address: Room 1029, 10th Floor, QEQM Buidling, St Mary's Hospital, London, W2 1NY, UK

Research team:

Prof Ara Darzi (Professor of Surgery)

Mr Sanjay Purtkayastha (Senior Clinical Lecturer in Surgery)

Dr Sankalp Chaturvedi (Associate Professor of Organisational Behaviour, Imperial Business School)

Appendix F3 – Descriptive statistics for repeated measure *Healthcare-OH* survey, by survey round (Round 1 denotes data collected December-January, 2 March-April, 3 June-July and 4 September-October) and by item (missing data, “*not applicable*” [n/a] responses)

Round				1			2			3			4		
Ref	n	skipped	n/a	n	skipped	n/a	n	skipped	n/a	n	skipped	n/a	n	skipped	n/a
S1	346	43 [11.1%]	2 [0.6%]	501	90 [15.1%]	6 [1.2%]	210	29 [12.0%]	2 [1.0%]	186	20 [9.7%]	0 [0%]			
S2	345	44 [11.3%]	14 [4.1%]	501	88 [14.7%]	8 [1.6%]	210	30 [12.4%]	1 [0.5%]	185	19 [9.2%]	2 [1.1%]			
S3	343	46 [11.8%]	16 [4.7%]	490	101 [16.9%]	6 [1.2%]	210	31 [12.9%]	0 [0%]	185	19 [9.2%]	2 [1.1%]			
S4	341	48 [12.3%]	2 [0.6%]	481	113 [18.9%]	3 [0.6%]	210	30 [12.4%]	1 [0.5%]	185	19 [9.2%]	2 [1.1%]			
S5	338	51 [13.1%]	4 [1.2%]	472	114 [19.1%]	11 [2.3%]	210	30 [12.4%]	1 [0.5%]	184	18 [8.7%]	4 [2.2%]			
S6	333	56 [14.4%]	6 [1.8%]	463	119 [19.9%]	15 [3.2%]	205	27 [11.2%]	9 [4.4%]	184	18 [8.7%]	4 [2.2%]			
S7	337	52 [13.4%]	4 [1.2%]	462	118 [19.8%]	17 [3.7%]	210	30 [12.4%]	1 [0.5%]	185	19 [9.2%]	2 [1.1%]			
S8	339	50 [12.9%]	12 [3.5%]	473	116 [19.4%]	8 [1.7%]	209	30 [12.4%]	2 [1.0%]	186	19 [9.2%]	1 [0.5%]			
S9	341	48 [12.3%]	4 [1.2%]	480	113 [18.9%]	4 [0.8%]	210	31 [12.9%]	0 [0%]	186	17 [8.3%]	3 [1.6%]			
S10	335	54 [13.9%]	10 [3.0%]	463	120 [20.1%]	14 [3.0%]	206	28 [11.6%]	7 [3.4%]	186	16 [7.8%]	4 [2.2%]			
S11	331	58 [14.9%]	12 [3.6%]	449	122 [20.4%]	26 [5.8%]	208	29 [12.0%]	4 [1.9%]	182	16 [7.8%]	8 [4.4%]			
S12	331	58 [14.9%]	15 [4.5%]	451	123 [20.6%]	23 [5.1%]	204	28 [11.6%]	9 [4.4%]	185	20 [9.7%]	1 [0.5%]			
S13	335	54 [13.9%]	14 [4.2%]	460	118 [19.8%]	19 [4.1%]	208	29 [12.0%]	4 [1.9%]	184	18 [8.7%]	4 [2.2%]			
R1	307	82 [21.1%]	32 [10.4%]	408	163 [27.3%]	26 [6.4%]	194	34 [14.1%]	13 [6.7%]	169	24 [11.7%]	13 [7.7%]			
R2	310	79 [20.3%]	27 [8.7%]	415	163 [27.3%]	19 [4.6%]	194	34 [14.1%]	13 [6.7%]	171	27 [13.1%]	8 [4.7%]			
R3	303	86 [22.1%]	18 [5.9%]	423	161 [27.0%]	13 [3.1%]	195	35 [14.5%]	11 [5.6%]	171	27 [13.1%]	8 [4.7%]			
R4	313	76 [19.5%]	15 [4.8%]	429	161 [27.0%]	7 [1.6%]	195	35 [14.5%]	11 [5.6%]	172	28 [13.6%]	6 [3.5%]			
R5	323	66 [17.0%]	13 [4.0%]	425	163 [27.3%]	9 [2.1%]	198	37 [15.4%]	6 [3.0%]	171	27 [13.1%]	8 [4.7%]			

Round	1				2				3				4			
Ref	n	skipped	n/a	n	skipped	n/a	n	skipped	n/a	n	skipped	n/a				
R6	318	71 [18.3%]	16 [5.0%]	427	161 [27.0%]	9 [2.1%]	195	35 [14.5%]	11 [5.6%]	171	27 [13.1%]	8 [4.7%]				
R7	315	74 [19.0%]	10 [3.2%]	428	163 [27.3%]	6 [1.4%]	198	37 [15.4%]	6 [3.0%]	174	30 [14.6%]	2 [1.1%]				
R8	317	72 [18.5%]	6 [1.9%]	430	161 [27.0%]	6 [1.4%]	199	38 [15.8%]	4 [2.0%]	175	20 [9.7%]	11 [6.3%]				
R9	320	69 [17.7%]	11 [3.4%]	429	160 [26.8%]	8 [1.9%]	198	37 [15.4%]	6 [3.0%]	173	29 [14.1%]	4 [2.3%]				
R10	311	78 [20.1%]	17 [5.5%]	427	159 [26.6%]	11 [2.6%]	194	36 [14.9%]	11 [5.7%]	171	27 [13.1%]	8 [4.7%]				
R11	313	76 [19.5%]	18 [5.8%]	425	159 [26.6%]	13 [3.1%]	197	37 [15.4%]	7 [3.6%]	171	32 [15.5%]	3 [1.8%]				
LM1	307	82 [21.1%]	1 [0.3%]	411	179 [30.0%]	7 [1.7%]	192	47 [19.5%]	2 [1.0%]	173	32 [15.5%]	1 [0.6%]				
LM2	307	82 [21.1%]	2 [0.7%]	410	180 [30.2%]	7 [1.7%]	192	47 [19.5%]	2 [1.0%]	173	31 [15.0%]	2 [1.2%]				
LM3	307	82 [21.1%]	2 [0.7%]	413	180 [30.2%]	4 [1.0%]	191	46 [19.1%]	4 [2.1%]	173	33 [16.0%]	0 [0%]				
LM4	306	83 [21.3%]	2 [0.7%]	409	181 [30.3%]	7 [1.7%]	191	46 [19.1%]	4 [2.1%]	173	29 [14.1%]	4 [2.3%]				
LM5	307	82 [21.1%]	4 [1.3%]	411	181 [30.3%]	5 [1.2%]	191	46 [19.1%]	4 [2.1%]	173	31 [15.0%]	2 [1.2%]				
LM6	308	81 [20.8%]	5 [1.6%]	414	181 [30.3%]	2 [0.5%]	192	47 [19.5%]	2 [1.0%]	173	32 [15.5%]	1 [0.6%]				
LM7	308	81 [20.8%]	5 [1.6%]	412	182 [30.5%]	3 [0.7%]	192	47 [19.5%]	2 [1.0%]	173	32 [15.5%]	1 [0.6%]				
LM8	300	89 [22.9%]	23 [7.7%]	391	188 [31.5%]	18 [4.6%]	185	41 [17.0%]	15 [8.1%]	171	31 [15.0%]	4 [2.3%]				
LM9	305	84 [21.6%]	6 [2.0%]	405	185 [31.0%]	7 [1.7%]	190	45 [18.7%]	6 [3.2%]	172	32 [15.5%]	2 [1.2%]				
LM10	305	84 [21.6%]	6 [2.0%]	408	182 [30.5%]	7 [1.7%]	190	45 [18.7%]	6 [3.2%]	172	32 [15.5%]	2 [1.2%]				
LM11	305	84 [21.6%]	9 [3.0%]	408	186 [31.2%]	3 [0.7%]	190	45 [18.7%]	6 [3.2%]	171	31 [15.0%]	4 [2.3%]				
LM12	306	83 [21.3%]	5 [1.6%]	406	186 [31.2%]	5 [1.2%]	190	45 [18.7%]	6 [3.2%]	172	32 [15.5%]	2 [1.2%]				
LM13	300	89 [22.9%]	20 [6.7%]	387	188 [31.5%]	22 [5.7%]	188	44 [18.3%]	9 [4.8%]	170	30 [14.6%]	6 [3.5%]				

Round	1				2				3				4			
Ref	n	skipped	n/a	n	skipped	n/a	n	skipped	n/a	n	skipped	n/a				
SW1	295	94 [24.2%]	1 [0.3%]	392	204 [34.2%]	1 [0.3%]	188	51 [21.2%]	2 [1.1%]	164	40 [19.4%]	2 [1.2%]				
SW2	290	99 [25.4%]	4 [1.4%]	372	224 [37.5%]	1 [0.3%]	187	50 [20.7%]	4 [2.1%]	163	41 [19.9%]	2 [1.2%]				
SW3	294	95 [24.4%]	2 [0.7%]	378	203 [34.0%]	16 [4.2%]	187	50 [20.7%]	4 [2.1%]	163	40 [19.4%]	3 [1.8%]				
SW4	292	97 [24.9%]	5 [1.7%]	381	207 [34.7%]	9 [2.4%]	186	49 [20.3%]	6 [3.2%]	164	41 [19.9%]	1 [0.6%]				
SW5	291	98 [25.2%]	6 [2.1%]	389	205 [34.3%]	3 [0.8%]	185	48 [19.9%]	8 [4.3%]	164	41 [19.9%]	1 [0.6%]				
SW6	306	83 [21.3%]	1 [0.3%]	390	205 [34.3%]	2 [0.5%]	187	50 [20.7%]	4 [2.1%]	160	37 [18.0%]	9 [5.6%]				
SW7	294	95 [24.4%]	11 [3.7%]	387	204 [34.2%]	6 [1.6%]	188	51 [21.2%]	2 [1.1%]	161	38 [18.4%]	7 [4.3%]				
SW8	289	100 [25.7%]	1 [0.3%]	389	205 [34.3%]	3 [0.8%]	188	51 [21.2%]	2 [1.1%]	164	40 [19.4%]	2 [1.2%]				
SW9	293	96 [24.7%]	9 [3.1%]	380	210 [35.2%]	7 [1.8%]	187	50 [20.7%]	4 [2.1%]	164	38 [18.4%]	4 [2.4%]				
SW10	294	95 [24.4%]	7 [2.4%]	380	209 [35.0%]	8 [2.1%]	188	51 [21.2%]	2 [1.1%]	164	40 [19.4%]	2 [1.2%]				
SW11	294	95 [24.4%]	5 [1.7%]	388	206 [34.5%]	3 [0.8%]	188	51 [21.2%]	2 [1.1%]	163	41 [19.9%]	2 [1.2%]				
SW12	299	90 [23.1%]	2 [0.7%]	377	209 [35.0%]	11 [2.9%]	188	51 [21.2%]	2 [1.1%]	164	41 [19.9%]	1 [0.6%]				
SW13	289	100 [25.7%]	22 [7.6%]	357	219 [36.7%]	21 [5.9%]	187	50 [20.7%]	4 [2.1%]	163	41 [19.9%]	2 [1.2%]				
SW14	287	102 [26.2%]	25 [8.7%]	351	221 [37.0%]	25 [7.1%]	186	49 [20.3%]	6 [3.2%]	161	38 [18.4%]	7 [4.3%]				
SW15	288	101 [26.0%]	28 [9.7%]	346	228 [38.2%]	23 [6.6%]	185	48 [19.9%]	8 [4.3%]	164	41 [19.9%]	1 [0.6%]				
SW16	301	88 [22.6%]	7 [2.3%]	377	214 [35.8%]	6 [1.6%]	188	51 [21.2%]	2 [1.1%]	164	41 [19.9%]	1 [0.6%]				
SW17	285	104 [26.7%]	17 [6.0%]	359	219 [36.7%]	19 [5.3%]	182	46 [19.1%]	13 [7.1%]	161	38 [18.4%]	7 [4.3%]				
SW18	283	106 [27.2%]	22 [7.8%]	349	220 [36.9%]	28 [8%]	179	53 [22.0%]	9 [5.0%]	162	42 [20.4%]	2 [1.2%]				
F1	287	102 [26.2%]	8 [2.8%]	370	217 [36.3%]	10 [2.7%]	181	47 [19.5%]	13 [7.2%]	160	44 [21.4%]	2 [1.3%]				

Round	1				2				3				4			
Ref	n	skipped	n/a	n	skipped	n/a	n	skipped	n/a	n	skipped	n/a				
F2	291	98 [25.2%]	11 [3.8%]	370	217 [36.3%]	10 [2.7%]	181	47 [19.5%]	13 [7.2%]	160	43 [20.9%]	3 [1.9%]				
F3	278	111 [28.5%]	15 [5.4%]	359	220 [36.9%]	18 [5.0%]	180	46 [19.1%]	15 [8.3%]	158	41 [19.9%]	7 [4.4%]				
F4	289	100 [25.7%]	1 [0.3%]	372	217 [36.3%]	8 [2.2%]	183	48 [19.9%]	10 [5.5%]	161	44 [21.4%]	1 [0.6%]				
F5	290	99 [25.4%]	12 [4.1%]	370	219 [36.7%]	8 [2.2%]	186	51 [21.2%]	4 [2.2%]	160	44 [21.4%]	2 [1.3%]				
F6	285	104 [26.7%]	19 [6.7%]	354	223 [37.4%]	20 [5.6%]	181	47 [19.5%]	13 [7.2%]	160	44 [21.4%]	2 [1.3%]				
F7	291	98 [25.2%]	19 [6.5%]	360	223 [37.4%]	14 [3.9%]	180	46 [19.1%]	15 [8.3%]	160	44 [21.4%]	2 [1.3%]				
F8	288	101 [26.0%]	24 [8.3%]	362	219 [36.7%]	16 [4.4%]	181	47 [19.5%]	13 [7.2%]	160	44 [21.4%]	2 [1.3%]				
F9	285	104 [26.7%]	12 [4.2%]	364	220 [36.9%]	13 [3.6%]	181	50 [20.7%]	10 [5.5%]	158	41 [19.9%]	7 [4.4%]				
F10	289	100 [25.7%]	10 [3.5%]	371	217 [36.3%]	9 [2.4%]	183	48 [19.9%]	10 [5.5%]	161	35 [17.0%]	10 [6.2%]				
F11	278	111 [28.5%]	14 [5.0%]	364	220 [36.9%]	13 [3.6%]	178	44 [18.3%]	19 [10.7%]	158	41 [19.9%]	7 [4.4%]				
PS1	284	105 [27.0%]	11 [3.9%]	362	226 [37.9%]	9 [2.5%]	180	51 [21.2%]	10 [5.6%]	158	46 [22.3%]	2 [1.3%]				
PS2	286	103 [26.5%]	6 [2.1%]	369	224 [37.5%]	4 [1.1%]	183	54 [22.4%]	4 [2.2%]	159	46 [22.3%]	1 [0.6%]				
PS3	281	108 [27.8%]	7 [2.5%]	356	230 [38.5%]	11 [3.1%]	179	50 [20.7%]	12 [6.7%]	158	46 [22.3%]	2 [1.3%]				
PS4	283	106 [27.2%]	7 [2.5%]	358	227 [38.0%]	12 [3.4%]	179	50 [20.7%]	12 [6.7%]	156	43 [20.9%]	7 [4.5%]				
PS5	281	108 [27.8%]	5 [1.8%]	359	229 [38.4%]	9 [2.5%]	179	52 [21.6%]	10 [5.6%]	157	44 [21.4%]	5 [3.2%]				
PS6	265	124 [31.9%]	10 [3.8%]	358	229 [38.4%]	10 [2.8%]	178	57 [23.7%]	6 [3.4%]	156	43 [20.9%]	7 [4.5%]				
PS7	263	126 [32.4%]	61 [23.2%]	271	266 [44.6%]	60 [22.1%]	166	41 [17.0%]	34 [20.5%]	147	32 [15.5%]	27 [18.4%]				
PS8	276	113 [29.0%]	62 [22.5%]	269	267 [44.7%]	61 [22.7%]	165	40 [16.6%]	36 [21.8%]	148	33 [16.0%]	25 [16.9%]				
PS9	268	121 [31.1%]	53 [19.8%]	290	257 [43.0%]	50 [17.2%]	170	43 [17.8%]	28 [16.5%]	151	36 [17.5%]	19 [12.6%]				

Round	1				2				3				4			
Ref	n	skipped	n/a		n	skipped	n/a		n	skipped	n/a		n	skipped	n/a	
PS10	268	121 [31.1%]	51 [19.0%]		289	256 [42.9%]	52 [18.0%]		168	42 [17.4%]	31 [18.5%]		153	39 [18.9%]	14 [9.2%]	
PS11	280	109 [28.0%]	18 [6.4%]		346	230 [38.5%]	21 [6.1%]		178	49 [20.3%]	14 [7.9%]		159	42 [20.4%]	5 [3.1%]	
PS12	278	111 [28.5%]	19 [6.8%]		339	235 [39.4%]	23 [6.8%]		178	49 [20.3%]	14 [7.9%]		157	44 [21.4%]	5 [3.2%]	
PS13	278	111 [28.5%]	13 [4.7%]		344	230 [38.5%]	23 [6.7%]		178	49 [20.3%]	14 [7.9%]		157	44 [21.4%]	5 [3.2%]	
PS14	281	108 [27.8%]	11 [3.9%]		356	227 [38.0%]	14 [3.9%]		179	50 [20.7%]	12 [6.7%]		158	44 [21.4%]	4 [2.5%]	
E1	276	113 [29.0%]	10 [3.6%]		346	239 [40.0%]	12 [3.5%]		177	54 [22.4%]	10 [5.6%]		157	43 [20.9%]	6 [3.8%]	
E2	270	119 [30.6%]	15 [5.6%]		330	245 [41.0%]	22 [6.7%]		175	52 [21.6%]	14 [8.0%]		153	41 [19.9%]	12 [7.8%]	
E3	280	109 [28.0%]	5 [1.8%]		355	238 [39.9%]	4 [1.1%]		181	58 [24.1%]	2 [1.1%]		158	47 [22.8%]	1 [0.6%]	
E4	272	117 [30.1%]	11 [4.0%]		330	247 [41.4%]	20 [6.1%]		174	53 [22.0%]	14 [8.0%]		157	46 [22.3%]	3 [1.9%]	
E5	249	140 [36.0%]	88 [35.3%]		174	350 [58.6%]	73 [42.0%]		148	36 [14.9%]	57 [38.5%]		141	23 [11.2%]	42 [29.8%]	
E6	247	142 [36.5%]	87 [35.2%]		180	343 [57.5%]	74 [41.1%]		146	36 [14.9%]	59 [40.4%]		139	22 [10.7%]	45 [32.4%]	
E7	254	135 [34.7%]	62 [24.4%]		239	294 [49.2%]	64 [26.8%]		159	41 [17.0%]	41 [25.8%]		147	34 [16.5%]	25 [17.0%]	
E8	260	129 [33.2%]	48 [18.5%]		267	274 [45.9%]	56 [21.0%]		165	44 [18.3%]	32 [19.4%]		153	41 [19.9%]	12 [7.8%]	
E9	261	128 [32.9%]	52 [19.9%]		259	282 [47.2%]	56 [21.6%]		168	47 [19.5%]	26 [15.5%]		152	38 [18.4%]	16 [10.5%]	
E10	264	125 [32.1%]	42 [15.9%]		285	264 [44.2%]	48 [16.8%]		172	50 [20.7%]	19 [11.0%]		150	37 [18.0%]	19 [12.7%]	
E11	259	130 [33.4%]	39 [15.1%]		279	268 [44.9%]	50 [17.9%]		168	47 [19.5%]	26 [15.5%]		149	36 [17.5%]	21 [14.1%]	
E12	264	125 [32.1%]	46 [17.4%]		280	268 [44.9%]	49 [17.5%]		169	49 [20.3%]	23 [13.6%]		153	33 [16.0%]	20 [13.1%]	
E13	274	115 [29.6%]	9 [3.3%]		340	243 [40.7%]	14 [4.1%]		177	54 [22.4%]	10 [5.6%]		155	44 [21.4%]	7 [4.5%]	
E14	274	115 [29.6%]	12 [4.4%]		338	243 [40.7%]	16 [4.7%]		176	53 [22.0%]	12 [6.8%]		156	45 [21.8%]	5 [3.2%]	

Round	1				2				3				4			
Ref	n	skipped	n/a	n	skipped	n/a	n	skipped	n/a	n	skipped	n/a				
E15	274	115 [29.6%]	5 [1.8%]	344	241 [40.4%]	12 [3.5%]	177	54 [22.4%]	10 [5.6%]	157	45 [21.8%]	4 [2.5%]				
C1	272	117 [30.1%]	6 [2.2%]	333	253 [42.4%]	11 [3.3%]	177	56 [23.2%]	8 [4.5%]	152	42 [20.4%]	12 [7.9%]				
C2	270	119 [30.6%]	5 [1.9%]	336	252 [42.2%]	9 [2.7%]	178	57 [23.7%]	6 [3.4%]	153	43 [20.9%]	10 [6.5%]				
C3	276	113 [29.0%]	5 [1.8%]	338	253 [42.4%]	6 [1.8%]	178	57 [23.7%]	6 [3.4%]	154	45 [21.8%]	7 [4.5%]				
C4	279	110 [28.3%]	4 [1.4%]	337	253 [42.4%]	7 [2.1%]	178	57 [23.7%]	6 [3.4%]	156	48 [23.3%]	2 [1.3%]				
C5	244	145 [37.3%]	50 [20.5%]	258	286 [47.9%]	53 [20.5%]	165	46 [19.1%]	30 [18.2%]	150	39 [18.9%]	17 [11.3%]				
C6	258	131 [33.7%]	44 [17.1%]	264	283 [47.4%]	50 [18.9%]	169	49 [20.3%]	23 [13.6%]	150	39 [18.9%]	17 [11.3%]				
C7	262	127 [32.6%]	30 [11.5%]	276	276 [46.2%]	45 [16.3%]	173	62 [25.7%]	6 [3.5%]	149	38 [18.4%]	19 [12.8%]				
C8	258	131 [33.7%]	44 [17.1%]	285	271 [45.4%]	41 [14.4%]	165	46 [19.1%]	30 [18.2%]	151	41 [19.9%]	14 [9.3%]				
C9	276	113 [29.0%]	17 [6.2%]	317	260 [43.6%]	20 [6.3%]	179	58 [24.1%]	4 [2.2%]	155	46 [22.3%]	5 [3.2%]				
C10	266	123 [31.6%]	38 [14.3%]	297	268 [44.9%]	32 [10.8%]	178	57 [23.7%]	6 [3.4%]	155	46 [22.3%]	5 [3.2%]				
C11	274	115 [29.6%]	21 [7.7%]	320	258 [43.2%]	19 [5.9%]	178	57 [23.7%]	6 [3.4%]	153	43 [20.9%]	10 [6.5%]				
C12	265	124 [31.9%]	23 [8.7%]	310	261 [43.7%]	26 [8.4%]	174	53 [22.0%]	14 [8.0%]	150	39 [18.9%]	17 [11.3%]				
C13	267	122 [31.4%]	29 [10.9%]	306	263 [44.1%]	28 [9.2%]	177	56 [23.2%]	8 [4.5%]	153	43 [20.9%]	10 [6.5%]				
C14	273	116 [29.8%]	8 [2.9%]	328	259 [43.4%]	10 [3.0%]	176	55 [22.8%]	10 [5.7%]	153	43 [20.9%]	10 [6.5%]				
C15	271	118 [30.3%]	11 [4.1%]	333	258 [43.2%]	6 [1.8%]	175	54 [22.4%]	12 [6.9%]	155	46 [22.3%]	5 [3.2%]				
C16	270	119 [30.6%]	13 [4.8%]	333	256 [42.9%]	8 [2.4%]	174	53 [22.0%]	14 [8.0%]	154	45 [21.8%]	7 [4.5%]				