The impact of service change on doctors' training

Prepared for the General Medical Council

By the Research Department of Medical Education,

UCL Medical School, 5th March 2021

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The aim of this research is to gain a deeper understanding about the direct and indirect impacts of service change on doctors' training: to understand if specific types of service change pose a risk to the training experience, and to gain insights into the contextual influences that undermine or enhance the education of doctors during service change.

Context

This research examined four types of large-scale reconfiguration, both planned and unplanned. Planned service change studied included: acute hospital reconfiguration which involved sites being changed into either "hot" i.e. acute services or "cold" for routine medical care, a Trust/Health Board merger where three geographically located hospitals amalgamated into one single trust with specialist services relocated to particular sites, and regional reconfiguration where major specialist centres are planned over a wider geographical patch. Research started in September 2019 but due to the Covid-19 pandemic data collection was paused between March-August 2020. The far-reaching service transformation which occurred because of Covid-19 presented an opportunity to examine the impact of unplanned service change.

Methods

This was a large-scale qualitative study interviewing a total of 95 participants. Phase 1 involved interviews with experts: senior leads with responsibility for service change within the NHS (N=15), including leads from educational bodies and trainee representatives in order to gain an in depth understanding of the definition, drivers, challenges and nature of service change and its consequences for doctors' training. Phase 2 undertook an in-depth examination regarding the actual impact of service change at three case study sites who were undergoing service change, covering eight hospital sites. At these case studies Trust/Health Board Leads (N=6), directors and associate directors of medical education, supervisors (N=30), and trainees across all grades (N=44) covering 18 clinical specialities were interviewed.

Key findings

- Service change is defined as a large-scale reconfiguration of services driven by the desire to smooth patient pathways and reduce duplication, through centralisation and integration. Shifting healthcare organisations from 'managerially led' to 'clinically led' was an aim of reconfiguration, however the lack of leadership skills and experience was raised as a barrier to effecting this change.
- Two approaches to the implementation of service change were identified: 'top-down' and 'bottom-up' approaches. The implementation of service change was typically perceived of as a 'top-down' process and hard to influence, either nationally or locally.
- However, 'bottom-up' approaches, when service change was either led by trainees or where training was fully considered in designing change, typically had positive outcomes for trainee

satisfaction, service, and retention. Flattening of hierarchies in unplanned service change resulted in successful trainee-led initiatives which improved frontline care.

- All types of service change impacted both positively and negatively on doctors in training with wide ranging ramifications on professional, educational, interpersonal, and personal challenges, many of which are unanticipated and emerge as change proceeds.
- The impacts and risks associated with service change vary by training grade, speciality, Trust/Health Board site and the type of service change. There are immediate risks on the educational experience of trainees and long-term risks for the recruitment and retention of permanent medical staff.
- Our analysis of data, pre and during the pandemic revealed similar types of risks associated with unplanned change. However, unplanned service amplified the nature of the risks. For example, redeployment was a feature in planned and unplanned service change, however the significance of workforce-wide, extended periods of redeployment was exemplified by unplanned service change. For some trainees the opportunity to work with acutely unwell patients was an expansive phenomenon. For other trainees their experience of training was impoverished as they missed out core foundation and sub-speciality placements which had implications for progression and on career choice and led to dissatisfaction.
- A finding from this research was a general lack of awareness of planned service change. However, the massive wholescale reconfiguration caused by the Covid-19 pandemic raised awareness and enabled contributions from all and, in particular, from trainees.

Conclusion

Overall, all participants thought that training was not fully considered when services were reconfigured; typically service trumped education. There are wide ranging ramifications from service change on doctors in training. It led to professional, educational, interpersonal, and personal challenges, many of which are unanticipated and emerged as change proceeds. The need to adapt curricula to help trainees understand the complexities of service change within the NHS, as well as to develop their ability to lead and manage change throughout their career was highlighted as an educational need by experts and leaders. All types of service change have advantages and disadvantages for training, these were specific to context, speciality, and training grade. Where service change was wholesale, workforce-wide, fast, and the structural changes were less bounded (that is 'cold' sites (sites for planned and routine admissions) became 'hotter' as patients unexpectedly deteriorated and 'green' areas becoming 'red' as in unplanned service change), the risks for doctors in training appeared to be greater.

Organisational recognition of training with the active involvement of trainees facilitates better training environments and led to positive impacts on service. Risk was minimised when organisations had a culture of valuing training and there was active engagement at Board level. External agencies with an interest in training could enhance their guidance about what changes to training is, and is not, acceptable during times of change and this would help to maintain a focus on training during implementation. Involving trainees, who are a fresh pair of eyes, would allow a deeper understanding about the ways in which service change affects training opportunities, as well as enhancing the understanding of its impact on the delivery of frontline care. Furthermore, engaging trainees would empower them to become future healthcare leaders. A systematic approach to involving trainees, nationally and locally, is recommended which has implications for both policy and practice.

Introduction

Overview

Service change is an all-pervasive phenomenon within the NHS. Service change is defined by NHS England[1] as any process that affects what NHS services are delivered, including where they are delivered. Service change can be planned, as in the development of integrated care/Vanguard sites/Sustainability and Transformation Partnerships (STP) and Trust/Health Board mergers. Service change can also be unanticipated, for example failing Trust/Health Boards going into special measures and the response to the Covid-19 pandemic. Contextual factors are key to understanding the impact of service change[2].

Policy drivers for service change have included: the European Working Time Directive[3]; the Five Year Forward View[4]; Next Steps on the Five Year Forward View[5], and the provision of a seven-day NHS[6]. Service change is predominantly driven by the desire to centralise NHS services with the suggested benefits of financial savings and managing workforce issues, improving patient outcomes and access to care. Of crucial relevance to this study, service change is often precipitated because of a lack of medical staff[7] and there is an absence of research about how service change impacts training[8]. However, data from General Medical Council (GMC) enhanced monitoring[9] reports and other intelligence suggests that service change can influence the quality of postgraduate training.

The purpose of this research was to gain a deeper understanding about the impacts of service change on doctors' training: to understand if specific types of service change pose a risk to the training experience; but also to gain insights into the contextual influences that undermine or enhance the education of doctors during service change.

Aim

The aim was to provide an in-depth qualitative understanding of the impact of service change on doctors' training, identifying the factors that pose risks to postgraduate training and how these might be mitigated.

Research questions

1. Is doctors' training being adequately considered within service change?
2. What are the issues that arise during service change in relation to doctors' training?
3. What impact and risks can service change have on doctors' training?

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[1] https://www.england.nhs.uk/wp-content/uploads/2018/03/planning-assuring-delivering-service-change-v6-1.pdf

[2] https://www.kingsfund.org.uk/publications/reconfiguration-clinical-services

[3] http://www.hse.gov.uk/contact/faqs/workingtimedirective.htm

[4] https://www.england.nhs.uk/publication/nhs-five-year-forward-view/

[5] https://www.england.nhs.uk/five-year-forward-view/next-steps-on-the-nhs-five-year-forward-view/

[6] https://www.england.nhs.uk/wp-content/uploads/2015/12/planning-guid-16-17-20-21.pdf

[7] https://www.journalslibrary.nihr.ac.uk/programmes/hsdr/12500159/#/

[8] https://www.kingsfund.org.uk/publications/reconfiguration-clinical-services

[9] https://www.gmc-uk.org/education/how-we-quality-assure/postgraduate-bodies/enhanced-monitoring

4. What types of service change pose the most risk to doctors' training?
5. How can the GMC pinpoint when/where this is happening?
6. What is best practice when implementing service change in order to protect doctors' training?

Overview of the report

This report details findings from our in-depth qualitative research on the impact of service change in the NHS on doctors' training.

The report briefly describes our two-phase methodology. In phase 1, we interviewed experts in implementing service change (those with a more strategic view of the process) regarding their experience and understanding of service reconfiguration. In phase 2, we adopted a case study methodology, purposefully sampling three Trusts/Health Boards undergoing service change, undertaking interviews with site leadership, and interviews and focus groups with clinical and educational supervisors and trainees. Phase 2 aimed to develop a nuanced understanding of the actual impact of service change by those who had previously been, or were currently, living through it. We used a theoretical framework from the field of workplace learning that explores the impact of organisational influences on education and training: the expansive - restrictive continuum[10].

The results section presents the qualitative analysis of both phases together to unite the strategic and lived experience under five common themes: service change; implementing change; the impacts of service change on doctors' training; organisation recognitions of trainees as learners and identifying and mitigating risks. Throughout the analysis there is a high degree of alignment between phase 1 and phase 2 participants regarding these themes but phase 2 participants provided in-depth exposition of real-world impacts.

The final chapter returns to address the research questions to consider if training is adequately considered, what the issues, impacts and risks are, how risks can be identified and what best practice is during times of change.

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[10] Fuller A. and Unwin, L. (2004) Expansive Learning Environments: Integrating Organisational and Personal Development, in H. Rainbird, A. Fuller and A. Munro (eds) Workplace Learning in Context, London: Routledge pp. 126-144

Methodology

Phase 1: Expert interviews

The aim of the phase 1 interviews was to explore healthcare experts' views on service change and the impact on doctors' training.

We developed a stratified sample of experts with knowledge of service change. These included individuals with a range of stakeholder perspectives working at national, regional, or local level, with wide-ranging expertise in health service implementation, education (through College and Deanery/Health Education England roles), clinical quality assurance, national trainee representation, and academia (see Appendix A).

We invited participation by emailing publicly available email addresses. We conducted one-to-one interviews (see Appendix B for the interview guide), by telephone or face-to-face (Sept-Nov 2019). Experts were also asked to suggest potential case study sites for Phase 2.

Phase 2: In depth qualitative case studies

Sampling and identification of case study sites

The aim of the case study approach was to examine the perspectives of Trust/Health board leadership, supervisors, and trainees about the effects of service change on doctors' training in the context of different types of service change across the UK. Case study methodology allows us to "scrutinize the particularities… and their distinctiveness"[11] whilst retaining the "holistic and meaningful characteristics of real-life events"[12] studied in context.

Case studies are the overall unit of our analysis. Case studies can be a collection of hospitals (sites) governed by one Trust/Health Board or may include more than one Trust/Health Board (as is the case for regional reconfigurations). To identify appropriate case studies, we used information from Phase 1 and combined this with desk-based research, analysing qualitative and quantitative data from publicly available information regarding Trusts/Health Boards undergoing service change, including policy documents, board reports, professional literature, and media reports.

Having identified potential sites through this process, we examined indicators that would provide an in-depth contextual understanding of each of the sites to create a longlist of potential case studies. We drew on quantitative data, including evidence of the organisational culture, through examining data on staff bullying (NHS staff survey, or equivalents) and staff turnover (NHS Improvement data, or equivalents). As an estimate of organisations' clinical performance, we examined care quality data (Care Quality Commission, Care Inspectorate Wales, Health Improvement Scotland, Regulation and Quality Improvement Authority) and data on the organisations' financial status. Additionally, we examined workload estimates (GMC National Training Survey (NTS)[13]). We ensured that the organisations being considered included enough trainees to make the focus group research feasible and took into account GMC enhanced monitoring data. The secondary data sources included written

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[11] Mason, J. (2018) Qualitative Researching (3rd edition), London: Sage p. 209

[12] Yin, R.K. (1989) Case Study Research: Design and Methods, London: Sage p. 14

[13] https://www.gmc-uk.org/education/how-we-quality-assure/national-training-surveys

reports to identify the type of service change. We developed a longlist of 15 potential case studies, which included 36 NHS sites. We ensured a wide geographical spread, including representation from all UK countries.

We identified three main types of **planned service change**: 1) mergers of local hospitals; 2) reconfiguration at a regional level, with medical services being reorganised on a wider scale (for example regional configuration of trauma and cancer care networks); and 3) the acute hospital reconfiguration (AHR) to 'hot' and 'cold' sites. 'Hot' and 'cold' reconfiguration is the conversion of sites into either non-acute sites, providing, for example rehabilitation and outpatient services or to 'hot' sites, which cover all acute medical and surgical admissions.

In developing a shortlist of six case studies (Appendix B: Phase 1 Interview schedule

), we purposefully sampled for these three types of service change. We included sites actively going through reconfiguration as well as those who had recently undergone change. Four case study sites were approached and three agreed to participate.

Due to the Covid-19 pandemic, phase 2 data collection was paused March-August 2020. At the point of ceasing the study we had performed all the case study Trust/Health Board interviews (N=6) and seven interviews with supervisors and trainees. Covid-19 had a significant and unanticipated impact on service delivery, and this event provided an opportunity to include the impact of **unplanned service change** on doctors' training**.** The three original case studies agreed to continue to take part in the research and this permitted the ongoing exploration of planned service change, as well as, examining the effects of unplanned change caused by the first wave of the pandemic on doctors' training.

Data collection

One-to-one interviews were conducted with seven Trust/Health Board leaders across the three case studies. During these interviews we sought permission to conduct interviews and focus groups with trainees and supervisors, and participants facilitated contact with key leads within the Trust/Health Board. Trust/Health Board clinical and educational leads facilitated recruitment of trainees and supervisors (see Appendix D for participants). When data collection resumed in September 2020 following the Covid-19 pause, we re-interviewed leaders from each case study to explore how the unplanned service change had impacted on service change and explore any ramifications on planned service change.

When data collection resumed after the Covid-19 pause, all interviews and focus groups were conducted online, using video-conferencing platforms such as Microsoft Teams and StarLeaf (see Appendix E for interview guide).

Data analysis

All interview and focus group data were audio recorded, transcribed verbatim and redacted to remove identifying information. We used QSR NVivo 12© software to facilitate the qualitative analysis.

In phase 1, an inductive approach was initially used to identify emergent themes, followed by in-depth deductive analysis using a thematic analysis.

For phase 2 we used a coding framework devised from our conceptual model, the expansive - restrictive continuum of workplace-based learning[10].

Conceptual model: the expansive - restrictive continuum

We used a conceptual framework derived from the field of workplace learning to explore the actual impact of service change on doctors' training in phase 2. The expansive - restrictive continuum[10] was developed from a contemporary understanding of apprenticeship learning and has been used to examine how organisations support or undermine training opportunities for employees. The framework describes organisation attributes that enhance (expansive) and undermine (restrictive) learning and it has been previously applied in the context of the NHS[10]. The application of this framework in both interview guides and data analysis allowed researchers to understand the ways in which organisations promote, as well as impoverish training environments and, for example, explores the access to educational opportunities, organisational recognition of training, supervision, and Trust/Health Board culture[7].

Research governance

We designed the study materials, including invitation emails, the participant information sheet, and the consent form, with input from the GMC. All participants provided written consent via the secure online platform REDCap.

The study was registered with UCL's Data Protection Office (registration number Z6364106/2019/08/120) and approved by UCL Ethics Committee (project number 15745/003).

Results

Participants

A total of 95 participants took part in the study. In phase 1, 15 experts in service change from across the UK provided a strategic overview of the practices and processes involved in implementing service change (Appendix A. In phase 2, 80 participants from three case studies, covering eight NHS hospital sites engaged with the research (Appendix D). There was representation from Trust/Health Board leaders, supervisors and trainees, including doctors from 18 clinical specialities.

Analysis

Five main themes arose from the data analysis: 1) service change definitions, drivers, types and challenges; 2) implementing service change; 3) the impact of service change on doctors' training; 4) organisational culture underlying service change; and 5) identifying and mitigating risks from service change. Each of these will be addressed in turn. Participant identifiers for quotations denote the differing perspectives, the prefix E representing experts from phase 1 and the prefixes L, S and T identifying Trust/Health Board leaders, supervisors, and trainees from phase 2 respectively. It should be noted that because the study explored both the strategic (phase 1) and lived experience (phase 2) not all voices are equally represented amongst the themes.

Theme 1: Service change: definitions, drivers, types, and challenges

This theme covers the definitions of service change, its drivers, the types of service change investigated in this research, the challenges that are commonly encountered during reconfiguring services and implications for postgraduate curricula.

1.i. Definitions of service change

Experts defined service change in a range of ways. For some, the definition of change related to a holistic notion of healthcare reorganisation across all relevant systems, like for example integrated care pathways. Whilst others prioritised the redesign of frontline clinical care. Examples also included local and specific changes, for example the introduction of electronic patient records. However, there was a general sense that service change was regarded as a large-scale reorganisation:

> *…well by 'service change' I mean changes to the structures, the incentives, the operational way in which the Health Service does its business*

> E10

Large-scale structural changes included the redesign of secondary care, typically to produce a centralised specialist centre complemented with smaller ancillary sites, and reconfiguration to provide regional patient pathways. Experts noted that whole system redesign required a strategic overview as well as aligning processes, working with partners across a range of stakeholder organisations, including the community, social services, primary care, ambulance services, the Department of Education, Health Education England, and local government.

1.ii. Drivers of service change

Figure 1 illustrates the six main drivers of service change and these were identified by the experts interviewed pre-pandemic. Whilst all were important in driving forward change workforce, finances, and variability in patient outcomes were regarded as the main reasons for reconfiguring.

Figure 1: Drivers of service change

Workforce: Recruitment and retention of healthcare staff were reported as significant drivers of NHS reconfiguration, with some medical specialities and geographical regions facing particular challenges. The shifts in work patterns and roles (e.g. from consultant-led to consultant-delivered care), also contributed to workforce issues.

Advances in healthcare: Developments in medical and surgical treatments were identified as triggering change, with telemedicine, personalised medicine, and artificial intelligence cited as more recent innovations, prompting new models of service delivery.

Quality of care: The pressure to improve patient outcome measures as well as eliminate unwanted variation precipitated service change and this could be achieved by centralisation of services; with large specialist centres focusing on discrete aspects of care, for example, the development of trauma centres. Having the right resources in the right place and 'getting it right first time' were also reported to reduce the financial and psychosocial costs resulting from medical complications, as well as driving up overall standards of care.

Brink of collapse: For several experts, there was a sense that the NHS was under so much strain it could not go on in its current model, and therefore there was no option but for an urgent restructure. Experts noted that this had already led to the creation of a range of new structures with the aim of reimagining the future of the NHS (e.g. Clinical Commissioning Groups, Integrated Care Systems, and Sustainability and Transformation Partnerships).

Financial: Increasing costs were noted as an inevitable consequence of contemporary medical practice, caused in part by innovation in treatments. This prompted the need to improve efficiency by avoiding duplication through developing integrated care systems and streamlining and aligning services (e.g. by massifying specialist services). Experts noted the exigency of achieving better value for money caused by the changes in funding streams (e.g. through the purchaser/provider split and commissioning of services). The expectation that service change is cost neutral was reported to be

misguided. The implementation of service change, aside from the consultation phase, is itself a costly process. There was a sense that greater financial support was critical across the whole cycle of implementation, but this was not factored in. The financial issues were compounded by underestimating any costs associated with dealing with unintended consequences of service change, and costs associated with training.

Societal expectations: Experts acknowledged that the NHS must respond to changes in patients' needs and expectations. Such as the necessity to provide patient-centred care and co-produce healthcare systems, the decline in patient satisfaction caused by not meeting targets, and the desire for care closer to home (e.g. through primary and community services).

1.iii. Types of service change

This research identified four important types of service change prevalent in the NHS: acute hospital reconfiguration (AHR) into 'hot' and 'cold' sites, mergers, regional reconfigurations, and unplanned service change (Figure 2
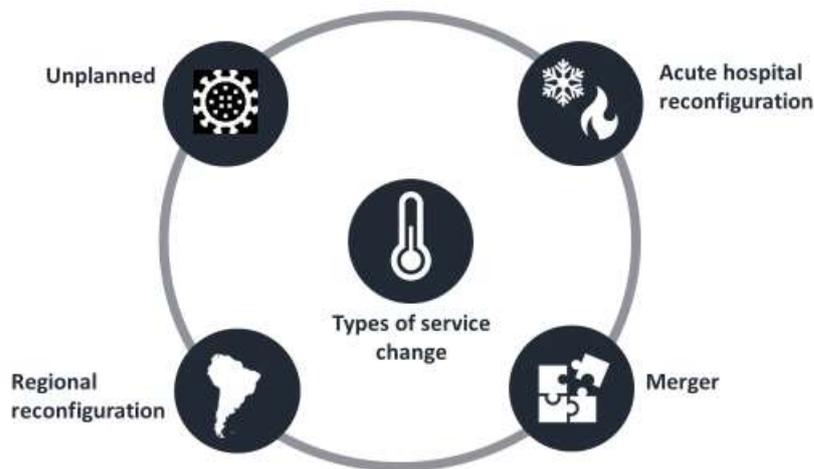
). The Covid-19 pandemic was the sole cause of unplanned service change researched. This subtheme describes the contextual factors and structural features at the three case studies.
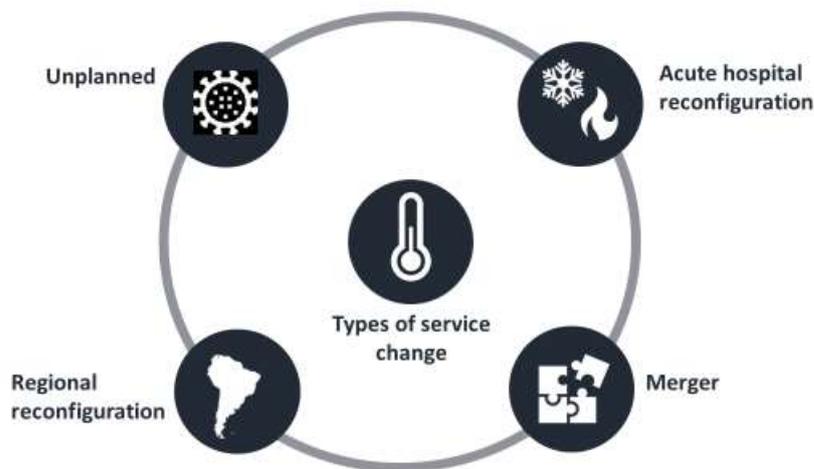
Figure 2: Types of service change

Planned service change – regional reconfiguration (case study A)

This case study covers a large region in country 2 which is undergoing transformational change, focusing on developing integrated care services by moving services from hospital to the community and integrating healthcare with social care. Centralisation and the creation of specialised centres aimed to standardise and improve patient outcomes. A tiered approach to reorganisation across the region started with integrating services and orientating them to community-based care. This was described as a major challenge requiring a new business model.

Within this regional reconfiguration, three sites (referred to as turquoise, olive and violet sites) have been identified as likely to be particularly affected by service change.

Significant change had already taken place with the Trusts/Health Boards over a decade ago, merging sites and centralising services. In some units this was described positively, as it had reinvigorated services, and supported both clinical and educational delivery. However, not all units had amalgamated positively, and despite the longstanding nature of this regional merger, some units were still establishing ways of working. The regional reconfiguration of major services was ongoing during the time of the study.

Planned service change – merging hospitals (case study B)

Case study B, based in country 1, was a merger of three geographically located district general hospitals (referred to as pink, black and red sites) into one large Trust/Health Board. The reconfiguration included the consolidation of speciality units onto specific sites, and specialised procedures becoming site-specific, aiming to standardise clinical outcomes. However, the merger was preceded by service changes at departmental level over several years. The reconfiguration involved significant consultation with a range of external stakeholder groups, considerable bureaucracy, and constant review by external healthcare organisations. The aim was to move from a management-led to a clinical-led organisation. One of the tasks was to upskill clinicians in this role, supporting them to take on strategic and operational leadership roles. Reconfiguration also aimed to increase training opportunities and

reduce staff turnover. There was a clear vision that, through reorganising services and specialisation, the newly reconfigured Trust/Health Board could provide an attractive training and post-training work environment which would lead to a sustainable workforce at its sites.

Planned service change – acute hospital reconfiguration into 'hot' and 'cold' sites (case study C)

Case study C, in country 1, was a retrospective reconfiguration to establish 'hot' and 'cold' sites (lime and purple, however, as trainees rotated across both sites it was not possible to attribute them to just one site as was case A and B). Acute services, such as medical admissions and the emergency department, were centralised on one site, with the cold site focusing on non-acute services, such as outpatients and routine inpatient care. Centralisation was aimed at improving patient care and tackling workforce issues. Some departments had been reconfigured previously but the switch from working as district general hospitals into the new Trust/Health Board happened overnight. Trainees rotated across 'hot' and 'cold' sites during their training; the aim was that 'cold' sites provided trainees with an opportunity for personal study, while enhanced clinical variety, working in specialised teams, and improved supervision would be a feature of 'hot' sites.

The (re)distribution of clinical services and access points for patients requiring admission presented challenges. Patients could attend the 'wrong' site or deteriorate and require a site transfer:

> *…and real life isn't hot cold, black white is it? It's every shade of grey.*

> TINT1C

Some specialities could be more predictably 'cold' than others. Leaders reported that an unintended consequence was increased intensity and workload at the 'hot' site, which also derailed planned and routine procedures. The reconfiguration also exacerbated existing rota gaps and despite the financial impact, senior leads increased staffing by recruiting a range of allied health professionals to support training.

Unplanned service change – the Covid-19 pandemic (all three case studies)

All case study sites were significantly impacted by the first wave of the Covid-19 pandemic in 2020. Rapid change necessitated "in that kind of scenario, you are basically telling people what to do" (L1B). Critically ill patients led to the expansion of intensive care facilities and new models of care developed. Online or alternative ways of practice (for example, providing clinical assessments in a car park) were developed as routine outpatient care was severely impacted. Elective care was delayed or transferred to other sites, such as private facilities. Hospital sites and areas were categorised as to whether they were Covid-19 secure or not, and staff movement was limited between these areas. Working from home increased but there were challenges, for example finding appropriate work to do and practical issues around information technology (IT) support. Personal protective equipment (PPE) made work difficult and staff wellbeing became more of a focus, and active wellbeing interventions occurred across the Trusts/Health Boards. There was an increase in staff shortages, due to increased sickness, and shielding and self-isolation to prevent the virus' spread. Rotas changed and senior staff were redeployed to the frontline and upskilled. Case studies had varying approaches to redeploying trainees but mostly it was mandatory.

Case study A reported that the impact of Covid-19 had been so overwhelming that they would have to remind themselves of the planned reconfiguration. At Case study B the merger went ahead, but some

of the specific clinical pathway reconfigurations were delayed. Case study C had already reconfigured, but Covid-19 had added to the 'hotness' of their 'cold' site. Unplanned service change caused by the pandemic caused massive workforce wide transformation of service delivery. The specific differences between unplanned and planned service change as it impacts on training will be addressed further on in the report.

1.iv. Challenges of service change

Seven key challenges were associated with service change.

Clinical issues: the clinical challenges arising from service change that participants highlighted included organising acute bed space, patient pathways, the logistics of moving patients between sites, as well as reorganising the medical workforce according to skills required to deliver patient care. It was reported that consultant and nursing staff bore the brunt of service reconfiguration rather than trainees, who were reported as "a bit more immune to all this" (SINT3C) as they were not involved in the change process. The wider workforce could find their job changed, with subsequent needs for increased training, as well as concerns regarding skills atrophy when they were placed into new roles not requiring existing skills.

Managerial responsibilities: Service change caused additional work for medical staff, including developing operational plans and attending planning meetings resulting in less time for training. A lack of strong leadership from the Trust/Health Board and turnover in managerial staff was reported to undermine effective change management.

Effecting change: Implementation of service change is a complex process involving multiple activities. Three key ingredients were noted for successful implementation: good datasets, clinical leadership, and communication using data (particularly comparative data). Comparative data (particularly differing healthcare outcomes across countries, regions, and Trusts/Health Boards) catalysed action and monitoring trends in healthcare data motivated the clinical workforce and enabled 'consultant buy-in'. Conversely, lack of baseline measurements or any robust evaluation made an evidence-based approach demonstrating the effectiveness of reconfiguration challenging. Whilst healthcare practitioners could understand how change *might* benefit practice, they were hesitant to implement change without hard data supporting claims of success. Clinicians were reported as being sceptical about the benefits of reconfigurations and there was a strong sense that research and better dissemination would aid smoother implementation.

Infrastructure challenges: Changes to support structures like human resources, prescribing, and information technology (IT) systems (merging systems/changing emails) left staff unclear about who to contact and how to access NHS systems. "Severe financial constraint" (SINT1AOLIVE) namely a lack of resources allocated to cover the costs of service change, was a concern, and insufficient office, teaching, and parking spaces.

Unintended consequences: There was a clear sense that service change had effects that had not been envisioned. One expert talked about a case where service change prioritised the development of acute services, but this took doctors away from outpatients, resulting in longer waiting times and less income. To mitigate this, a specialist nurse service was introduced, however, this also had its own negative financial impacts, as well as creating a new model of service delivery. Other unanticipated problems described by experts included changes in role, the nature of work, workload, relationships

with colleagues, and the quality of the educational experience. Piloting before wide scale implementation was suggested as a way forward.

Travel and transportation: Reconfiguration increased movement of clinical staff between hospital sites, necessitating additional time to commute. Service change also impacted on the day-to-day lives of healthcare workers. For example, being expected to commute to a different site could impact on the length of doctors' working day and their ability to perform tasks like the school run.

Awareness of service change: in many instances supervisors and trainees had low levels of awareness regarding planned service change. For mergers and regional reconfigurations the impact of service change was speciality specific, supervisors noting that's they "didn't notice any particular major effect" (SFG1ATURQUOISE) as a result of service change and "for [SPECIALTY], apart from some discussions at managerial level… it hasn't quite percolated down (SFG2BPINK). Trainees noted they had nothing to compare any change with and because they were "a bit more protected" TINT1BPINK. However, unplanned service change caused by the pandemic resulted in widespread awareness of service change, thus allowing trainees to contribute in greater depth about the experience of service change on training.

1.v. Curricula implications

This theme identifies the curricula implications associated with service change. Important developmental areas included better preparation of junior doctors to work in integrated systems, to understand healthcare systems, and develop clinical leadership skills. These were considered important because of the evolving nature of healthcare systems and upskilling trainees enabled engagement in service change:

> *…the trainees of now and of the future, they are genuinely going to be working across systems and populations in a way that you know we are not currently doing. And so for me there is something about you know how the training of today prepares those colleagues for the challenge of tomorrow.*

> E15

However, it was noted that current medical curricula are insufficiently addressing such challenges, and it was postulated by experts that senior NHS leaders may underappreciate the importance of educating doctors about these issues.

> *Our training isn't dedicated to teaching us how systems work. Little to no time is actually spent preparing people for the realities of actually running the service rather than just delivering care in it.*

> E4

Experts and leaders highlighted the importance of recognising that service change, driven by advancements in healthcare, can result in outdated curricula. As such, service change can present an important opportunity to review and update curricula, increasing its relevance and taking account of the future skills and capabilities that doctors will need as they work in systems that are rapidly evolving:

> *The panoply of things that you can do in postgraduate medical education has massively expanded …there are now tangible foci within the organisational construct of health*

and social care where you can go… which would enable you to place postgraduate medical education in a very exciting and much, much broader space… it is absolutely a point for reflection… for the GMC and the medical schools [council] to think again about how they approach medical education and training and using the new integrated health and care agenda to improve what's currently available.

E12

Theme 2: Implementing service change

This theme illustrates five key processes in the implementation of service change: 'top-down' approaches to service change (where change is imposed by those at the top of the organisation, excluding front line workers from the decision making process); 'bottom-up' approaches to change (where change is led by front line workers); the importance of leadership; communication and change, and the impact of the pace of implementation of change.

2.i. 'Top-down' approaches

At the level of macro-politics, many experts described the raft of policies and strategy documents from government and NHS bodies about reforming healthcare delivery. The political imperative to centralise specialist services is currently a major factor influencing service change. The notion that the NHS was a "political football" (E9) was posited as problematic, as effective change requires collaboration and consistency. Inconsistency in policy and practice occurred through local enactment at Trusts/Health Boards whose "prime aim as a business is to make the books balance and to provide a safe care for the patients that they're looking after" (E1). Change was omnipresent within the health service and governed by macro-level and meso-level politics. Experts noted that training was not thought to be a key consideration when service change was being planned or taking place:

> *I can't remember a single occasion when somebody has really talked in any depth about how they're going to improve the quality of training for doctors as a consequence of the reconfigured service.*

> E5

> *I've been guilty of this… is when you make service changes is not thinking right at the start what the potential impact on training [is].*

> E12

Experts noted the 'top-down' nature of the implementation of service change. It was regarded to be difficult to influence change at government, regional, or local level. Some experts described their attempts to ensure that doctors' training needs were considered as falling on deaf ears:

> *That there's been a failure I think of policymakers or indeed management on the ground to engage clinicians… to involve the frontline, but especially doctors, in understanding what those changes are and what the implications would be, and to involve them in helping to shape the way that the service is run.*

> E8

> *I tried to explain what I felt was going to be the best way forward, both for patients and also for training purposes. The [Trust/Health Board] claimed that they listened, but they continued to follow their own agenda.*

> E14

A national representative reports trainees' input was blocked at macro, meso and micro-levels, leading to feelings of alienation:

The impenetrability, certainly at a local and regional level, if not a national one, makes it hard to actually influence change… in terms of how you're going to involve trainees in that systemic change, how at a regional level trainees can be involved in the commissioning process, there simply isn't the time made in people's lives to do that.

E4

Supervisors also commented that "these big reconfigurations in my experience are almost planned centrally or regionally" (SINT1C) and as a result top down approaches were perpetuated. Supervisors also expressed a feeling of being powerless in this process: "I sort of feel a bit forced to just get on with supervising, listening to trainees, but not think that I can necessarily make a huge difference [to improve training]" (SINT3C). Thus, despite recognising the effort that departments and "individuals who really care about training" (SINT3AVIOLET) make, both trainees and supervisors felt limited in their scope to influence, preserve, and promote training.

2.ii. 'Bottom-up' approaches

Experts noted that service change led by 'bottom-up' or 'top-down' approaches tended to have different outcomes for doctors' training. Improvement in training came from 'bottom-up' approaches where training was prioritised, and trainees were actively given a voice. Service change that took account of training led to better training experiences and better service provision:

It has been a bottom-up driven change… the change was being made for the purposes of improving service and at the same time considering training opportunities as a part of that service. Whereas whenever the change comes from the hierarchy within the organisation, they only focus… on the financial element, and very specific client interface. They do not take account of training requirements whenever they do that – it comes right down at the bottom of the list of things to be considered – and frequently falls off the list completely.

E14

I don't think we give the trainees as a group enough of a voice in this. The trainees themselves had been given and taken the responsibility for organising rotas... what that meant was that the holes that we know exist in many of the training rotas at the minute were no longer there, they stopped using locums, they were able to better organise themselves.

E15

At Site C (the AHR) trainees took part in designing rotas, redesigning handovers and "creative things like SOPs [standard operating procedures] for escalation, SOPs for support, things like that" (SINT2C). In contrast to the widely perceived hierarchical and restrictive approach in planned service change, both trainees and supervisors considered that, during unplanned change, advancements to training and to service seemed increasingly possible: "we can be a bit more imaginative about how training can be undertaken" (SINT1C). Trainees were motivated to involve themselves, and take ownership of, new ways of organising both service and training. Supervisors noted that "most of the best initiatives were trainee-led, so it gave the trainees a lot of ownership of the initiatives" (SINT1C). This bottom-up approach to service not only resulted in effective initiatives, but also provided the trainees opportunities to develop leadership skills:

…it was the trainees saying: "I'm ready to beat this. Can I ask you about this?" or "this was raised as a problem, here's our potential solution" or "this thing worked really well, and I just wanted to share that" […] it was a really positive thing for them.

<div align="right">SINT3AVIOLET</div>

Supervisors noted by engaging trainees in service change to see "when education and service are working together" would enable trainees to understand the complexity in service reconfiguration and its close relationship with training.

2.iii. Leadership

Good leaders effectively used organisational hierarchies and collaborated with relevant stakeholders and these were regarded as essential prerequisites for successful outcomes of service change. Conversely, poor outcomes were seen to result from ineffective leadership, a lack of awareness of systems and healthcare priorities, a failure to engage other health professional groups, and a lack of respect between clinicians and managers.

Leadership mindful of training could lead to service change positively impacting on doctors' training as well as service provision:

They were in a position whereby they were the most financially challenged Trust [for] years in the NHS… And what they decided to do was to invest in training, so they built some new facilities for the trainees and they really invested in it, and they invested in physician associates to help support them, and now it's one of the most popular places to work and it's probably one of the most financially secure… as well.

<div align="right">E1</div>

However, a lack of clinical leadership was noted, and Trust/Health Board leaders noted that consultants were not always affected by service change, resulting in nonengagement. This coupled with a lack of expertise in clinical leadership made service change difficult to implement.

Leadership and management education opportunities are available to trainees and were reported as invaluable, but these opportunities were the exception rather than the rule:

It's not something that is readily mentioned, it's something that I would have to bring up […] never is there something that you have to tick a box for leadership or management. Which I think is a real shame {…} I think there's a real gap in the market if you like for additional qualifications for medical trainees […] because we know the clinical side of things and we need to know a bit about this kind of thing to bridge that gap.

<div align="right">TINT1BPINK</div>

2.iv. Communication and change

2.iv.a. Communication

Leaders acknowledged missed opportunities communicating with trainees about service change, recognising that communication was not always effective because they did not "understand enough

about the feelings of junior doctors about the working environment or the organisation" (L2B). Communication with supervisors could also be problematic, leaving them "in the dark" (SFG1B(MIX)). There was simultaneous information overload and poor targeting of information regarding the implementation of service change, leading to difficulty in keeping up with communication about service changes.

The pervasive culture of a top-down approach to devising service change was reflected in the top-down nature of communication. The implicit assumption that both knowledge of, and agency in, service change was the 'territory' of senior career grades was evident across all groups:

> *Juniors are never really involved… it's always a top down sort of approach. From my understanding it's only when you get to a senior registrar [or] consultant level within medicine that you probably are more fully aware of the managerial side of things that the main people are involved.*

> TINT1BPINK

In all types of service change, there was a lack of communication about how service change would affect doctors' training:

> *There has not been any communication about anything that changed in how trainees are going to be posted or where services are going to be concentrated, or how services are going to be redefined, with inpatient beds – be it [specialty] or units.*

> SFG2BPINK

> *We just keep on receiving changes that are happening, but no one really asked us if this new change that we've done helped us or is it making things more complicated.*

> TFYFG1C(MIX)

Communication was focused on the service change itself, rather than its impact on training. Supervisors reported that this lack of information caused "uncertainty" and "bred dissatisfaction" (SFG1B(MIX)) and their consequent inability to provide reassurance to trainees. Trainees' perceptions were of disorganisation and a lack of clarity regarding how patient pathways and care had altered in both planned and unplanned service change. The need for systems that embedded regular, appropriately targeted information exchange with trainees was highlighted. There was a sense from both supervisors and trainees that communication is supportive even in the absence of clarity about the way forward. Communication was seen as serving multiple functions simultaneously: sharing information, fostering supportive working relationships, and engendering a sense of ownership and involvement, leading to the trainees feeling valued and supported "and you're willing to get involved in more than just your day job if you're valued"(TINT1BPINK):

> *Yeah, so I think the things that have helped are very close communication with the trainees… they need to be part of the process, need to feel as if they're involved.*

> SINT1C

2.iv.b. Consultation

There was also a lack of consultation at any level about the educational impact of service change:

> *It was just a case of being presented with 'Well this is the new service that your trainees are going to have to participate in' – rotas were drawn up without any involvement not only of the educational supervisors, but no involvement of the individual specialities.*

> SINT3C

Consultation had profound benefits beyond the practical, in that it fostered a sense of being valued, which motivated personal investment. Irrespective of the type of service change, two-way communication led to identifying and addressing the unintended adverse consequences of change on services, and in mitigating the effects of service change on doctors' training. Supervisors felt that decisions were often taken by those who did not know the service well enough, nor how training needs feature within service redesign, and therefore unintended consequences with considerable impact on junior doctors could not be prevented. Additionally, supervisors reported decisions being taken by those who *believed* they had taken training into account, but the lack of consultation was damaging, as departments had not been afforded the respect of being consulted:

> *It's caused a huge amount of damage in that department because they felt as though decisions were made without them as very important stakeholders, you know they weren't consulted, and that they have to carry on regardless… and not to take that personally has been incredibly difficult, and there's a lot of damage to be mended there.*

> SFG1B(MIX)

The contradiction between the failure to consult trainees and their future role as senior decision-makers highlighted missed opportunities for developing the skills of the future workforce:

> *We need to involve trainees in the processes of change, because they are going to find themselves at some point in the future with some similar catastrophe to deal with. And the experience of actually being in the places of decision making is something that should be recognised as useful.*

> SFG1ATURQUOISE

2.vi. Speed of change

Service change that has a drawn-out planning stage was reported to 'hang over' services, affecting morale, recruitment, and investment in care. However, service change required thought, and imagining a fundamental redesign of services whilst struggling to provide a service was noted by experts to be a real challenge. Although the planning required for the change had often been substantial, the actual change could happen overnight or incrementally over months. Opinions differed as to how long it took for things to settle down. From one supervisor's perspective, it seemed that after a period of "ironing out patient pathways" (SINT1NCS) things settled down relatively quickly. From a trainee perspective, embedding change took longer:

So people continuing to do things in the old way, because although the mechanics of change had happened, people's understanding hadn't quite caught up yet.

<div align="right">TINT1C</div>

Unanticipated consequences of change could emerge over time, which took longer when aspects of services were used less frequently. Change which was both rapid and unplanned, as occurred during the Covid-19 pandemic, arguably presented the greatest challenge: "the Covid changes were happening so quickly, that nobody quite had a handle on what was happening" (SFG1ATURQUOISE). Change that was more incremental, such as where several Trusts merged over a period of years, had less of a negative impact. The slower speed of change allowed time for people to adjust and provided opportunities to deal with any unintended consequences of change.

Theme 3: The impact of service change on doctors' training

Data analysis revealed six ways in which service change impacted on doctors' training: access to educational opportunities; supervision; the trainee experience; wellbeing; workforce; and workload (see Figure 2).
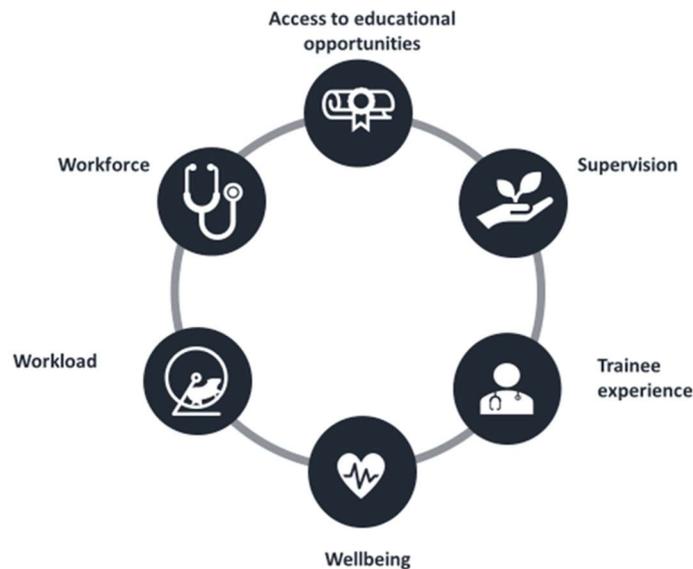

Figure 2: Impact of service change on doctors' training

3.i. Access to educational opportunities

This section focuses on how, service change impacts on training, including the access to formal education, learning through direct clinical engagement at work and study leave.

3.i.a. Formal workplace educational opportunities

Trainees reported that planned service change could lead to enhanced opportunities to take on leadership roles and engage in quality improvement activities. Formal educational activities for supervisors were better attended, as service change resulted in the centralisation of consultant staff where courses were delivered. A barrier to participation was workload (see section 3.v Workload).

Pandemic related service change had a fundamental impact on formal education. Initially, scheduled teaching was cancelled and e-learning programmes were developed. Online learning was regarded to have many advantages, being more flexible and reducing the need to travel. However, protected time for attendance decreased as trainees still held bleeps. Some trainees felt that online events barred them from networking with colleagues. The downside of catching up with online training was the invasion into private time.

One of the most critical factors during unplanned service change was the impact on assessments. The number and type of workplace-based assessments remained the same for most trainees but, with consultants under increased pressure, trainees encountered difficulties gaining sign off which impacted on Annual Review of Competency Progression (ARCP) as a result. Many formal exams were

cancelled or postponed adding to the challenge. Trainees were concerned that they may not be able to achieve the required ARCP outcome thus preventing them from applying for specialty training, progressing, or completing their certificate of completed training (CCT). Trainees mentioned that "how we are going to be judged has not adapted, but the expectation remains the same, even though the opportunities have been reduced" (TFG2BBLACK). For example, a trainee reported:

> I'm really struggling to get signed off in preparation to go into the ST6 year, because
> […] we're doing very few elective non-emergency procedures […] so that will potentially
> have an adverse effect on progression.

> TFG1C

College exams, for example OSCEs using patients, were problematic in the context of the pandemic and alternatives such as the use of simulated patients raised questions about their validity. Trainees perceptions were of a lack of clarity amongst the colleges about how to proceed in these circumstances. The overall impact on trainees of delays in achieving the requirements for ARCP led not only to concerns over career progression, but their ability to plan personally and financially:

> I've become a bit more worried about my training and progression within my training,
> I'm more worried about exams and more worried about how I'll progress in the next
> job well, if I'll get a job - if I don't what do I do.

> TINT2BPINK

3.i.b. Learning at or through work

There were positive and negative impacts on learning in workplace contexts caused by all forms of service change and these impacts varied by site, grade, and specialty. Positive features associated with centralising services included an increase in the variety and number of clinical cases. A busier hospital, such as a 'hot' site, attracted a breadth of medical conditions providing greater exposure for trainees. This was also the case in unplanned service change where trainees considered the pandemic a "once in a generation opportunity" (FYINT2C), allowing them to have an increased exposure to dealing with acutely unwell patients, and their consultants noted "their skills seemed to rocket up almost under that" (SFG1B(MIX)):

> This [Covid-19] allowed us to have enough time to deal with the acutely ill patients and
> provide the proper care for them. And this would impact the trainees in a positive way
> I'd say.

> TFG1BPINK

Foundation doctors agreed they experienced a very steep learning curve since the onset of Covid-19 and noted that through this increased patient contact they "were learning it at the same rate" as everyone else around them because "there's so many unknowns" (FYINT1C). Working in a specialist centre (as was the case in mergers, 'hot' and 'cold', and regional reconfigurations) led to more bespoke exposure to sub-specialities and taking part in advanced levels of clinical care. This particularly advantaged senior trainees:

> They moved several outpatient clinics over to the [site]…that worked quite well for my
> training because there were maybe only four or five patients in the clinic, [so there]

was plenty of time to discuss cases with a consultant and even have supervised practice. So, in a way, the service change helped in that regard.

<div align="right">TINT1C</div>

Positive opportunities were also encountered as a consequence of the merger, enabling trainees to participate in "really good opportunities, for example with the quality improvement stuff, being involved in setting the terms of reference – so as a trainee incredible opportunities" (TINT1NCS).

However, there were disadvantages associated with all types of service change. Experts recognised that whilst reconfigured services could result in improved patient outcomes, it could reduce trainee exposure to the variety of clinical cases they encounter and opportunities to gain a more holistic view of patient care:

…the way that service change is happening… for the best in terms of patient outcomes, you've got these… particular centres that are specialising in things - hyperacute stroke… so I think it makes it more challenging for trainees to always have the holistic view of the patient pathway.

<div align="right">E13</div>

Reconfiguration of services could also reduce opportunities for patient contact or to gain practical skills:

…if we move dermatology to a remote model… trainees will have less opportunity to look at the skin in outpatients… if consultants are coming in to do procedures all the time, then you know one of the things is from surgical trainees is 'I'm not getting enough experience', etc.

<div align="right">E12</div>

In the case of a merger when trainees were placed at a site without a particular specialism, this limited their clinical training:

In terms of the anaesthetic side, if you don't have certain surgeries occurring within your hospital, within that trust, then again you're not experiencing that at all.

<div align="right">TINT2BPINK</div>

Where service change reduced training opportunities, it resulted in difficulties in gaining competences and achieving the requirements of postgraduate curricula outcomes. Ensuring trainees had the sorts of clinical opportunities to achieve their curriculum was reported by supervisors as "our biggest challenge, access to education" (SINT2C). This was particularly the case in AHR and unplanned service change. Foundation doctors at the 'cold' site at case study C complained when they felt their training was "mundane" (SINT3C) or repetitive, and that reconfiguration had resulted in limited training opportunities in comparison to those in specialty training grades:

If you were an acutely minded person […] being busy here, that can be beneficial. Equally if you're acutely minded and doing a nightshift at [site] and nothing happens the four hours, that might be a bit frustrating, as you might feel that the potential education has been reduced.

<div align="right">TINT1C</div>

Unplanned pandemic service change meant trainees stopped rotating, which "didn't allow the trainees and especially the junior staff to be exposed to other cases" (TFG1BPINK). The shift from face-to-face to online consultations, typically led by consultant staff, meant that juniors "are losing on this experience of engaging with patients through the telephone or video consultation" (SFG1ATURQUOISE) and missed out on opportunities to develop core skills such as managing chronic conditions. Unplanned service change affected some specialities more than others. Specialties which were predominantly outpatient based, for example dermatology, were impacted more significantly by the pandemic on core and higher trainees' experiences; and cancellation of surgical procedures greatly reduced the opportunities for higher surgical trainees to gain their required competencies. However, supervisors noted that the clinical down time could, in instances, lead to better educational opportunities as there was more opportunities for tutorials and completion of logbooks.

3.i.c. Study leave

In planned service change, there were issues when managers attempted to fill rota gaps by cancelling study leave. However, in unplanned service change this was a greater issue. Trainees expressed concern about their inability to take study leave due to staffing issues and rota gaps. Even when study time was approved it was often not possible to take because of workload, and supervisors noted that cancellation of study during the pandemic caused "consternation" (SFG4BRED) amongst trainees.

3.ii. Supervision

Participants in phase 2 highlighted that planned service change negatively impacted on supervision because of the additional time supervisors needed for travel between sites and to deal with the extra workload change caused. Working across 'hot' and 'cold' sites and in the regional reconfiguration resulted in a more peripatetic senior workforce, which made it increasingly difficult to provide trainees with the agreed amount of educational supervision, schedule educational supervision meetings with trainees, and to supervise trainees on the ward:

> *It changed from having a stable kind of three consultant workforce on that ward to a more kind of on call model …and a doctor based on that ward would go from seeing three consultants regularly to loads of different consultants, who all have different styles.*

> SINT1C

The absence of supervisors, particularly at 'cold' sites, made trainees feel more vulnerable, especially when things became 'hotter'. Trainees struggled to make some decisions, and supervisors noted "they don't feel like we are there" (SINT3C). Having to depend on telephone advice and offsite support contributed to trainees' sense of uncertainty, which sometimes resulted in junior doctors inappropriately escalating problems. Experts noted that access to supervisors was crucial to ensure that trainees were supported and able to learn from clinical experiences and that service change could lead to improvements in support:

> *…if you're putting [them] in place a better system than you had before. So they're getting better supervision, better mentorship, better exposure to whatever it is – then they'll love it.*

> E2

> *…although that wasn't the sole driver behind the change, it created a much better environment for the trainees when they were on call because you had the CT [core trainee] supported by a registrar.*

<div align="right">E12</div>

Equally positive, supervisors at Site C (the 'hot and 'cold' reconfiguration) felt that the reconfiguration led to better supervision at the cold site because it "changed the way the entire staffing sort of like works…The consultant was present in the [speciality] assessment, unit which was never there before" (SFG1C). Unplanned service change also had positive gains for supervision of trainees because "since Covid they have now made an entirely separate floor consultant who is not attached to a list, and so who literally floats around troubleshooting issues" (TINT2BPINK). Supervisors also indicated there was more time for supervision:

> *I think that was the time when there was maximum supervision. Because the consultants were around. I mean there was a lot of redeployment, people were moved into the acute admitting speciality. […] so, a lot of the juniors were moved into either ITU, medicine specialities, and there were at least three to four medical consultants 24/7 in every hospital. So, I think from the supervision impact I don't think they were supervised like that ever at any time in history.*

<div align="right">SFG1B(MIX)</div>

During the pandemic technology was used innovatively allowing for supervisors and trainees to meet remotely, although it presented new learning needs for supervisors as they learnt how to supervise virtual consultations and trainees remotely.

In Site B, (the merger) supervisors described the merger as an opportunity to learn together and share best practice:

> *…we are getting together, we are doing educational and clinical supervisor courses together, so we get a vast amount of knowledge from other sites. We are changing our, so simple things, study leave budgets, what we can do with that, different ideas […] a huge amount of knowledge is being put together because now we are talking to each other and getting together*

<div align="right">SFG1B(MIX)</div>

3.iii. Trainee experience

This theme considers two main issues surrounding the impact of service change on 'trainee experience' : 1) the impact on trainees' satisfaction with training; and 2) the impact of requiring trainees and supervisors to work in new clinical environments, with new teams.

3.iii.a Trainee satisfaction

Supervisors recognised that service change could impact negatively on trainee satisfaction with training, as it could drastically change the nature of work. However, they were unclear as to whether it alone was responsible for dissatisfaction. Even when trainees' satisfaction seemed to decline after the implementation of planned service change, supervisors felt this could be caused by factors such as a rising workload. Equally, planned service change could improve trainee satisfaction. A department

at Site C (the 'hot' and 'cold' reconfiguration) had issues around a lack of support for junior doctors, identified through the GMC NTS, which was resolved as a result of a planned reconfiguration, so trainee satisfaction improved:

> So immediately once we thought about all those changes and the [speciality] team was protected, you know it came off the GMC survey because a lot of changes were introduced, just part of the issues that were raised. So in that way reconfiguration certainly helped.

SFG1C

The experience for trainees depended on their stage of training, so at the 'cold' site, where elective care predominated, Foundation doctors were dissatisfied because they felt their experience was being curtailed:

> The F2s and SHOs, they will rotate through every couple of weeks, so they get really good exposure, it's just us F1s that are just kind of permanently based there.

FYINT1C

Supervisors noted that service change could result in developments which enhanced the training experience during organisational reconfiguration. However, they also noted that trainees might not see this enhancement, before they move on to their next placement. Examples in planned service change included employing additional staff with specific educational expertise, and opportunities for trainees to engage in activities such as fellowship schemes or developing skills in leadership or quality improvement.

3.iii.b Workplace relationships

Service change also had an impact on trainees' workplace relationships. Experts were mindful that doctors had always rotated through clinical placements to gain experience. Equally, they were aware of increasing fragmentation caused by loss of the 'firm' structure, where teams of doctors consistently worked together (even though experts noted that firms were not always positive experiences) and how shift work had undermined a sense of collegiality. For junior doctors their team was reported to be the second biggest priority after a reasonable workload. However, there was a feeling that service change requiring trainees to work across Trusts/Health Boards decreased trainees' sense of belonging. Centralising services, and the consequential relocation of consultant staff could leave junior staff feeling isolated. There was an acknowledgement that service reconfiguration could be "disruptive" (E13) as trainees were expected to work in large, complex organisations, which, for example, did not have common information technology systems across sites, or required different processes of IT authentication every time. Service change was disruptive for supervisors too:

> I mean [specialty] would be the classic place where people felt completely dissatisfied and there is more animosity created between the three places than you know friendships if you want to put it that way – that was another you know unintended consequence.

SFG1B(MIX)

Service change was also associated with changing the nature of the community, with the introduction of new team members, such as physician associates. As these new members became established, it was reported that this could have a negative impact on trainees, who were more transient.

Supervisors at Site B were concerned that the merger was "going to take away a lot of … interactions or you know relationships" (SFG2BPINK) because of the need to work at different sites which would lead to less contact, awareness of, and ability to, respond to trainees' needs. Trainees too echoed this concern, and more transient relationships with staff could act as a barrier to integration:

> *…go over to other hospitals in different… within the trust that maybe an extra half an hour away from their home, it's a different department, you've got to get used to new people again, new systems, new teams etc. So I think that's caused a bit of a rift I guess.*

> TINT1BPINK

Issues of identity and perceptions of loss by senior staff who had been relocated, required additional efforts from them and their new teams in order to reach new harmonious ways of working. In some instances, this took a very significant amount of time to resolve. This was reported to lead to "discordance between departments" (TINT1BPINK). Supervisors and trainees reported that it impacted on the junior doctor experience and, in the instance of a regional reconfiguration, a supervisor notes:

> *And some of our larger rotas, they are on the move so much by the time they do nights, by the time they have some annual leave, by the time they're cross covering, and actually the training… so the nursing teams don't know their names, the trainers don't know their names… and how do we foster a team when we have that physical situation happening? There's no ill will there, people are not setting out to be mean to anybody – but there is something around that formulation that isn't particularly working, and it's something that we're all quite I think we're all quite anxious around.*

> SINT1AOLIVE

Both planned and unplanned service change could leave trainees feeling undervalued. Changes which resulted in decreasing a sense of belonging increased apathy and dissatisfaction; this disengaged trainees from investing in their workplaces.

Rotating between sites and working in newly reconfigured communities also presented advantages. For example, mergers were considered to offer the opportunity for "disparate communities" (E10) to come together to improve service provision but also provide broader networks of peer support for trainees. Working at different sites had positive benefits for trainees, seeing different ways of working and developing networks. Cross-site appointments of consultant staff were reported to mitigate against the problem of community fragmentation by providing a constant presence at all the sites involved in the reconfiguration:

> *The impact upon the trainees there from that cross pollination of consultants has enhanced their experience of training… because in units which have got that different case mix there are different opportunities for training… that cross fertilisation has strengthened the learning environment up in [region].*

> E15

Working in reconfigured teams meant effort to establish working relationships, but it also meant being "part of a much bigger group of people working to achieve the same purpose" (E10). Valuing trainees as members of the community could produce long-term benefits and perpetuation of community membership:

> *a) [they] might want to stay here for longer and b) you know they will then be able to do more – they'll get into a position of being more confident so it will be an investment.*

<div align="right">E13</div>

3.iv. Wellbeing

Reconfiguration, particularly regional, could negatively impact on trainees as they could be placed in centres outside their region, distancing them from local support networks. Reconfiguration which resulted in increasing travel and transportation had a negative impact on work-life balance affecting, for example, trainees' ability to manage parental responsibilities. Work-life balance for current cohorts of junior doctors was reported as increasingly important "because if it's not sustainable people won't continue, or they will be personally damaged, you know by that" (E3). Planned and unplanned service change caused increased levels of stress, underpinned by feelings of uncertainty and vulnerability. In planned reconfiguration, exhaustion resulted in increased numbers of junior and senior doctors on long-term sick leave:

> *During the merger, there was a sense of people feeling exhausted, people feeling quite cynical.*

<div align="right">TINT1NCS</div>

Causal factors for a decline in wellbeing included: the stress associated with the additional work of implementing service change, lessening any time for 'headspace'; clinical uncertainty caused by changes to patient pathways and new processes and technologies; a lack of managerial support; the requirement for staff to do things in different ways, or take on unfamiliar roles; and the requirement to work in organisations they weren't familiar with and the subsequent loss of a sense of belonging. Where reconfiguration reduced the numbers of senior staff, trainees felt isolated and trainee morale was reported to have declined, as noted here by a supervisor before the pandemic:

> *People are becoming a little bit isolated and, you know, not wanting to talk about how they're feeling and not wanting to talk about low morale, because they just feel that it's cycling down into a depressive pit.*

<div align="right">SINT1C</div>

High levels of stress and burnout were recognised by senior leadership even before the pandemic, who had responded by increasing the training of mental health first aiders, and increased emphasis on occupational health.

Where reconfiguration led to rota changes causing trainees to be constantly moving around, loneliness, anxiety, and burn-out ensued. Here a trainee reflects on the anxiety that the merger caused at their Trust/Health Board:

> *I think big changes like that are generally sold as positive changes from management and higher above and the slogans and catch phrases are thrown about, the anxiety was apparent about what was going to happen and what it was going to be like and what it was going to mean for people's jobs and the day to day running of things.*

<div align="right">TINT2BPINK</div>

Unplanned service change meant that work in hospitals became more stressful. This presented in a variety of ways, such as increased staff fatigue, annual leave being refused, and working relationships becoming more fractious as workforces were split into "cold"/ "hot"/"amber" sites with differing amounts of service provision. Trainees suffered an additional anxiety regarding the lack of progression of their training.

However, the collective stress felt by colleagues did lead to feelings of "solidarity" and "looking after each other" (TFG1BPINK) within departments, with supervisors still finding time to listen to trainees.

3.v. Workload

Experts highlighted the importance of workload in the creation of "happy" trainees (E1). High workload was reported to be problematic, with negative impacts on wellbeing, work life balance, patient safety, and supervision. 'Happy doctors' were reported to be more satisfied, take less sick leave, perform tasks more effectively, and make fewer mistakes. The opportunity to think more imaginatively about workload was often absent from service change:

> *I saw very little innovation around trying to sort the workforce issues through a workforce lens, rather than actually doing it as a numbers game. So generally the arguments ran we've only got six junior doctors on this site and another six on the other, and it takes 10 junior doctors to run an out-of-hours rota. So if we put the two sites together then we've got enough junior doctors to run the rota. But what that calculation fails to take account of is the workload doesn't decrease. So you may have enough doctors to spread across your 24 hours, but the workload generally doesn't lessen, and so those doctors are therefore much more stretched in the reconfigured service.*

E5

Overall, service change increases the intensity of work. Experts, leaders, and supervisors recognised the negative impact of workload and its association with trainees' ability to take up training opportunities and the demoralising impact of this pressure:

So people can cope with a relatively frequent on-call scenario if the intensity is very weak. One of the reasons that remote sites can cope with what looks like a perilous number of doctors is because actually the number of occasions when someone is called in the middle of the night is so rare. But if you are in a very intense situation then frequency matters hugely, and you need to be more infrequent to compensate for the intensity.

E5

It is the intensity and the volume of work that gets them down, because they don't feel able to leave the ward to do their outpatient work for their learning objectives.

L1C

Workload increases actually. I fail to think of a service change, that I'm aware of, in which there has been an overgenerous allocation of resource and time.

SINT1NCS

All types of reconfigurations tended to lead to increased workload for supervisors and often trainees and prevented trainees and supervisors alike from attending formal educational events; everyone being "just more stretched" (SINT3C). Even if trainees and supervisors attended educational events this could result in needing to stay late to complete their clinical work.

The reconfiguration into hot and cold sites caused an increased workload for trainees, there was less "down time" (SINT1C) for personal study for juniors at the "cold" site than had been originally intended:

It was those shifts that were meant to allow a little bit of education to happen. But those shifts have been changed into 12 hour long days to provide acute care at the [site] site, which is like I say busier than we thought it was going to be. So those opportunities have been lost unfortunately.

TINT1C

Trainees at merged sites reported that their workloads had not been affected, and if there was a change in workload it was to do with clinical demand.

Unplanned service change generated additional workload and negative effects on training:

We are expecting them all to work in environments that are really really busy, and actually overwhelming. And you know that sense of feeling a bit burnt out, now can you get good training opportunity when you're working in an environment that's just noise?

SFG1C

Trainees also spoke about the impact of increased workload on their training during this time. One trainee spoke about "missing out on the training aspects of your job even more" (TFG1C) when covering additional shifts caused by staff absences. Overall, consultant's workloads were also affected by all types of service change, as not only did they have their clinical and educational work to do, but there were additional roles and tasks involved in re-organising or services and dealing with any unintended consequences.

3.vi. Workforce

Service change was reported to be "all about workforce – workforce, workforce, workforce" (E1), with the "impact on the training experiences is rarely lifted out of a reconfiguration, although the availability of junior doctors is almost invariably lifted out as an issue", in effect service change "play [s] the numbers game" (E5). This means that service change attempts to address inadequate staffing levels, so whilst service change resulted in larger overall numbers of trainees helping to cover rotas it underestimated the increase in workload at reconfigured sites and typically fails to engage in broader innovatory thinking. Staff shortages across the entire healthcare workforce were noted, particularly affecting rural settings and certain specialities. Junior doctor attrition was another important factor in reducing staffing capacity. However, participants noted the changing nature of the healthcare workforce with other clinical roles, like physician associates, being developed in order to compensate for the declining numbers in the medical workforce. Leaders commented that service change involved a redistribution of skills across the entire clinical workforce enabling other non-medical staff to develop. However, this could "restrict[s] the juniors' ability to get clinical exposure and learn from that clinical exposure; then that's where the service change can interfere with things" (L1B) and cause tension.

Trainees felt that Trusts/Health Boards treated them as a flexible workforce; easily relocated. Supervisors confirmed that service change meant new arrangement for shifts and a constant rotation of junior doctors and consultants; stating that trainees are "so used to moving, that actually I think in some ways, the trainees help the situation" (SINT1AOLIVE). Less concern about workforce issues was raised regarding the merger where less movement of trainees occurred.

Issues with redeployment were apparent in planned service change, with trainees "used to being redeployed" (SINT2C), however, this became amplified in unplanned change. Staff absence due to ill health required trainees to become service providers:

> *I think in some ways it's being a body to fill the rota and to support consultants. It's not necessarily, I don't necessarily think my training comes into it.*
>
> TINT3FTURQUOISE

> *And Covid really highlighted, foundation year has sort of become a service provider, filling in rota gaps, filling in where they need medics rather than focussing on training us and our interests and what we want to be in the future as a specialist.*
>
> TFYFG1C(MIX)

> *…juniors are just numbers and you just plug them in, and if you've got a gap you can always, you're disposable, you can always find someone else to fill a gap.*
>
> TINT1BPINK

Trainees were given very little notice about moving onto a different department, leaving them very little time to prepare for the new environment:

> *like I've been told like Thursday or Friday …oh you should be moving on Monday to the new rotation… it was okay, but as a person you need like some time to change to a new environment, it's just not the rotation, you are a human being, so you have like, you can't switch off completely from like one day to the next day*
>
> TFG1BPINK

Some trainees described a lack of support when being redeployed making them feel "side-lined":

> *No one really checked in on us to see are we coping okay, are we feeling like we're, no one senior, obviously whoever we were working with on a day to day basis was very polite and supportive in any way that they could be, but we were just very side-lined in that we weren't acknowledged.*

> FYFG1BPINK

Supervisors described redeployment which was "haphazard" rather than "intelligent redeployment" (SFG1C), with "knee-jerk reactions" (SFG1C) to the relocating of trainees. Trying to intervene was described as "frustrating" (SFG1C). Supervisors "lost" contact with trainees:

> *So the F2 CT1/2 tier… they all basically were lost to us and they went off to various other parts of the hospital. The senior tier, the registrar rota, they stayed with us.*

> SFG1ATURQUOISE

Redeployment out of specialty rotations impacted on completing essential training tasks for higher trainees; they had less time and less exposure to the clinical cases and procedures that they needed in order to complete their assessments. Trainees being taken out of their specialty rotation to cover 'Covid wards' were effectively "excluded… to some extent" (SFG1ATURQUOISE) from their specialty training as a result.

However, there were examples of innovations in training driven by the need to improve the workforce which had positive impacts. One expert gave the example that through the fundamental consideration of training workforce issues could be addressed:

> *[We created] an imaging academy… and everybody benefited because everybody had a shared problem with being able to train and recruit consultant radiologists. So it's a nice example of where you know if everything comes together and… it does really work well.*

> EAP12

It was suggested that for future service change, training and numbers of trainees should be factored in right at the start, in order to make training posts attractive, ensuring that the service being provided is also safe for patients. Extra human resources at times of change were deemed important – even if short term and despite additional financial resources.

Theme 4: Organisational recognition of trainees as learners

This section addresses three areas regarding whether organisations recognise trainees as learners, 1) the tension between service and training, 2) the trainee voice, that is whether trainee input is sought when considering change and 3) whether the organisation recognised the value of investing in trainees, for future recruitment known as the 'post-apprenticeship aim'.

4.i. Service versus training

A critical issue was the balance between service and training. There was a strong sense that healthcare culture prioritised service over training and that training wasn't given the fullest consideration because of the pressing need to provide service:

> *...it's where the training interferes with the need to deliver a pressurised service, you know that's where the conflict comes through you know.*

E12

> *And I don't think that medical education, which is big for us, is particularly high on the radar when an organisation is the planning reconfiguration; it's something that 'this is happening, sort it'.*

SINT2C

In unplanned change that this was exacerbated:

> *I think during times of change, particularly rapid change, there's always going to be a tendency for education to lag behind because service provision is always going to be king.*

SFG1ATURQUOISE

For trainees the way training was handled during Covid-19 was symptomatic of a systemic undervaluing of training more generally: "Covid has been a scapegoat for not prioritising training" (TFG1FOLIVE).

4. ii. Trainee voice

This theme identifies the link between organisational culture and expression of the trainee voice at times of change. Service change could negatively impact on organisational culture adversely affecting supervisors and trainees. Cultures that prioritise accountability, reducing costs, and achieving targets, rather than creating a positive working environment, may not fully account for training needs. Service change that does not engage trainees thus creates negative working cultures:

> *I think we've seen a lot of upheaval in the structure and organisation, certainly in the delivery of healthcare. And I think what's interesting is despite all of that upheaval and all of that tumult, actually I think trainees if anything feel more alienated from the system they work in.*

E4

Conversely, where supervisors are supportive and see supervision as an investment, positive cultures are perpetuated, even within risky contexts. Experts urged that a culture of partnership should be promoted, as trainees play a critical role in service provision:

> *They are the future workforce, their training is important, and to plan regardless of the needs of staff in training must be daft. But there's a tricky balance to be struck there between… you know the service actually is about delivering for patients isn't it, it's not training the future generation.*
>
> E6

> *And I had hoped that… we would begin to view our doctors in training much more as partners rather than the hierarchical way that it was when I trained.*
>
> E15

All participants reported an absence of trainee voice inputting into service change. Experts described the missed opportunities from not involving trainees, because trainees, as front-line workers have valuable insights which could be capitalised on when planning service change. Not involving them could lead to negative impacts on patient care and a failure to prepare trainees to lead future change:

> *Trainees weren't involved in decision making around that [the loss of bloods in transport]…[they] weren't factored into the decision making. And actually that passed by a lot of the people that were working there until it was too late and it had happened.*
>
> E4

> *…if it's going to be an organisational institutional change, communication and involvement of the individuals who actually deliver this service is essential… because they are the ones on the ground, they are the ones delivering the service, they are the ones who are best placed to know what works and what doesn't work.*
>
> E14

Mechanisms of feeding back about the impact of service change were reported to be inadequate and whilst trainees could theoretically be given opportunities to share their perspective, this was often curtailed because of concerns about anonymity or confidentiality. In addition, there was little or no on-going assessment of the impact of the change on trainees or on the clinical workplace. Failing to include junior doctors as stakeholders resulted in trainee disenfranchisement and disempowerment, as well as representing the loss of a valuable opportunity for trainees to shape the services in which they will be delivering care throughout their careers.

Trainees suggested they could be involved in committees as a useful resource; voicing the clinicians' perspective and leaders and supervisors supported that view:

> *One that I find quite useful is that sometimes there are issues which are related to doctors in training, and rather than solving it for them if you actually engage with them and get them to sort out the problem or the issue in hand.*
>
> L1B

Being involved in the process of change was considered important because it could empower trainees, make them feel valued and develop their networks:

It gives you a sense of empowerment that you are designing provision of care, and it also has that undervalued aspect of working within teams and building new relationships, new peer groups, new support networks… make you healthy in your working space. And there's the ownership you know… it's not something which has been kind of delivered as the national clinical director's pathway for whatever it might be.

E10

4.iii. Post apprenticeship aim

The post apprenticeship aim is where organisations recognise that trainees are not transient members of the workforce, rather they are, or could be, the Trust/Health Boards future workforce. There are two aspects of 'post-apprenticeship aim'; 1) that providing a good training experience leads to better consultant recruitment at that Trust/Health Board; and 2) that exposure to clinical specialities is essential to recruit to that speciality.

There was a clear recognition from leadership of the value of providing high quality training experiences for junior doctors as a means of encouraging them to consider joining the Trust/Health Board as consultants. Service change was seen to provide an opportunity to review the training offered with an aim of making it more attractive to juniors in the longer term:

> …we're looking at how we can reshape our training package if you like to make them more attractive. So for example if we want… you know somebody wants to be a trainee in [speciality] to have several centres offering different specialist experience within the trust and having jobs which can rotate around that… so you have experience of a whole organisation. We know that if people get a good experience within an organisation they're much more likely to apply for senior jobs there later on.

L2B

Both trainees and supervisors noted that making trainees feel engaged and invested in the Trust/Health Board aids retention; trainees return fostering "a positive cycle" (SINT1NCS).

Despite reassurances from the Deanery/Health Education England that unplanned service change should not impact their future careers, there was widespread concern amongst trainees that the impact of redeployment and barriers to progression would have ramifications:

> It obviously makes a huge difference if you've worked that job or not and if you have that experience and the contacts you make.

TFYFG1C(MIX)

There was concern about not developing key skills, from for example missing out on outpatient experience. Supervisors did not share trainees' concerns about the impact of the radical, but relatively short-term, unplanned changes. Instead, their concern was about the long-term impacts of planned change on specialty exposure and post-training outcomes. In Site A, where certain aspects of the regional reconfiguration had been completed years earlier, a supervisor explained how the reconfiguration made it difficult for trainees to have exposure to a wide range of smaller specialities because their rotation may not take them to the hospital site where they were now located. This resulted in an inability to make an informed career choice. Similarly, for a trainee at Site B, the impact has been both on career choice as well as where they wanted to work:

In relation to my career choice and where I will potentially choose to be a consultant or what I choose to specialise in […] If you tell me that they're going to take my favourite speciality away from a hospital, then I don't want to work in that hospital

<div align="right">TINT2BPINK</div>

The negative effects for certain specialities as a result of a merger or reconfiguration thus start in training; particularly if the trainees have limited or no exposure to that specialty.

Theme 5: Identifying and mitigating risk

Participants considered how medical education and training could be put on the wider agenda during times of service change. Three subthemes were identified: identifying risk, mitigating risk, and prioritising education.

5.i. Identifying risk

Risky training environments were also considered risky for patients, and therefore clinical metrics could be used for detection. Equally, structures used for educational governance like the GMC NTS survey could be used. However, these metrics could miss risky environments because risk can be specifically located to a department:

> *You don't want a junior doctor in a poor quality care environment, so all of those would signal potential risks… its headline metrics may be appalling but within that there are almost certain to be some really kernels of fabulous practice... And the same is true in hospitals that at face value look like they're absolutely marvellous - there will be bad apples within them who are doing really sinister things.*

> E5

Local measures to identify vulnerable learning environments included: 1) 'walking the wards' to identify issues and give trainees a voice; 2) using local intelligence such as "regular interviews and regular surveys" (TFG1BPINK); and 3) early involvement of regulators. Internal governance frameworks could be "a good and open mechanism for identifying issues" (SINT1NCS) but Trust/Health Board leadership recognised that that "we're not really asking the right questions" (L2B) because of a blind spot regarding the impact of change on training. Trainees indicated unplanned service change could pose additional risks for their training:

> *…it just wasn't safe, there was no continuity and it got to a point where we were all so exhausted that we actually had to raise our concerns to our consultants to get taken off of it. And although people kind of mentioned it, it wasn't really recognised until we put our foot down and we were just like 'We're not doing this anymore'.*

> TFG2BBLACK

Therefore, extra vigilance is required to temporarily monitor the quality of training in rapidly changing environments and identify risk:

> *Something that is […] needs looking at continuously to make improvements and make changes […] people come and go, people change, supervisors change.*

> TINT2BPINK

> *Some sense of monitoring that [risk], auditing that, feeding back.*

> SINT1C

5.ii. Mitigating risk

Strategies for mitigating risk included a high-level structural reconfiguration of educational leadership across sites, and the employment of extra clinical staff. Risk could be limited through better planning, with problems better anticipated and swiftly addressed; however, the lack of on-going evaluation on the impacts of service change made this problematic. Externality, that is input from organisations outside of the Trust/Health Board, was crucial to ensure that trainees and supervisors could escalate concerns and provide a strong leadership voice to the Board, championing training during times of change:

> …because we can't just expect people like that or troops on the ground having to make sure that things or training is maintained, or the environment, the level of the opportunities are provided. We have got so much to do already that we can't be expected to have to argue for all these things – this should come from above.
>
> SFG2BPINK

The current method of updating external parties, like the GMC and Health Education England (HEE)/Deaneries regarding risk mitigation was described as burdensome, and it was suggested that there should be clearer agreement about expectations for training during change, so that interventions and support matched regulators' expectations. One supervisor made an analogy with the introduction of revalidation and appraisal, and suggested something similar for Trust/Health Board sites undergoing reconfiguration:

> …like a 'change support team' and they would come in, just to ensure that there is still a voice on the wards […], because you know that everybody else is now too busy to do that job.
>
> SINT3C

5.iii. Prioritising education

Prioritising training could be achieved by ensuring a prominent position for this on the agenda for every meeting about service change, while every proposed change could be reviewed to consider the impact on training. Proposed strategies for prioritising education included a:

> Matrix of dos and don'ts that people had to tick off at meetings… Does it mean people moving more than once during the day? If yes, then you can't have that change or does it mean that you can't get your curricular requirements according to the experts? If yes, then you can't have that change
>
> SINT3C

Leaders recognised their role was influential within the organisation but equally how support from external agencies, like the GMC and HEE/Deaneries could ensure that training was high on internal agendas:

> That needs not only corporate leadership locally, but support from various external bodies. That might include GMC, that might include Health Education England – that training remains very high in the profile of when trusts set up their quality objectives or set up their goals for the next year – training and education has to be there and has

to feature… I think that would go a long way to sustaining and improving where improvement is required in education and training.

<div align="right">L1B</div>

External scrutiny, constructive feedback, and support could concentrate efforts to consider the trainee experience

Well one thing that we have found useful is support from [HEE/Deanery]…in coming out and looking at what we are intending to do. Just pointing out where we might have problems and offering our support in terms of… Time from advisers or additional posts that we might want to co-fund with them… They've just been constructive… And I've been very appreciative of that.

<div align="right">L2B</div>

These organisations might also have a more active role in monitoring training, ensuring that standards are met, despite service change:

[HEE/Deanery] has now given a very robust document, it's still in the consultation stage, but it's very very robust, about how things should be reported back. Which should be a wake-up call not for our merger alone, but throughout the country, because as you know financial education in most places goes into a big black hole.

<div align="right">SFG1B(MIX)</div>

Greater involvement of educators in all the steps involved in service change and prioritising education financially through commissioning, similarly to clinical services, can make education "part of our contract to provide a certain amount of education" instead of "buy[ing] into service and we provide training almost as an add on" (SINT3C). These suggestions to prioritise education would all contribute to a culture shift:

And it's a bit of a culture shift isn't it to ensure that that takes place really, you know it's recognising the value of training in that.

<div align="right">SINT1AOLIVE</div>

Findings

This section draws upon the results across all participants in this study, from experts interviewed in phase 1 and Trust/Health Board leaders, supervisors and trainees interviewed in phase 2 to directly address the research questions.

Research Question 1: Is doctors' training being adequately considered within service change?

There was an ambition to improve training through reconfiguration and practical benefits could be realised through this process (e.g. new learning opportunities), but the majority view was that training was not adequately, or consistently, considered during change. However, the medical workforce and the supply of junior doctors to provide service delivery was a key priority; a phenomenon called "playing the [workforce] numbers game" (E5) which ignored the impacts of service reconfiguration on actual workload. For example, the availability of junior doctors and the need to fill on-call rotas overtook training considerations as service trumped education. The pressing issues of financial accountability and improving clinical care could also dominate attention and detract from a focus on training. Even when training was considered by Trust/Health Boards, other factors intervened undermining considerations about training.

Blanket approaches to communication meant that trainees and supervisors did not feel they were personally communicated with. Participants noted that communication was about service rather than training. Internal consultative processes were superficial, marginalising the training agenda and resulting in trainees and supervisors feeling undervalued and disempowered.

Participants noted that service change led by 'bottom-up' or 'top-down' approaches had different outcomes for doctors' training. 'Top-down' changes driven through a hierarchy, either from Trust/Health board leadership or national levels, tended to focus on other priorities (particularly financial imperatives or health outcome targets), with the consequence that they may overlook training. The inability to influence change was an important factor marginalising the training agenda. All participants described examples where attempts to ensure that doctors' training needs were considered had fallen on deaf ears through the 'top-down' process of implementing service change. Planned service change is a complex process involving consultation with a wide range of stakeholders and is administratively bureaucratic, resulting in this hierarchal approach to implementing change. The trainee voice was absent in all the stages involved in service reconfiguration and perceptions of the transient nature of trainees and a lack of understanding of the unique insight's trainees bring compounded their exclusion.

The consensus was that trainees should be involved in the consultation process, as service change impacts their training and subsequently affects their future roles. Involvement in redesign made trainees feel valued and they identified issues that had not been anticipated through top-down approaches: "they come with some really fresh thinking" (E15). Changes driven from 'ground level' tended to be spearheaded by clinical staff, with the consequence that medical training needs are more likely to be integral to the process of change.

Interestingly, unplanned service change resulted in 'bottom-up' approaches to change: innovation led by trainees through flattening of hierarchies and increased flexibility through the reduction of bureaucracy. Despite many negative impacts on training caused through the unplanned service change in response to the pandemic there we also many illustrations about how bottom-up

approaches to service change enabled trainees to become active agents in resolving issues and had positive results on their training experience and ensured better patient care.

Whilst experts and leaders were highly mindful of service change, there were lower levels of awareness in the supervisors and trainees interviewed. Heightened levels of awareness were present for those where service change was active, i.e. in the merger case study and particularly in unplanned service change. The pandemic facilitated the engagement of doctors in training, particularly foundation doctors who without the experience of unplanned service change would have found it challenging to comment on the impact of service change on their training.

Research Question 2: What are the issues that arise during service change in relation to doctors' training?

Issues that arose included: tensions between service and training, lack of communication, approaches to change, the impact of new health professional roles, and trainees' curriculum.

Tension between meeting the needs of patient care and doctors' training: The complexity inherent in the need to balance changes to services to meet patient needs whilst considering training needs was acknowledged. This was exemplified in unplanned change where differing goals foregrounded service over training. Although all stakeholders agreed patient care should be the core priority in times of change, trainees pointed out that reconfiguring training alongside patient care is just as crucial to maintain a high standard for patient care.

The impact of new health professional roles: Although the implementation of new health professional roles (e.g. nurse specialists and physician associates) aimed to improve workload to benefit doctors' training, such initiatives could have unintended consequences on trainees when consultants preferred to work with these colleagues as trusted, long term team members; whereas in contrast, trainees were considered transient and required more support.

The curriculum: Experts and leaders mentioned that training curricula rapidly becomes outdated during service change. Therefore, service change creates a need to review and update curricula to keep them aligned with changing clinical environments. Postgraduate curricula should include understanding healthcare systems and the processes for effecting of change; this would provide trainees with the knowledge and skills necessary to navigate through rapidly changing healthcare systems. There are also curriculum implications for developing medical leadership. The case study sites aimed to shift from a 'management-led' to a 'clinically-led' organisation, but the expertise and appetite to lead change was noted to be absent by experts. However, the importance of this was stressed by Trust/Health Board leadership as they tried to effect change within their organisation.

Research Question 3: What impact and risks can service change have on doctors' training?

The impact of unplanned and planned service change on doctors in training varies depending on the speciality, training grade, and site. Despite the overwhelming impact of Covid-19, no additional risks were identified; rather, the hazards associated with service change appeared to be generic. Unplanned change acted as a 'canary in a mine' amplifying the impact of the risks identified.

Impact on learning opportunities: Service change had positive and negative impacts on the amount and diversity of clinical exposure. For example, centralisation of services improved clinical case mix at acute sites and enabled trainees to have better specialist supervision. However, non-acute sites tended to lack such exposure. Reduced learning opportunities also occurred when new models of care were introduced in planned service change (for example, telemedicine) and in unplanned service change (for example, on clinic experience). For some trainees the opportunity to work at the front line with acutely unwell patients in service change caused by the pandemic was an expansive phenomenon, but for other trainees their experience of training was impoverished. Formal educational opportunities realised through online learning, were transformed because of the pandemic; mostly this was perceived as positive.

> **Risks:** narrow or reduced exposure to clinical cases and missing out on core foundation and sub-speciality placements (as occurred in unplanned service change) risked trainees' ability to achieve curricula competences and a successful outcome in the ARCP. This resulted in trainees feeling negatively about their preparedness to practice, leading to dissatisfaction and concerns over their progression. Supervisors noted that a lack of exposure to sub-specialities risked future consultant recruitment.

Impact on supervision: Service change improved training by increasing access to supervisors at 'hot', merged, and reconfigured sites with specialist centres. Mergers and reconfigurations of specialised services enhanced supervision, particularly for senior trainees. However, service change could undermine effective supervision, particularly in non-acute sites having poorer senior cover, and through cross-site working where trainees dealt with a constant change in supervisory staff, which was noted to have implications for the quality of feedback trainees received. Unplanned service change, as a result of the pandemic resulted in better supervision as senior doctors provided frontline care.

> **Risk:** any reorganisation that results in less or poorer quality supervision. This included competing demands from other healthcare workers, like for example physician associates.

Impact of the experience of training: Participants were unclear as to whether service change per se had a direct impact on trainee satisfaction. There were examples of how service change had improved trainees' experiences. Mergers were considered to offer the opportunity for "disparate communities" (E10) to come together, improving opportunities for peer support and networks that trainees could draw on. However, the introduction of cross-site working impacted on trainees' ability to manage parental responsibilities, and travel when working across split sites caused strain.

> **Risks:** Whilst there are some benefits of dispersing workforce across sites, and to different departments, there are important risks attached. Moving around is disruptive and can affect belonging, fragment supervision, and negatively impact relationships with seniors and other clinical staff. For seniors, "running around sites" (SFG1C) consequentially resulted in a less time for supervision. Redeployment was a feature in planned and unplanned service change, however the significance of workforce-wide, extended periods of redeployment was exemplified by unplanned service change where redeployment happened on a major scale. Moving trainees to new clinical areas could mean familiarizing themselves with local systems, practices and processes which is disorientating and took time.

Impact on workload: Service change has its own associated workload, with changes to Trust/Health Board infrastructure, IT, changing clinical pathways, keeping up to date with latest guidance and

communication, and rectifying the unintended consequences of service reconfiguration. These factors affected supervisors and trainees regardless of the type of change and was an additional burden. Higher clinical workloads were associated with working at hot sites and during unplanned service change, although some specialities experienced lighter workloads with the pandemic. In the case of unplanned service change the sheer effort of having to keep up to date with changing clinical pathways and protocols caused added work.

> **Risk**: the delicate equipoise between workload and learning; even with increased learning opportunities that arise because of service change, high workloads may limit the extent to which trainees can take advantage of them. High workload also negatively impacted the quality of supervision, and supervisors' and trainees' wellbeing and work-life balance. Ultimately, high workload could jeopardize patient safety.

Impact on workforce wellbeing: Work-life balance for current cohorts of junior doctors was reported as increasingly important, affecting their long-term retention. 'Happy' doctors were reported to be more satisfied, less frequently absent due to sickness, more effective at performing their tasks, and less likely to make mistakes. Trainees and supervisors provided a more in-depth understanding of the psychological impact of service change.

> **Risks:** include stress, exhaustion, less time to think, and introduces new stressors like working in new roles and in unfamiliar organisations. Resistance to change coupled with anxiety and the identity issues that change provoked impacted negatively on staff well-being, sickness, and relationships. In unplanned service change the psychological impact was much greater. It did, initially, improve camaraderie and teamwork, with trainees being 'highly resilient', but working in intense clinical environments as well as restrictions on day-to-day life negatively impacted on well-being, and the endurance of this was reported to be dwindling as the second wave of coronavirus swept the UK.

Long term risks: In addition to the more immediate risks of service change this study identified three long terms risks. 1) inadequate exposure to clinical specialities, particularly sub-specialties, was reported to negatively influence trainees future career choices. 2) organisations who did not value trainees were less likely to attract ex-trainees to future consultant posts, thereby negatively impacting on the recruitment and retention of tomorrows' workforce. 3) the exclusion of trainees in the design and implementation of service change deprives tomorrows' workforce of the skills it needs to maintain the effectiveness of the NHS.

Research Question 4: What types of service change pose the most risk to doctors' training?

All types of change examined in this study had benefits and risks for training. Below are some examples of how the impacts and risks for training varied by type of change, speciality and training grade. There are many more examples throughout the results section.

Case study A (regional reconfiguration): if foundation doctors were not placed at hospital sites where a major centre was then they may miss exposure to common medical conditions. For example, if they were not at the site where the hyper- acute stroke unit was based then foundation doctors would not experience the presentation and management of patients with coronary vascular accidents. Another feature more prominent in regional reconfigurations was that trainees were often required to move

sites to provide care. This meant that they had less strong bonds with staff at the various sites and this coupled with increase travel distanced them from professional and personal support networks.

Case study B (merger): in this reconfiguration specialist services were consolidated to one site rather than being run at each the three hospitals involved. This impacted more on higher-level speciality trainees because if they were at a site without specialist provision, they could miss important sub-speciality clinical experiences. For example, if particular types of surgery didn't happen at a particular hospital site then that would impoverish anaesthetic training because trainees would not gain experience of specific procedures and associated anaesthetic techniques. However, this impact varied by the clinical speciality of the trainee because not all clinical services were reconfigured.

Case study C ('hot' and 'cold' reconfiguration): There was a clear educational rationale expressed for the creation of these different sites, yet they presented different opportunities and threats for training. 'Hot' sites provided better access to educational opportunities and supervision, but this had to be balanced with the impact of increased workload. 'Cold' sites were regarded as being quieter and aimed to permit more time for formal education. However, 'cold' sites could become warmer when patients deteriorated, and the absence of senior medical staff at such sites caused anxiety for the foundation doctors there. If trainees were not distributed according to their correct skill set, there were potential risks for them as well as patients when clinical care was unnecessarily escalated. On the contrary, foundation doctors were reported to generally feel that working at 'cold' sites was mundane. However, senior trainees had positive experiences at 'cold' sites from better opportunities to deliver outpatient care. In this reconfiguration trainees and supervisors worked across the two hospital sites. This impacted on supervision and rather than a constant supervisor presence on a particular ward, the model of supervision moved to a more on-call mode where different senior staff were present. There were advantages and disadvantages to this change. It increased exposure to different styles of supervision but less constant observation of a trainee by one supervisor could potentially undermine the quality of feedback.

Unplanned service change (caused by the pandemic): The pandemic resulted in massive reconfigurations of services and new ways of working and learning, having several positive impacts on training. Unplanned change improved access to formal educational opportunities through the increased use of online learning and social media, as well as supervision with more consultant staff on the front line. In this reconfiguration many staff were redeployed to front-line care. For foundation doctors this could be regarded positively with increased exposure to acutely unwell patients as well as very high levels of supervision. For some foundation doctors, however, this prolonged and rapid redeployment was perceived negatively because they missed essential clinical experience (e.g. missing out on a surgical placement and concerns about dealing with acute surgical emergencies in the future). For core and higher trainees, the experience varied according to speciality, so for example surgical trainees not redeployed to the front line had increased time for formal learning opportunities, however, this was not the case for medical trainees. Positive features also included a flattening of hierarchy and a more cohesive, supportive medical workforce, and managers were reported to give a bit more leeway in how service delivery was arranged. Trainees "were useful, used and busy" (SINT1AOLIVE). It also, at least initially, improved a sense of belonging and gave trainees an opportunity to get involved with the organisation of front-line care. However, overall, it appeared to be risker because of its greater impact on workload, wellbeing, and reduced access to the training opportunities expected from training curricula.

The data gathered for the regional reconfiguration and the merger was nearly exclusively post-Covid-19 and this limits the claims made about these types of changes. However, what is apparent is that these changes were incrementally enacted, therefore risks appeared to be less and were not workforce wide as they were in AHR and unplanned change. Also, the structural changes associated with these reconfigurations were more fixed, in that specialities relocated to certain sites which gave more permanence and allowed better planning for trainee rotations.

Speed of change: The planning phase for planned service change is a lengthy affair, but the implementation phase varies. In the case of the merger the slower speed of implementation provided an opportunity for incremental change and snagging. In the AHR, whilst some change had occurred prior to the main transformation, the change in the nature of the sites happened speedily. An expert commented that, paradoxically, planned change that is speedily enacted can have a less harmful effect on training than planned change with long run-in times because it does not 'hang over' the service, creating uncertainty and affecting morale. However, the consequence of the apparent disregard for training at the planning phase, combined with the lack of ongoing communication, consultation, and evaluation, poses further risks to protecting the training experience. It is the post implementation phase where unanticipated consequences arise, and unplanned service change exemplified the risks associated with speedy change.

Where service change was wholesale, workforce-wide, fast, and the structural changes were less bounded (that is 'cold' sites becoming 'hotter' as in acute hospital reconfigurations and 'green' areas becoming 'red' as in unplanned service change), the risks for doctors in training appeared to be greater.

Research Question 5: How can the GMC pinpoint when/where this is happening?

The indicators of riskier training environments were poor leadership, a lack of engagement of clinical staff, low levels of organisational recognition of doctors in training, and education not being on the Board's agenda. Less risky environments were those who had a strong local approach to identifying risk (walking the wards, giving trainees full voice), early engagement and collaboration with other educational providers (Deaneries/HEE/GMC), and taking a proactive and autonomous stance to addressing risk.

Environments risky for training were also regarded as risky for patients. Clinical, organisational, and educational governance mechanisms and metrics were posited as being able to detect problems, e.g. incident reporting/ the GMC National Training Survey. Soft indicators like sickness absence, occupational health referrals, vacancies in training rotations, and poor morale could also pinpoint risk.

Risk was noted to vary by speciality and grade, as well as site and department this coupled with the fact that service change is dynamic in nature means that organisational metrics can miss risky training environments. Therefore, during change more frequent monitoring of trainees' and supervisors' views would be valuable to assess the impact on training during change. This could be done via survey data or through dialogue. Examining risk would also include identifying redeployment of trainees. In the case of unplanned change this was critical; not only did it impact progression and postgraduate examinations, but lack of training in a core foundation placement or specific sub-speciality denied trainees of crucial clinical experiences, which caused anxiety and was regarded by them as impacting on their future careers.

Therefore, pinpointing risk with the quality assurance mechanisms that exist for routine surveillance is problematic and current systems will miss important risks associated with service reconfiguration. Identifying the risks that occur during change needs new approaches with proactive, dynamic and supportive methods; one that is mindful of the burden faced by the frontline workforce. Better post-implementation evaluation to assess the ongoing impact of service change on doctors' training would allow for deeper insights regarding the unintended consequences and sharing of best practice.

Research Question 6: What is best practice when implementing service change in order to protect doctors' training?

Participants emphasised the value of considering training during times of service change. Consideration of training enabled short term advantages including greater flexibility to meet training needs, improving access to, and quality of, learning opportunities and supervision. This also resulted in long-term benefits on recruitment and retention of doctors. Best practice therefore included consulting with the medical workforce about service change and developing a culture of treating junior doctors as partners in service change. Consultation led to a mutual understanding of the issues posed by service change, fostered partnerships with trainees and lead to training becoming an important priority in the change process. Direct communication and engagement about trainees' priorities ('what matters most') helped those implementing change to understand the issues trainees face, and enabled organisations to address the clinical, personal, professional and psychological impact of change. This had immediate practical benefits, as this dialogue improved trainees' insights into the service they deliver, made them feel valued, and supported high quality clinical care, as well as the longer-term benefits of valuing the contribution from tomorrows' clinical leads.

Giving all stakeholders an opportunity to present their perspectives and be part of the decision-making process thus seems to be a good way forward to protect doctors' training. Those in management positions have access to the 'big picture' - of what needs to change and why, however, those involved in training doctors, and in particular trainees, have important insights about effects of service change on training, as well as clinical care which if harnessed could lead to improvements in both aspects.

Best practice included education and training being represented at the highest level. Service change has many opportunities for trainees, but explicit communication is needed to help them understand what these are, as well as how these can benefit their development of both clinical and generic professional capabilities.

Other suggestions about best practice took into consideration geographical relocation of services and its impact on learning opportunities and supervision. Examples were given of service change which enabled consultants to work across sites, improving consistency of supervision or to come together to form new networks and share experiences. Too many transitions to different sites and departments is disruptive for trainees but if transitions were properly supported trainees could benefit from working across a geographical area, giving them exposure to different sites, teams and clinical cases, and if done with adequate support could be an expansive phenomenon.

The development of standard operating procedures or checklists could ensure that as many eventualities as possible have been accounted for and have an associated action plan, thereby limiting negative consequences on trainees. At times of change workloads increase and therefore extra resources should be put in place. These are human resources, for example temporary clinical staff to share the workload, but financial resources as well. It was suggested that, when commissioning

services, the costs of education should be explicitly included into tenders to better highlight all the aspects of providing service, and this implicitly includes training junior doctors. The costs associated with actual implementation and rectifying unanticipated consequences were not factored into calculations, nor were costs to support the development of best practice; however, these should be. Extra resources were also required in terms of ensuring that implementation and outcomes are evaluated in a robust way. The lack of evaluation and research were regarded as problematic in identifying and disseminating best practice.

External support was also felt to be important. This prioritised education and training, but also external agencies could be conduits for sharing best practice and highlighting common pitfalls. It was suggested that in this regard regulators may positively influence training at times of change.

Key messages

The reconfiguration of NHS services is complex, ongoing, and critical. For postgraduate training the ways services are changed have benefits as well as disadvantages, however the exclusion of trainees and their supervisors from inputting into the process is problematic as opportunities to advance training as well as service are missed. Of further concern is that short-term priorities to provide service, reduce costs etc. ignore the long-term impact of a poor training experience on recruitment and retention on tomorrows' medical workforce.

A systematic approach to facilitating the trainees' voice is required both locally and nationally, from service redesign, to implementation and through to evaluation and training should be represented at the highest level within reconfiguring organisations. The enhanced emphasis on training would benefit from external support from organisations with responsibilities for training, like the Deaneries/HEE and the GMC. These organisations could provide an important impetus to focus attention on training at Trust/Health Board level at times of change and an on the ground presence could further aid the identification of risk at a time when Trust/Health Board staff were struggling with all the demands placed upon them. External agencies like the GMC and HEE/Deaneries could, and in some instances were, conduits for sharing best practice and highlighting common pitfalls. If this became more systematic through guidance and practice it was suggested regulators could positively influence training at times of change.

There is also an opportunity to influence high-level leadership and impact on policy by creating guidance about what, and what should not happen to trainees during service change. This should account for the key risks identified in this study. The NHS faces monumental social, economic and political challenges, and ensuring the best quality education and training is fundamental to its future.

Appendix A: Table 1 Expert interview sample

No. of participants	Organisation type	Area of responsibility	Organisational role	Participant identifiers
2	Royal College	National	Lead within a Royal College	E1 E2
2	National Trainee organisation	National	Trainee representative	E3 E4
2	Academic	National	Academic expert in service reconfiguration	E5 E6
2	NHS	National	Expert in service reconfiguration	E7 E8
2	NHS	Regional	Regional expert in service reconfiguration	E9 E10
2	NHS	Trust/Heath Board	Trust/Health Board-level expert in service change	E11 E12
2	Deanery/Health Education England	Regional	Postgraduate Medical Education lead	E13 E14
1	Quality assurance organisation	National	Quality Assurance lead	E15

Appendix B: Phase 1 Interview schedule

1) Can you tell me a little bit about yourself? How did you come to be (job role)?
2) Could you **briefly** tell me about your experience of going through service change in your Trust?
3) What is the biggest challenge/s during service change?
   - Were you able to overcome them? How?
   - What are your priorities during this time?
4) Explore:
   - What are the intended purposes of service change and for whom?
   - What are drivers for service change?
   - Who oversees/implements service change?
   - How are decisions made?
   - What impacts do you think service change has on the organisation – (immediately and long term)?
   - Have there been any unintended consequences?
   - Are there any organisational factors that undermined your efforts to implement service change? E.g. workload etc.
   - Are there any factors that enabled you to implement changes?
   - Are there other factors/pressures outside service change that might influence the changes you see occurring in your Trust?
5) What are the issues that trainees notice/experience during service change?
6) What support do you think is important for doctors in training when service change is occurring? Explore why they think so – why more so than when service is stable.
7) Do you think that postgraduate medical training is adequately considered at times of service change?
   - Why do you say that?
   - In your opinion, are there any factors that you think are important that are not generally considered?
8) From your experience do you think service change has impacted on the experience of doctors in training?
9) Could you give any examples of service change improving the experience of doctors' in training? Explore why.
   Prompts include:
   o Communication with trainees,
   o Leadership,
   o Involvement in service change,
   o Active support for doctors in training (who provides this? Trust leadership, Departmental leads, Supervisors) and,
   o Ethos of valuing trainees,
   o Morale/wellbeing of trainees.
10) Are you aware of any negative impacts that service change has had on doctors in training? What were the reasons for this? What affect did it have on doctors in training?
    Prompts include:
    o Inadequate opportunities for learning (covering the curriculum -formal and informal), study leave,
    o Do supervisors have sufficient time?
    o Antagonistic employer/employee relationship,

- o Hierarchy,
- o Impact of workload (amount/organisation of work/rota gaps) on doctors in training well-being.

11) How could medical education and training be put on the wider agenda during times of service change?
12) Do you have any insights about how risky training environments could be identified?
13) And what support do you think would be helpful to put in place to ensure high quality learning environments at times of change?

Appendix C: Case study metrics for short listed phase 2 case studies

Please note: Some data are only available for the overarching provider organisation with site level data not available: this is indicated by trellised cells.

A key is provided which indicates how the metrics were translated into the colour coding (Table A3).

Table A2: Shortlist of phase 2 case study sites

Country		Type of service change	Sites (code name)	Enhanced monitoring	Trainee numbers	Performance		Culture		Workload
						Quality metrics	Financial	Bullying	Staff turnover	
2	**Case study site A**	Regional reconfiguration					green	amber	green	amber
			Violet	No	grey	amber	hatched	hatched	hatched	red
			Turquoise	No	dark grey	amber	hatched	hatched	hatched	amber
			Olive	Yes	dark grey	blue	hatched	hatched	hatched	amber
1	**Case study site B**	Merger								
			Pink	No	grey	amber	red	red	green	amber
			Black	No	light grey	amber	red	amber	red	amber
			Red	No	grey	green	red	amber	green	amber
1	**Case study site C**	Reconfiguration: Hot and cold sites				amber	red	amber	green	red
			Purple	Yes	light grey	amber	hatched	hatched	hatched	red
			Lime	Yes	dark grey	amber	hatched	hatched	hatched	red
1	**Case study site D**	Reconfiguration: hot and cold sites								
			Lilac	No	grey	green	green	green	green	amber
			Cream	No	grey	amber	red	amber	green	
			Azure	No	grey	amber	green	amber		
3	**Case study site E**	Regional reconfiguration								
			Grey	Yes	dark grey	amber	red	orange (hatched)	green	amber
			Mauve	Yes	dark grey	striped	red	light hatched	green	red
			Lemon	Yes	light grey	red	red	light hatched	green	amber
			Indigo	Yes	grey	red	red	hatched	green	red
1										
	Case study site F	Merger				green	green	amber	green	amber
			Green	No	dark grey	hatched	hatched	hatched	hatched	red
			Yellow	No	light grey	hatched	hatched	hatched	hatched	green
			Blue	No	grey	hatched	hatched	hatched	hatched	amber
			Scarlet	No	light grey	hatched	hatched	hatched	hatched	amber

Table A3: Key to phase 2 case study metrics

Enhanced Monitoring

N	No
Y	Yes

Trainee numbers

	Under 100 trainees
	100-199 trainees
	Over 200 trainees

Performance　　**Quality Metrics**

	Inadequate
	Requires improvement
	Good
	Outstanding

　　　　　　　　　　Financial

	Overspent above 10% of annual budget
	Overspent not above 10% of annual budget

Culture　　　　**Bullying**

	Bullying score 7.7 or below
	Bullying score 7.8 - 8.2
	Bullying score 8.3 or above

　　　　　　　　　　Staff turnover

	Workforce Stability is below average
	Workforce Stability is average or above

Workload

	Workload score is in lower quartile (indicating higher workload)
	Workload score is in second or third quartile (indicating medium workload)
	Workload score is in higher quartile (indicating lower workload)
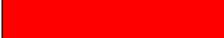
Data not available at Trust/Health Board Level

Data not available

Data only available at National level

Appendix D: Table 2 phase 2 participants

N	Site/type of reconfiguration	Focus group/ Interview identifier	Gender[#] Male (N)	Femal e (N)	Speciality[#]
6	**Trust/Health Board Leadership**				
1	Site A/Regional reconfiguration	E11	1	-	-
4	Site B/Merger	L1B	1	-	-
		L2B	1	-	-
		L3B	1	-	-
		E12	-	1	-
1	Site C/Hot & Cold	L1C	1	-	-
31	**Supervisors (includes Directors & Associate Directors of Medical Education, Education and Clinical Supervisors)**				
6	Site A/Regional reconfiguration	SFG1ATURQUOISE	3	-	Plastic Surgery, Clinical Biochemistry, Orthopaedics
		SINT1AOLIVE	-	1	Intensive care
		SINT2AOLIVE	1	-	Endocrinology
		SINT3AVIOLET	-	1	Endocrinology
17	Site B/Merger	SFG1B(MIX)	1	3	Respiratory Medicine, Medicine x2, Neurology
		SFG2BPINK	1	1	Nephrology, Paediatrics
		SFG3BBLACK	5	-	Anaesthetics, Emergency Medicine x3, Medicine

		SFG4BRED	1	1	Geriatrics, Nephrology
		SFG5B(MIX)	3	-	Paediatrics x2, Obstetrics & Gynaecology
		SINT1BRED	1	-	Vascular and Endovascular Surgery
7	Site C/Hot & Cold	SFG1C	-	3	Obstetrics & Gynaecology, Emergency Medicine, Medical Education
		SINT1C	1	-	Diabetes and Endocrinology
		SINT2C	1	-	Pathology
		SINT3C	1	-	Cardiology
		SINT4C	-	1	Medical Education
1	Non-case study/Regional reconfiguration	SINT1NCS	1	-	Respiratory
21	**Core/Higher Trainees**				
5	Site A/Regional reconfiguration	TFG1FOLIVE	1	1	Infectious Diseases x2
		TINT1FTURQUOISE	-	1	Medicine
		TINT2FOLIVE	-	1	Gastroenterology
		TINT3FTURQUOISE	-	1	Geriatrics
11	Site B/Merger	TFG1BPINK	2	2	Internal medicine, Emergency Medicine, Endocrinology & Diabetes, Anaesthetics
		TFG2BBLACK	2	1	Paediatrics, Medicine (Diabetes and Endocrinology), GP
		TFG3BRED	2	-	Anaesthetics, Endocrinology
		TINT1BPINK	1	-	Endocrinology & Diabetes
		TINT2BPINK	-	1	Anaesthetics

4	Site C/Hot & Cold	TFG1C	-	2	Obstetrician & Gynaecologist, Medicine
		TFYFG1C(MIX)	-	1	Paediatrics
		TINT1C	1	-	Geriatrics
1	Non-case study/Community integrated care	TINT1NCS	1	-	Psychiatry
22	**Foundation Trainees**				
16	Site B/Merger	FYFG1BPINK	5	7	Surgery (4x), Medicine (4x), Psychiatry (2x), Geriatrics, Orthopaedics
		FYFG2BRED	1	2	Surgery, GP, Medicine Cardiology
		FYINT1BBLACK	1	-	Acute Medicine
6	Site C/Hot & Cold	TFYFG1C(MIX)	1	3	Medicine (2x), Emergency Medicine, Geriatrics
		FYINT1C	1	-	Geriatrics
		FYINT2C	1	-	GP

#Not provided for Trust/Health Board Leadership to maintain confidentiality.

*Indicates an expert interviewed in phase 1

Appendix E: Phase 2 Interview schedule

1) Could you **briefly** tell me about your experience of working at this Trust/Health board which is going through service change?
2) What is the biggest challenge/s during service change?
   - Were you able to overcome them? How?
   - What are your priorities during this time?
3) Do you think that postgraduate medical training is adequately considered at times of service change?
   - Why do you say that? [Other priorities e.g. targets]
   - In your opinion, are there any factors that you think are important that are not generally considered?
4) What support do you think is important for you in your role as [doctor in training] [supervisor] when service change is occurring? Explore why they think so – why more so than when service is stable?
5) Do you think service change has impacted on your experience of [training] [supervising]?
   Prompts include:
   Learning/support of learning
   - Are there adequate opportunities to learn? Prompts: covering the curriculum (formal and informal)), reflection, study leave.
   - Are there adequate opportunities to develop new skills?
   - Is there active support for [doctors in training] [supervisors]? Who provides this? (Trust leadership, Departmental leads, Supervisors)
   - Are you/doctors in training encouraged to develop holistically?
   Relationships
   - Are you/doctors in training encouraged to network with colleagues in other departments?
   - Do you feel your role as [doctor in training] [supervisor] is valued?
   - Are you/doctors in training encouraged to work in teams or is the work more isolating?
   - Has service change impacted on relationships at work?
   Workload
   - Is the workload manageable? (amount/organisation of work/rota gaps)
   - Do you think that service change has impacted on supervision time – how? In hours and out of hours?
   Communication/Culture
   - Have you seen service change impact on well-being or morale?
   - Has there been good communication with you about service change?
   - If you have made comments about this do you feel these have been heard?
   - Has the service change been well led? Why?
   - Is there a hierarchical approach/top down approach to managing change?
6) Are there other factors/pressures outside service change that might influence the changes you see occurring in your Trust?
7) Could you give any examples of how service change has improved your experience? Explore why.
   - Has service change had negative impacts on you as a [doctors in training] [supervisor]? What were the reasons for this? What affect did it have?

8) How could medical education and training be put on the wider agenda during times of service change?

9) Do you have any insights about how risky training environments could be identified?

10) And what support do you think would be helpful to put in place to ensure high quality learning environments at times of change.