How does the education and training of health and social care staff transfer to practice and benefit patients?

A realist approach

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Foreword

The original intention of this research was to identify and synthesise the evidence on key indicators to support the development and use of the Education Outcomes Framework (EOF). The EOF was a framework, developed under the Conservative and Liberal Democrat Coalition Government (2013), to ensure the health and social care workforce had the right skills and were available in the right numbers to support the delivery of excellent healthcare.

“The EOF is designed to help the integrated health and care workforce meet the outcomes set out in the NHS, Public Health and Social Care outcomes frameworks and is central to the relationship between the Department of Health (DH) and the whole health and public health system.” (1)

The EOF was intended to measure improvements in education, training and workforce development and the consequential impact on the quality and safety of services for patients. This was to be achieved across the following five domains: excellent education; competent and capable staff; a flexible workforce receptive to research and innovation; NHS values and behaviours; and widening participation.

The EOF also included a definition of patient outcomes, which has remained in place to guide the impact of education and training in this current piece of research.

“The definition of quality in health care, enshrined in law, includes three key aspects: patient safety, clinical effectiveness and patient experience. A high quality health service exhibits all three.”(2)

In our research, we also specified that ‘patient experience’ (where appropriate) should be assessed by patients themselves, rather than by staff.

The original objectives for this research, articulated in the application for funding, were as follows:

1. To identify and synthesise the evidence on key indicators for each of the five following domains: excellent education; competent and capable staff; a flexible workforce receptive to research and innovation; NHS values and behaviours; widening participation.

2. To identify the contexts and mechanisms that improve the quality of patient experience, effectiveness, and patient safety across the healthcare system.

3. To use data to develop and test models that link education, training, and staff development interventions to healthcare outcomes.

The change in Government in May 2015 led to EOF being ‘parked’. Therefore, with agreement from the Department of Health, we refocused to a more enduring question about how the education and training of health and social care staff can transfer to practice and benefit patients.

Following this change, we adapted the focus of our aims and objectives accordingly, although we largely retained the methodological approach originally proposed. Therefore, the enclosed report provides an account of research, which aimed to provide an evidence-based framework for commissioning, quality assurance, and evaluation of education/training in health or social care settings to ensure that interventions reach patients. This broadening of perspective also offers a generalisable and sustainable model, which can be applied locally, nationally, and internationally.
In the UK, the work presented here has traction as a complement to Health Education England’s Quality Framework, which contains six domains that reflect key components for quality in work-based placements for all staff groups. The project reported within will also strongly support the work of the NHS Education, Training and Development (ETD) community and the Training Quality Team (TQT), who have jointly developed a set of standards and guidance for trainers and training managers in the design, delivery, and evaluation of their training. However, the greatest value of the evidence-based model presented here is in the shared utility across policy, governance, and delivery stakeholders applicable locally, nationally and internationally. The benefits for patients, evident from our work, of a shared perspective and broad but flexible adoption of the model, apply across all health and social care systems.
Executive Summary

Background

The primary aim of this study was to identify how education and training can transfer to practice and benefit patients (through improved clinical effectiveness, patient safety, and patient experience). This is of interest both nationally and internationally within health and social care service delivery. It adds to the knowledge base, both theoretically and practically, by providing an evidenced-based model of how educational resources targeted at staff can be facilitated to benefit patients. The amount of evidence identified in our research has exploded the myth that demonstrating the link between staff education and patient outcomes is too challenging to pursue.

Aim: To investigate how the education and training of health and social care staff can lead to patient benefit (we have used the term ‘patient’ throughout, but by this term we would include ‘service user’ and ‘client’).

Methods

To identify the successful features of education or training interventions, our research was conducted in stages:

1. The first stage was a realist synthesis of the international literature reporting both an educational intervention for health or social care staff and patient outcomes. This work provided evidence about the contexts in which the interventions were implemented and the mechanisms that triggered the patient outcome. The synthesis of evidence was used to create a programme theory, which maps out the steps that are required to ensure transfer of learning that will benefit patients.

2. The second stage was a test of the programme theory. This was conducted in three phases, using multiple methods. The first used a case study design to test the programme theory in real healthcare settings to illustrate how the theory fitted with diverse training programmes being delivered in the NHS and explore any deficiencies in the theory. The second was an analysis of an online survey of Health and Care Profession Council registrants to explore how individual Continuing Professional Development (CPD) could transfer to patients. The third phase was to explore the use of routinely arising Trust-level data to evaluate to what extent workforce and educational factors were associated with patient outcomes and experience.

External consultations, Public and Patient Involvement (PPI) and hosting a Think Tank

To aid research governance, a Patient and Public Involvement (PPI) group and experts in the field of medical education (i.e. realist methodologist, theorists and educationalists) provided external consultation throughout the research. The feedback from these groups was used to guide the project design, develop the programme theory, and consider its application in healthcare settings. The patient reference group strongly supported the model as it was being developed. In addition, we hosted a Think Tank to further test the model, where experts, patients, and students attended.

Results

The systematic literature search identified over 24000 international publications, which were reduced to 1149 after exclusions and duplications were removed, and ultimately 368 papers met the
criteria for inclusion. To be included, a measure of patient outcome was required. As a result, most papers concerning pre-qualification or undergraduate education were excluded, and the focus of the review was on practicing health and social care professionals. Included papers were tabulated and coded. To gain the explanatory power required for a programme theory, 51 papers (containing rich process information) were analysed in detail.

The programme theory was then modified following further testing using case studies and an online survey of CPD that benefited patients. The Four-Step programme was refined to support entry to the model at each Step i.e. individual led CPD at Step Two and culture change at Step Four.

Four-Step model

We identified four steps to facilitate staff education designed to achieve patient benefit:

**Step One (education or training is initiated and is designed to demonstrate patient benefit)**
Step One identifies the important role of the organisation in setting aims, clarifying objectives and planning implementation, committing senior staff to oversee and support the initiation of training, and allocating resources. Ideally, training should be aligned to the strategic goals of the organisation to succeed. The outcome of this step is to initiate training designed to benefit patients. Organisational awareness and commitment to commissioning education is key to achieving this outcome. Patient Public Involvement highlighted the importance of including and targeting patients at this stage.

**Step Two (the learner is motivated and ready to learn)**
This step focuses on the individual being motivated and ready to learn from the education/training intervention. The right people with the right scope of practice need to attend. However, attendance alone is insufficient; individuals also need to be personally motivated to benefit from the education/training. Individuals can increase their motivation to learn if they recognise the importance and relevance of the training for their work (often from prior feedback). Also removing practical barriers (e.g. financial, time) to facilitate attendance is key and may involve offering incentives or making attendance mandatory if applicable.

**Step Three (the learner learns successfully and has the commitment and desire to apply the learning)**
There are a number of considerations for trainers, to ensure that learning has the desired effect on learners. Ideally, trainers should ensure that an assessment of learning needs is made and fed back to learners to help them engage. Teaching and learning are optimal when focused on current and desired performance, and are delivered using engaging and varied teaching methods. Learners need to learn, but also have the desire to apply their learning into practice. Time spent focused on action plans can engender this commitment and support transfer of learning. Successful learning will involve knowing what to change, but also how to make changes to practice and service delivery.

**Step Four (learner has the capability and transfers learning into practice)**
Learners need to have the ability, confidence, or sufficient prior experience to deliver complex new skills. If learners have a support structure (learner networks, peers, managers, influential change champions), it will help them develop their practice and maintain momentum for change when they return to the workplace. Ongoing monitoring will support the needed change and aid momentum. Staff ownership of the intervention will increase learner desire to persist in the face of difficulty.
Training whole teams reduces resistance to change. Sharing knowledge and experience back in practice increases team commitment to change. The new practice will become the regular practice and learning will spread and embed, leading to culture change.

Conclusion

The model developed from this research and reported in this report can be utilised to ensure educational and training initiatives targeted at health, and social care staff reach and benefit patients (i.e., lead to increased clinical effectiveness and patient safety, and improved patient experience). The realist synthesis and evaluation have provided an evidence-based model that can provide a practical guide for commissioning, implementation, and evaluation: outlining how to optimise education to benefit patients, as well as how to recognise environments that are not supportive to change and where an intervention is likely to fail. It offers ten messages to guide future implementation of education or training to benefit patients:

**Step 1: Need to change**

1. The key to this step is the organisational awareness of the need for a change. This can be because of a national policy, awareness of new evidence or, a driver for quality improvement. This step ends with the initiation or commissioning of the needed educational/training intervention.
2. Ensuring that the training is targeted at patients (ideally following patient input) and that a plan is in place to deliver, monitor and evaluate the training are crucial.
3. Another important aspect is the engagement and commitment of personnel who will provide support and ensure the needed resources are available to take the issue forward.

**Step 2: Motivate to learn**

4. This step involves removing any barriers to enable access to attend the training. Sometimes it may be necessary to make the training mandatory or provide incentives to attend.
5. Staff need to recognise they need the training (this can be enhanced by prior assessment of their knowledge or skills) and recognise it as both important and relevant to their role.

**Step 3: Desire to apply**

6. This step focuses on the learner knowing what they need to learn. The learner will then engage with the learning (through innovative and varied formats and resources) and have the commitment and desire to apply the learning in practice.
7. The training should end with a period of planning about how to introduce the new knowledge and skills when back in practice.

**Step 4: Spread and embed**

8. To facilitate transfer of learning, learners need to overcome barriers to ensure the learning is transferred into practice.
9. The organisation needs to demonstrate commitment to the initiative by providing ongoing support and opportunities for networking.
10. To achieve a culture change, where the new practice becomes the regular practice, the learning needs to spread and embed. Ongoing monitoring of the expected change and regular reporting will facilitate this.
Keywords:

Realist
Transfer of learning
Patient outcomes
Patient benefit
Continuing Professional Development
Training
Education
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List of abbreviations

C Diff - Clostridium Difficile
CI – confidence interval
CLABSI – central-line associated bloodstream infection
CPD – continued professional development
CMOCs – context mechanism outcome configurations
CQC – Care Quality Commission
CVC – central venous catheter
DH – Department of Health
ED - emergency department
ETD - education, training and development
FFT - friends and family test
FU – follow up
GMC – General Medical Council
HCA-MRSA - healthcare-associated methicillin-resistant Staphylococcus aureus
HES – hospital episode statistics
ICU – intensive care unit
IMG – international medical graduate
IV – intravenous
k= thousand
LOS – length of stay
MICU – medical intensive care unit
MRSA - meticillin-resistant Staphylococcus aureus
NTS - national trainee survey
NSS - national staff survey
OOH – out of hours
PG – post graduate
PRG – patient reference group
PICC - peripherally inserted central catheter
PDSA - Plan, Do, Study, Act
QI – quality improvement
QOL – quality of life
RAMESES – Realist And Meta-narrative Evidence Syntheses: Evolving Standards
RCT – randomised controlled trial
SHA - Strategic Health Authority
SHMI - summary hospital mortality index
SICU – surgical intensive care unit
TQT - training quality team
VAD – vascular access device
VAP – ventilator associated pneumonia
VTE – venous thromboembolism
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1 Background

The need for a flexible workforce is increasing, as health and social care systems position themselves to address future challenges in funding and demographics, reflecting increases in the complexity of patients’ health needs, and inequalities in health outcomes. The need to deal with these challenges in a context of workforce shortages and insufficient public-sector funding, has forced inefficiency savings such as extending the use of agency staff, replacing or extending roles with cheaper alternatives, and minimising training times. Other efforts have included attracting staff into training places through bursaries, especially in nursing. This context makes the efficient management of training and training budgets essential to the address the workforce pressures facing health and social care. A flexible and innovative workforce, with the ability to learn new skills and absorb additional roles, would be a major contributor to the provision of an efficient and effective health service.

The NHS spends over £40 billion on training, including a range of formal and informal activities from the education and training of staff to continuous professional development (CPD). However, evidencing how staff education and training benefits patients is challenging both theoretically and empirically, and has adopted a mythical quality. Many attempts to demonstrate the impact of training and education aimed at staff often stop at answering only questions of effectiveness (does it work?) and do not account for issues of complexity (answering how, why, and for whom interventions work?), and therefore do not make the next step of showing a patient benefit.

Although the evidence is growing for the impact of education on patient outcomes, particularly in the field of systematic reviews, even these findings often provide limited evidence, and do not measure, or explain, how education achieves patient impact.

Providing a clear, detailed, and dynamic account of how learning is transferred has been the business of educators, academics, and healthcare professionals interested in work-based learning. Studies have identified many enablers and barriers in the context of a work environment, at the learner level, and at the training intervention level. More recently, the active role of the learner as an agent, rather than a passive recipient of training, has been explored. Billett’s work combines these in his research on workplace learning.

All these studies, when applied to the field of healthcare, are important in underpinning evidence-based practice. However, the ability to specify the theoretical and practical application and transfer of learning would be enhanced considerably, if we can take numerous enablers and barriers, and the multiple actors involved in education, and explain how they interact with each other to produce desirable outcomes.

This provided the impetus for our realist approach to transfer of learning. We present a dynamic account of how learning can be transferred to benefit patients, thus extending previous large-scale reviews of education and outcomes, and transfer of learning models beyond the usual focus solely on the educational outcome. Our extension involves a consideration of the conditions for learning before education is implemented, and of the outcomes of learners’ behaviour changes on
patients, rather than the behaviour changes themselves. Therefore, to our knowledge, the body of work presented here contains the largest review produced so far, in both size and scope.

1.1 The rationale for this research

Despite the increasing focus on “outcomes research” in medical education,(29, 30) the endeavour to demonstrate and explain links between the education of health and social care professionals and patient outcomes is beset with challenges. First is the ambitious aim to evidence the chain of events that link education or training targeted at staff to improved patient outcomes. To address this, researchers in healthcare education often use indirect measures to act as the pathway to clinical outcomes.(31) Secondly there are several methodological challenges of inadequate sample sizes, failures to establish causal links, and bias in outcome selection.(29) Thirdly there are the empirical challenges of attribution and dilution of the impact of education as it is filtered through healthcare professionals and systems towards patients. Understanding what makes training successful for patients (when it is measured) is complex, as systemic and contextual challenges hinder either the interventions themselves, or the evaluation of them. For example, Mathers et al.(12) highlighted several successful CPD interventions, but the change cycle was often not completed, making the measurement of impact on patients impossible. Much of this challenge is associated with the focus on clinical or health outcomes, in response to social priorities, rather than disciplinary or educational priorities, where the focus on professional behaviour outcomes is usually sufficient.(29)

“...the on-going relative lack of focus on patient outcomes (experience, clinical effectiveness and improved safety) supports the tired belief within our community that we cannot “close the education loop”... this out-dated focus of medical education research, is both myopic and costly”.(32)

To address these challenges, it is important to adopt methodologies that offer explanatory power about how education and training results in outcomes for patients, by considering contexts and the complex pathways of change.(33, 34)

In order to ensure that we captured patient outcomes, and not staff behavioural or practice outcomes, we used Kirkpatrick’s four-level model of educational outcomes(35, 36): (1) reaction/satisfaction; (2) knowledge, skills and attitudes; (3) behaviours; and (4) results), now adapted to six levels: (1) reaction/satisfaction; (2a) changes in attitudes; (2b) acquisition of knowledge and skills; (3) behavioural change; (4a) change in practice; (4b) benefits to patients/clients), also advocated by Cook & West.(29)

This model was intended to encourage more holistic and comprehensive evaluations, although Kirkpatrick acknowledges the limitations of outcome measurement. Many studies focus only on levels two and three, however the focus of our review was on outcomes measured to be of benefit to patients (level 4b).

We would like to note that while we believe outcomes that benefit patients are ultimately the remit of health and social care services, we also believe this to be one of many worthwhile outcomes.
Therefore, educational interventions that seek to achieve improvements for learners and staff, are also valuable and should not be considered as lesser outcomes.

1.2 Definition of education and training

Salas et al. (37) have highlighted the importance of context and complexity by viewing training “as a system”, not a one-time event. This involves considering what happens before, during, and after training.

“This system must promote the application of newly acquired skills to the job. So, we suggest that what happens in training is not the only thing that matters—a focus on what happens before and after training can be as important. Steps should be taken to ensure that trainees perceive support from the organization, are motivated to learn the material, and anticipate the opportunity to use their skills once on (or back on) the job.” (37)

We have focused on both education and training in this research. Education is often defined as gaining theoretical knowledge, and training is defined as gaining practical skills. Health and social care professionals, such as: doctors, nurses and care workers learn theoretic knowledge but use practical skills to support patients, service user, clients and residents. However, skills can be required (and imparted) in education, and theoretical knowledge can be required (and imparted) in training. Sometimes, the term education is associated more with schools and universities; whereas training is associated with workplaces. Although there may be a slightly different emphasis, the terms are also used somewhat interchangeably. Thus, highlighting the two types of learning are intertwined for these professionals, and therefore it is meaningful to combine them. In the UK the main recipients of this research, Health Education England also use the terms education and training together recognising their close relationship.

The terms education, training and intervention are used interchangeably throughout this report. It was not essential to differentiate between these terms for the purpose of this current study. We defined an educational or training intervention as:

A system of education or training (either a programme or a component of another intervention) that is targeted at health and/or social care staff who have a patient/client facing role, with the aim of improving the knowledge, skills, behaviours, or practices of those staff, at the individual or team level.

1.3 Transfer of learning theory

Realist approaches begin by eliciting and formalising an overarching theory, explaining how the set of interventions being explored may work (or not) and how desired outcomes are achieved (or not). Therefore, in keeping with a realist approach (explained more in methods), we started with the aim of developing a programme theory. A programme theory is an explanation describing how an
intervention is expected to lead to its outcome and in which conditions it may do so (specifying what mechanisms will generate the outcomes and what features of the context will affect whether or not these mechanisms operate).

We therefore explored existing transfer of learning models to provide a framework of theoretical constructs. An integrative review of training transfer into practice was conducted. (18, 20, 38-43) Many of these models provided a compilation of factors that influence the transfer of learning, and present models of association between factors, but did not extend to an explanation of their linkages and processes (see Appendix 1 for a summary comparing the different models). These models were not seen as having sufficient evidence of transfer of learning or were not easy to apply in the work context.

For example, Holton’s Learning Transfer System Inventory (LTSI) is an 85 item instrument which involves ability factors, motivational factors and work environment factors. In this model there are a large number of variables and a large number of questions (38), and in practice there are few differences between some variables, such as effort performance expectancies and performance outcome expectancies.

Baldwin and Ford proposed a simple model that suggested the transfer of learning depends on training inputs that included: trainee characteristics, training design and work environment (38), and how they relate to one another. The model suggests that the outcome of training is influenced by trainee characteristics and the work environment in a direct manner. Learning transfer and retention of learning could also be affected by an individual’s motivation or supervisory support.

The model enables evaluators to assess the impact of each input factor on training and ideally improve learning in all areas, particularly looking at how learners’ motivation to transfer is related to later job performance. However, this model was limited as it does not fully explore the transfer of learning back into practice. The model concentrated mainly on individual learning rather than the transfer of learning. Research in this area has often concentrated on short-term impact and on individual factors, rather than looking at a more dynamic interactive approach between the different factors to the transfer of learning.

In contrast, Kirwan (38) synthesised the common factors identified from these models presented above and identified a revised transfer of learning theory. We therefore chose this model by Kirwan (38); illustrated in Figure 1; a comprehensive but clear synthesis of previous models, for its applicability and clarity, and for its ability to allow analysis at multiple levels: the individual (the learner), the education/training (intervention) and the work environment including peer and manager (support).
No transfer of learning will occur without individual agency; that is the action taken by learners to implement their new knowledge and skills. Kirwan’s model,(38) which was tested in the Irish Health Service, specifies three necessary outcomes for learners throughout training which occurred primarily during one of each of the three stages of the learner pathway; before, during and post training:

1. **Motivation to learn:** Before training individuals see training as an opportunity to learn and develop. The educational intervention must be relevant and show how the individual can transfer the learning to the workplace. The credibility of the content and the trainers all support learning and reduce resistance to learning transfer.

2. **Motivation to transfer:** During training learners learn and develop the desire to apply their learning. This is crucial to any transfer of learning. Their commitment is influenced by factors such as willingness to apply the learning, a belief that it can be applied and whether any effort made by them will be effective and acknowledged. This central point in the model is influenced by the intervention, individual motivation, peer and manager support and how receptive or resistant the organisational climate is to change.

3. **Personal ability to transfer:** Post training, on return to the workplace, the degree to which individuals are able to transfer learning into practice. This is the point at which change occurs. This includes peer support, manager support and organisational climate for transfer. This stage requires the individual to make the time and ‘mental space’ to apply the learning to the workplace.

These characteristics increase the potential that motivation and ability will support the transfer of learning to the workplace. The roles of motivation to transfer learning and personal ability to transfer learning are pivotal at the level of the individual, where educational interventions tend to be aimed.
The concepts outlined in Kirwan’s model provided analytic building blocks for our theory-generation.(38) The model can be applied to a realist approach and its concepts broken into the recognised context, mechanism and outcome variables. Contexts refer to the conditions in which interventions are delivered, and mechanisms are activated to produce the outcome. However, none of the transfer of learning models or theories provided a framework which allowed the impact of learning to extend to patient outcomes. Rather, they focus on educational or learning outcomes.

1.4 Aim and objectives

This study aimed to develop an evidence-based framework for commissioning, quality assurance, and evaluation of education/training in health or social care settings to ensure each intervention reaches patients. This broadening of perspective also offers a generalisable and sustainable model, which can be applied locally, nationally, and internationally.

Our objectives were to:

1. Develop a model, through a realist synthesis of published evidence, to identify and explain the processes involved in the transfer of education or training into practice of health and social care staff to improve patient outcomes (safety, clinical effectiveness, patient experience).
2. To test the model in a realist evaluation of primary data gathered in actual healthcare settings
3. To explore routinely collected data on patient outcomes and contributory factors to evaluate its use in developing and testing models of learning transfer.

1.5 Overview of realist approach

This study used a realist approach to identify the evidence that educational/training interventions can reach and benefit patients. This approach is summarised here. The main aim of this research was to identify an evidence-based model, which can be used to guide education/training interventions that reach and benefit patients. We have used the term ‘patient’ throughout, but by this term we would include ‘service user’ and ‘client’ (as reflected in the search terms).

Realist approaches start by identifying relevant, existing theories, which are then used to help identify patterns in the data. The data is interpreted alongside the theory and this process is then built upon by developing and testing a programme theory that explains how and why interventions benefit patients, rather than simply identifying whether an intervention works.

The first phase of this research involved a realist synthesis of the international literature. The search was designed in consultation with key informants and experts within education, educational policy, organisational psychology, professional governance, and from educators and researchers in the international health and social care community and with input from a Patient and Public Involvement (PPI) group. The synthesis of evidence was used to identify existing evidence from the literature (studies that reported patient benefit) and with each published study we identified the study contexts (organisation, problem, staff etc.), processes (what was supporting the study outcome) and measurable outcomes that showed patient benefit.
We explored transfer of learning theories that could help us to understand the elements that are needed to ensure training transfers to practice. We spoke to experts about the theories and worked with methodology experts to support the development of our own programme theory explaining the transfer of learning to practice. From the synthesis of the international literature we were able to develop an evidenced-based programme theory of how educational and training reached and benefitted patients. Input from our PPI group informed an earlier iteration of the model, revising a five-step model into a four-step model, in which Step Five; patient outcomes, were incorporated into Step One, thus ensuring patients were targeted right at the start of any intervention (also reinforced by our Think Tank).

The second phase involved testing the theory that was evidenced from the international literature with case studies. We explored our programme theory with cases from the UK National Health Service (NHS), expecting that some aspects of our theory may need further refinement and that other factors, not reported in the literature could be missing from our programme theory. We tested our theory using five case studies. Some of these were more successful than others, some had certain elements missing (organisational support, mandatory training) and again this informed our programme theory. We noted that most of the evidence in the literature started from a ‘top down’ organisational perspective, and only one case study included a ‘bottom up’ approach where individual staff attempted to introduce interventions for patient benefit. Therefore, we invited (via a survey) staff registered and regulated by the Health and Care Professions Council to provide personal testimonies of their own education/training (Continuous Professional Development) which they believed had benefited patients. Evidence from individuals reinforced our model, and provided more evidence of Step Two, but more importantly highlighted how flexible our programme theory was. Following these tests, we termed our programme theory a model.

Our final test to our programme theory involved the use of information from national health and education databases. We developed a theoretical model which might identify links from education to patients. However, without national data on educational interventions we were not able to attribute training to the patient indicators.

This report will first present the methodology and findings of the realist synthesis of the published evidence, followed by phase two: case studies, survey and analysis of routinely collected national data. This process has identified the need for publication guidelines for future authors to ensure the links from education to patient benefit are clearly evident. Finally, our discussion explores the impact of this work and details how it can be used to inform education/training commissioning decisions, quality assurance, and evaluation of education and training interventions.
2 Realist Review

2.1 Realist Review Methods

2.1.1 Rationale for adopting a realist approach

We aimed to produce a coherent explanatory model to evidence how education and training can transfer to practice to reach and benefit patients. The effectiveness of interventions used within health and social care practice can vary depending on a variety of factors; including the context (e.g. infrastructure, leadership and levels of support), implementation process and participants.

A realist synthesis is a ‘systematic, theory-driven interpretative technique’ (44, 45, 46) that offers a view of the internal workings of complex interventions, by demonstrating nuanced answers to: “what works, for whom, under what circumstances, how and why?” (47, 48) rather than focusing solely on outcomes. Such theory-driven approaches offer a more appropriate alternative to other approaches as they attempt to unpack the ‘black box’ - the ‘ifs’ and ‘buts’ in the chain of causation between the intervention inputs and complex pattern of outcomes (44, 46, 47). The fundamental purpose is to improve the thinking that goes into the delivery of interventions.

Identifying how best to invest in staff education and training would make a major contribution to health and social care systems and the wider field of professional education. There has been a call for use of evidence syntheses to identify how professionals can transfer knowledge into improved health outcomes for patients (44). We conducted our review in line with Realist And Meta-narrative Evidence Syntheses: Evolving Standards (RAMESES) publication standards for realist syntheses.(47)

2.1.2 Applying the realist approach

Interventions represent ideas or theories, often created by those who develop and implement them, about the way in which outcomes can be achieved. The task of using the realist approach is to identify the core theories (programme theory) about how the intervention works and then test these to see if they are valid, practical and applicable in other contexts.

Realist synthesis deconstructs complex interventions to understand contextual factors that affect intervention success and what mechanisms drive change, resulting in an individual’s actions or outcomes. (44, 45, 46) A realist synthesis assumes that a particular intervention (or class of interventions) will trigger certain mechanisms differently depending on the context. Theoretical explanations that are constructed through the realist approach are referred to as ‘middle-range theories’ (46). Middle-range theory starts with a testable idea (hypothesis) and tests it using data. Middle-range theories are considered temporary, work in progress and aim to develop theories about the social world. This differs from grand theory (theory that is highly abstract and untestable).

The aim is then to test the middle-range theories against data (using primary or secondary data) to see if the theory or aspects of it are supported. The aim is to produce generalisable findings from in-depth analysis of the themes and patterns in the data (contexts and mechanisms) and identify a programme theory, which is then tested and refined with further data (discussed later in the evaluation stage).
In realist approaches, context refers to the conditions in which an intervention is introduced (for example this could include both fixed factors, such as organisation and staffing, and variable factors such as leadership and culture) that either enable or disable the desired mechanisms to operate and trigger the outcome (46). Mechanisms are not visible and operate largely at a cognitive or psychological level. Mechanisms are defined as ‘...underlying entities, processes, or (social) structures which operate in particular contexts to generate outcomes of interest’ (46). The intervention is introduced into the context, and changes the context by enabling difference choices to be made, but it is the mechanism than leads to the outcome rather than the intervention. Outcomes refer to the consequences of interventions, either intended or unintended, resulting from the individual’s response (mechanisms) in differing contexts.

Pawson and Tilly state that the aim of realist approaches is to produce generalisable findings from in-depth analysis of the themes and patterns by identifying the relevant contexts and mechanisms that lead to the desired outcome. (46) The aim of the synthesis was to analyse each study, initially using Kirwan’s Transfer of Learning Theory to support understanding of transfer of learning, but to further develop a programme theory that additionally explains how education and training of health and social care staff transfers to practice and leads to patient benefit.

2.1.3 Piloting and scoping the review

The review began with a piloting phase in which papers known to the research team were discussed with clinicians, the patient reference groups, academic experts and members of the advisory group. Search terms were then developed and refined with support from an information scientist.

Initial searches returned very large numbers of results due to the breadth of several key search terms (e.g. “training” and “intervention”). Following further consultation with the information scientist who had expertise in database searches - a more focused search was conducted in Embase using three key search criteria:

1. “Education” (exploded) AND
2. (“Patient outcome*” or “health outcome”) AND
3. “Health personnel” (exploded)

The focused search was designed to yield a higher proportion of studies which would be included in the review when assessed against our inclusion and exclusion criteria, but it did not include the wide range of terms in the full search and was conducted on one key database (Embase). This pilot search returned 2190 results. Of these, 424 (19%) were included, and 1549 were excluded for the reasons outlined in Table 1.
Table 1. Reasons for excluding papers from pilot search

<table>
<thead>
<tr>
<th>Exclusion criteria</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 = Not empirical research (e.g. superficial description, anecdote or commentary)</td>
<td>251 (16.2%)</td>
</tr>
<tr>
<td>2 = No education/behaviour change intervention</td>
<td>136 (8.8%)</td>
</tr>
<tr>
<td>3 = No evidence of patient outcome (i.e. Not Kirkpatrick Level 4b)</td>
<td>814 (52.5%)</td>
</tr>
<tr>
<td>4 = Not healthcare/social care setting or healthcare/social care staff</td>
<td>306 (19.8%)</td>
</tr>
<tr>
<td>5 = Other</td>
<td>42 (2.7%)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1549</td>
</tr>
</tbody>
</table>

A further 123 were re-visited as they were coded for either background reference, offering potential theoretical explanations (n=76) or because they were relevant papers for follow-up but did not meet the inclusion criteria (n=47). The remaining papers were either duplicates or titles only. We investigated any anomalies with the search engine results as they arose.

Of the 424 papers initially identified in the focused search, 39 were primarily reviewed by 13 members of the review team, of which 22 high quality papers (detailed accounts of educational interventions and possible mechanisms) were included for analysis. A data extraction sheet was developed, piloted and modified using these papers (Appendix 2: data extraction sheet). Both rigour and relevance were summarised. Rigor is defined, as “whether the methods used to generate that particular piece of data is credible and trustworthy” (47), papers are not selected by design or graded for quality. Relevance is the assessment of relevance to the developing theory “whether it can contribute to theory building/or testing”. With regard to realist perspective, we might include papers that are low on rigour and high on relevance as they consider clear aspects of the developing programme theory (for example a small descriptive study). This detailed analysis had two purposes: the first, to establish the level of consistency between the review team; and secondly, to map any relevant concepts onto Kirwan’s model of learning transfer. Our challenge was to identify concepts that would show how a transfer of learning model that was created to explain learning or behaviour change as outcomes, could be extended to include outcomes for patients.

An initial analysis was conducted on twenty-two key papers. These papers were analysed using Kirwan’s Transfer of Learning model, highlighting key concepts from the model that were identified in each paper. An example is illustrated in Appendix 3 Through extensive discussion and review of the selected 22 papers, we identified factors and characteristics that were then synthesised into an initial conceptual framework. This framework helped identify possible features of articles under review as contexts, mechanisms, or outcomes in ongoing data extraction, according to the theory, and facilitate some consistency across the review team. Contexts are pre-existing conditions into which interventions are introduced, although interventions can contribute new resources into these contexts. Mechanisms are processes of how people interpret and respond to, or act upon the resources offered by the intervention. Thus, the intervention alone does not constitute a context or a mechanism. Outcomes refer to the consequences of interventions, either intended or unintended, which result from the individual’s response in differing contexts. Figure 2 presents the initial programme theory, which informed subsequent analysis. From here, the theory evolved iteratively with analysis.
On four occasions throughout the study, a realist expert (Geoff Wong) provided realist methodology training for the research team to help ensure quality and rigour with regards to realist methodology.

### 2.1.4 Main search strategy

Analysis of key sources on learning transfer, together with our research questions, consultation with subject matter experts and selected members of the advisory group, all helped to define the scope of the literature searches. The search terms were grouped into three concepts and their related terms:
1. Educational interventions (e.g. simulation training, supervision, work-based training, continuing professional development, assessment, appraisal) (concept 1)

2. Patient outcomes (e.g. length of stay, mortality, morbidity, duration of illness, complication rate, quality of care, patient benefit, patient experience, patient safety, quality of life) (concept 2)

3. Health and social care professions grouping (e.g. nurse, doctor, allied health professional, interdisciplinary, trainee) (concept 3)

The databases included Embase, Social Services Abstracts, PsycINFO, CINAHL, and Social Care Online. We chose these to ensure medical, non-medical and social care staff would be captured in the literature. The complete set of search terms and search limitations is available in Appendix 4. Selected papers needed to include a search term from all three search concepts (i.e. education AND patient outcomes AND health/social care occupational groups).

Given the broad scope of the search terms, it was not feasible to run the full search across all databases. This was confirmed by test searches which generated a very high number of results (e.g. approximately 240,000). In consultation with the information scientist, the main search strategy involved two strands:

1. **Full Search:** All search terms from the three concepts were submitted to a key word search in Embase (including Medline) and Social Services Abstracts. This yielded 13,486 returns.

2. **Focused Search:** A more specified search was conducted using PsycINFO, CINAHL and Social Care Online. Papers indexed with subject headers relevant to education (concept 1) and healthcare occupational groups (concept 3) were included, as well as papers that also included a search term from the full list of search terms related to patient outcomes (concept 2). This approach targeted relevant papers more effectively, as several search terms in the full search were generic (e.g. supervision, user satisfaction) or had multiple meanings (e.g. orientation, degree, resident). Subject headers and Medical Subject Heading (MeSH) terms were exploded and relevant search terms were retained. This search yielded 8,568 returns.

To ensure that relevant papers were not missed, full searches were also conducted in PsycINFO and CINAHL. A sample of papers were examined that were included in the full search results, but not the focused search results. No relevant papers were identified and we progressed with analysis of the focused search. The database ERIC was considered but not included: following discussion with the information analyst, it was felt that it would not return patient outcomes.

### 2.1.5 Selection and inclusion

Across both searches, sources were limited to include peer-reviewed papers published between 2004 and 2015, and only those published in English. Where database search limits allowed, the search was restricted to peer-reviewed papers with abstracts (excluding conferences). Only sources which included a measurable patient outcome were included. The outcomes were identified using
five categories: clinical outcomes, patient experience outcomes, patient safety outcomes, and no patient benefit (see Table 2). The fifth outcome, cost effectiveness, emerged from the literature.

Deciding how best to examine the impact and reach of education and training of the health and social care professionals is complex. However, Kirkpatrick developed a model that is frequently used to illustrate the type of impact that interventions can have: levels 1–3 are focused on learners and level 4a is focused on organisations, and level 4b on patients. In this review we focused on education or training interventions that produce patient benefit (i.e. Kirkpatrick level 4b). Thus, only those which include a measurable patient outcome are included.

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical outcomes (O1)</td>
<td>Measurable changes to patient physical and mental health (e.g. behaviours which could be clinical assessed) which was intended by the intervention.</td>
<td>Reductions in mortality, pain, HbA1c, quality of life, hospitalisation rates, or improved function; negative health behaviours like smoking, resistance to breastfeeding, and drug regimen adherence.</td>
</tr>
<tr>
<td>Patient experience (O2)</td>
<td>Only included where the patients had directly reported them: health professional reports of patient perceptions and experiences were not deemed sufficient evidence of a patient outcome.</td>
<td>Patient satisfaction, discomfort associated with a procedure, and rate of screening.</td>
</tr>
<tr>
<td>Patient safety (O3)</td>
<td>Reductions in harm associated with patient care or procedures.</td>
<td>Reduced errors, falls, central line bloodstream infections, pressure ulcers, postpartum haemorrhage.</td>
</tr>
<tr>
<td></td>
<td>A modest group of papers compared the clinical outcomes of trainees or students with more experienced clinicians. Where no differences were observed, patient safety was coded as being maintained.</td>
<td>Morbidity or mortality, complication rates, length of stay, readmission rates, and operative times.</td>
</tr>
<tr>
<td>Cost effectiveness (O4)</td>
<td>Cost avoidance, savings, and cost per case</td>
<td>Cost of length of stay, cost of stay, reduced hospital visits, average cost of case</td>
</tr>
<tr>
<td>No patient outcome (O5)</td>
<td>Interventions from which patient benefit was intended, but was not produced or was not significant.</td>
<td>—</td>
</tr>
</tbody>
</table>

2.1.6 Data extraction

Results from the pilot search (2190) and the full and focused searches (22054) were combined and compiled into Endnote (a bibliographic software package). Results were then screened by the researchers. Data extraction for included papers was conducted using an extraction form designed for the purposes of this review (Appendix 2). A team of 13 reviewers were involved in reading and coding full papers. Reasons for exclusion were coded.
The following data items were extracted from all included full text sources: (i) summary of paper (aim, setting, population, design, methodology, limitations, indications of rigour), (ii) descriptions of the education and training intervention, (iii) outcomes, (iv) possible context variables, (v) possible mechanism variables, (vi) direction of effect on patient, (vii) theoretical inferences, and (viii) any important references to follow up. The initial transfer of learning theories discussed were used to guide data extraction. This process ensured transparency.

2.1.7 Synthesis and programme theory development

2.1.7.1 Developing codes from all included papers

A coding framework was iteratively developed and shared among the review team. Context, mechanism and outcome variables were allocated a code and a sample of the papers were double coded to help maintain consistency across reviewers. The initial programme theory (five-step) was used as a guide for mapping the links between context (C), mechanism (M), and outcomes (O) as described or inferred by authors, known as Context Mechanism Outcome Configurations (CMOCs). These were generated through identifying patterns (demi-regularities) in the data for each paper. These codes can be seen in Appendix 5. However, it is important to note that, as is typical in realist approaches, the coding frame evolved iteratively: the four-step programme theory is the product of several iterations of coding, where coding in early analysis were grouped together and re-labelled as analysis progressed. Each paper was coded and categorised to produce a preliminary five-step framework, where patient outcomes were categorised in a fifth step. As analysis progressed, we refined the framework into a four-step programme theory. The table contained in Appendix 5 was our analytic tool for final refinements, and therefore does not perfectly match the codes in the four-step programme theory presented below. However, the outcome codes (O1-O5) are consistent across the table of included papers (Appendix 5), and the programme theory.

These codes were tabulated to ensure their coherence using methodology described by Ford et al.(49) This process generated logic statements about how contextual concepts create the conditions for mechanisms of behaviour, and how the interactions of contexts and mechanisms result in patient outcomes.

Where context or mechanisms could not be linked to a patient outcome (clinical effectiveness, patient experience, patient safety, a financial service outcome, or a negative outcome), the paper became a candidate for exclusion in the development of theory. However, many were included if they contained partial CMOCs, for example where only context and outcome variables, or mechanism and outcome variables were identified. Configurations implied by the original transfer of learning theory, but not represented in the literature were also identified. Relevant concepts from the papers were coded inductively where they did not accord with the programme theory. In this inductive and deductive manner, a comprehensive coding frame was created. The refinement of codes and their linkages was further supported and tested through team discussion, the sharing of exemplar papers and consideration of alternative codes and CMOCs.
The intervention is introduced into the context, and changes the context by enabling difference choices to be made. Therefore, the interventions are separate to the context and do not fit within the realist categorisation of contexts, mechanisms, or outcomes. (50)

2.1.7.2 Key paper analysis

We aimed to ensure that a sufficient number of papers were reviewed in-depth to build an explanatory programme theory. We initially identified papers that were of high relevance (47) and rich in process (mechanism) data, lending themselves to detailed CMOCs, thus offering explanatory richness and evidence for our emerging programme theory. Other exemplar papers were identified but were not included in the detailed analysis stage (data saturation reached).

Key papers were imported into NVivo qualitative data analysis software program Version 10 (51) and analysed by multiple team members independently. Reviewers then discussed coding selections and descriptors, to enhance consistency and develop a shared understanding of CMO configurations. Memos were written throughout analysis to ensure an audit trail was maintained and to enable any thoughts to be discussed at team meetings. Separate configurations for each paper were used to refine and modify the original transfer of learning model and were combined to provide an evidence-based model of learning transfer in health and social care. The papers were coded and re-coded twice by three authors to ensure consistency. Authors were contacted for clarification or comment in some cases.

The final stage of the synthesis involved compiling all the included papers to identify any areas of the developed programme theory that were under-supported and to challenge the programme theory with the data. This led to final amendments to the programme theory (e.g. merging, re-naming, or simplifying sections), which was subject to scrutiny by members of the advisory group.

We revised Kirwan’s model recognising there were more details to add and hence we developed our initial five-step theory. Each step of the programme theory identified a process which was key in terms of reaching a patient outcome. Kirwan’s model stops at the individual-level of performance (behaviour) and therefore corresponds to Kirkpatrick level 4a, therefore a programme theory needed to extend to patient outcomes.

In line with the RAMESES guidelines (47) we also sought to close any gaps identified in the evidence by conducting secondary searches. These findings could potentially lead to further understanding about the processes involved in learning transfer. It was necessary to move iteratively between all data to test emerging middle-range theories.

2.1.8 Quality Assurance

2.1.8.1 Establishing coding consistency

The initial analysis during the pilot phase enabled the team to establish a common coding approach and assessed the level of agreement between reviewers. Inter-rater reliability was high – 5 papers were included by all raters. This process also enabled the research team to check for the inclusion of
key papers (identified from initial searches and consultation with experts), to test and develop the inclusion/exclusion criteria (to enhance calibration of coding across raters in the research team), and to refine the search terms in the main search. Inclusion and exclusion criteria were modified using coding instructions.

Several measures were taken through the analysis process to develop a shared approach to coding across all team members. These measures are described in descriptions throughout the project, and mainly refer to team meetings where ideas about coding and interpretation were shared, discussed, and challenged. Most of the included papers, and all of the key papers, were analysed by more than one team member. These measures not only served the research by mitigating inconsistencies, but interpretations also benefitted from a broad spectrum of analysts, including clinicians, qualitative health and medical education researchers, and researchers with expertise in realist methodology. This provided a robust coding framework.

2.1.7.2 External Consultation and engagement

Advisory Group

An advisory group was established to offer expert advice and guidance at key stages in the project:

- Initial framework conception
- Development of the literature search strategy
- Towards the end of the literature analysis on the emergence of the concepts that link education to patient outcomes
- On the evidence that emerges from the case studies
- Feedback from reports
- Advice on dissemination

A Think Tank was hosted by the project team in July 2018, to explore the perspectives of patients and international academics, about the final programme theory. Two patient representatives attended, and one delivered a talk to showcase the role that patient and public involvement (PPI) has in health and social care research. They both contributed significantly to discussions throughout the day, and positively engaged with the research, the programme theory, and raised awareness of the importance of patient contribution at the beginning of an intervention.

Members of the advisory group were approached for specific areas of advice, based on their expertise (See Appendix 6). The research team also engaged with several other experts in the fields of health and social care education, which helped to inform the development of the research.

- Prof Larry Gruppen from Michigan University (USA) commented on the study potential, suggested key references to follow up [September 2014], and commented on earlier versions of the report [Oct 2017].

- Prof Karen Mann from Dalhousie University (Canada) discussed her insights on links between education and patient outcomes and identified potential references to follow up [October 2014].
- Rebecca Ellis presented her work on Human Factors and Simulation Training (HuFaST) with an NHS Trust in December 2014. HuFaST was based on Crew Resource Management (CRM) and the programme designed using Kirwan’s transfer of learning model. An eight week follow up demonstrated patient benefit (including a reduction in patient falls). She also described case studies from the steel mining/construction industry and the nuclear energy industry on risk management interventions.

- Several members of the research team met with Sue Covill (Director of Employment Services, NHS Employers) in August 2014 to discuss the development of educational policy in the UK.

- A workshop was organised for the team of reviewers to which Cyril Kirwan was invited to explain the transfer of learning model and received earlier versions of the report for comments.

- Geoff Wong discussed how to conduct a realist synthesis in several workshops and provided ongoing advice throughout.

- Emma Nunez, Head of Quality, NHS England North, presented the Investing in Behaviours interventions in the region developed in collaboration with Jim Kirkpatrick (Kirkpatrick Partners).

- Ciaran Crowe, National Medical Director’s Clinical Fellow, presented a quantitative model used to predict poor quality in medical education.

**Patient and Public Involvement (PPI)**

A patient reference group was established to obtain feedback and guidance from patients at three key stages of the project. The members of the group were recruited from existing and known patient reference groups within the former Durham University School of Medicine, Pharmacy, and Health. The PPI group comprised of nine males and four females. There was a range of age group from late 20s to retired members over 70. The PPI group also had representatives from different ethnic groups, individuals with disabilities, and a range of experience with the NHS (including patients who were general NHS users or mental health service users, patients and carers). They were invited to become members of an on-going patient reference group by invitation via established internal links (see Appendix 7).

The invitation included a participant information sheet outlining the project and what would be expected of the group and its members. We explained that members might be expected to participate in discussions with the research team, be involved in specific patient study groups, and comment on draft project reports. Participants received £30 of gift vouchers to acknowledge their time and travel costs for meetings with the research team, following patient preference to completing forms and submitting receipts. Interested individuals were asked to contact a member of the research team and following this they would receive further information about the project, including its aims, activities, benefits, what involvement would require of them, and that they had rights to withdraw at any time. If they agreed to become a member, they were then asked to attend an initial discussion.
Across the entire study, three meetings were conducted with the patient reference group (see Appendices 7, 8 and 9 for full meeting notes). Before each meeting, the group members were provided with a brief update and agenda. The 13 members of the PRG met in January 2015 to offer their views on the project remit as well as the project design. PRG feedback identified key issues related to the importance of time to communication skills (especially listening skills), opportunities to learn in practice (work-based training), and the barriers to sharing innovative ideas across organisations. The group met again in July 2016 to comment on the emerging programme theory from the literature review results. The research team also asked the patients about how best to involve patients in the delivery of training, and how the gap between staff education and patient outcomes can be bridged. These were important questions to challenge the programme theory development and identify any areas that are not covered in the known literature. The third meeting was held in July 2017 and was used for the group to scrutinise the steps. In particular, this meeting led to the refinement of the model from five-step to four-step. The influence of the feedback provided by these meetings is addressed throughout our reporting of the results.

**Think Tank**

A Think Tank was set up on July 2018 to discuss the topic ‘How can education and training of the healthcare team involve, reach and benefit patients?’ The purpose of the Think Tank was to spend a day exploring this question and themes related to it and to present and gain feedback on the programme theory. In addition, we used the Think Tank to explore ‘How Continuing Professional Development (CPD) benefits patients?’ We attempted to reach a wide range of participants: patients, students, clinicians, educators (clinical and non-clinical), national and international perspectives, and representation from organisations who we involved with the education and training of the health and social care team i.e. Medical Schools, Health Education England, The General Medical Council and Health and Social Care Trusts.

The day involved participants being allocated to one of nine small groups. Nine national and international facilitators hosted a question for discussion. Each question was discussed in different small groups five times and each facilitators fed back to the Think Tank at the end.
2.2 Realist Review Results

2.2.1 Search results

1149 publications (from over 24000 initially identified) that included either an educational or training intervention and patient outcomes were reviewed (see Figure 3).

![Flowchart](flowchart.png)

Figure 3: Results of full (including focussed) literature search and paper review
We included 368 papers in the full analysis. A list of included papers is tabulated in Appendix 5, which details the country, setting, methodology (and control groups where appropriate), target staff group, follow up period, a description of the intervention, specific patient outcomes measured, and the context-mechanism-outcome codes for each paper. This table was used to inform programme theory refinement by identifying how well codes were populated, and providing a metric of data saturation.

Most papers reporting undergraduate or pre-qualification training were excluded because they did not meet the inclusion criteria that a patient outcome should be reported. The requirement that they were all published in the English language also limited the papers retrieved. Of 1149 papers identified for full review, 368 met the inclusion criteria. Reasons for excluding the remaining 781 papers are given in Table 3.

**Table 3. Reasons for exclusion**

<table>
<thead>
<tr>
<th>Code and Reason for Exclusion</th>
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</thead>
<tbody>
<tr>
<td>1 = Not empirical research</td>
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<tr>
<td>2 = Single case study only</td>
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<tr>
<td>3 = No education or training intervention</td>
</tr>
<tr>
<td>4 = No evidence of patient outcome (KP Level 4b)</td>
</tr>
<tr>
<td>5 = Intervention not directed at healthcare/social care staff</td>
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<tr>
<td>6 = Other</td>
</tr>
</tbody>
</table>

A large variety of settings (clinical and educational), across a variety of countries, were represented across all of the included papers. As such, we decided to streamline this for reporting purposes and full details of all included papers can be found in Appendix 5. The findings were further diversified by the broad set of professions and specialties included in the review. Setting was not a condition that featured in analysis, so although our categorisation simplified the data (and lost detail), the categorisation process did not limit interpretation. The following categories were selected as broadly capturing the study/intervention setting:

- Tertiary (that included hospital and secondary care settings)
- Primary care
- Community
- Care homes (and any other form of long term/residential care for patients)
- Paramedics
- Educational settings (e.g. medical schools)
The majority of included studies were in health care settings (299 papers; 81%). Many these studies targeted several professionals at once. Papers included the following healthcare professionals: doctors (including physicians, surgeons, residents, public health, anaesthetists, and ophthalmologists), nurses and midwives, pharmacists, managers/administrators, occupational therapists, physiotherapists, dental hygienist and others (see Appendix 10). Interventions targeted improved patient care, improved communication with patients, improved patient satisfaction (including better patient centred care), reduction in prescribing errors, improved patient safety e.g. reduction in infection rates, and reduction in length of hospital stay/visit/readmission. In addition, there were a few papers that were more public health focused; targeting reduction in weight, reduction in smoking and sexual health (see Appendix 10 for full details).

The remainder of included studies were focused on social care (69 papers; 19%, of which 13 were key papers). Settings included care homes, nursing homes, and residential care for people with mental health or learning disabilities. Staff included social workers, care home staff, nursing home staff, nurses, dining assistants/nutrition staff and mental health practitioners. Interventions for social care included: Improvement in use of medication/reduction errors/pain control, reduction in pressure ulcers, reducing falls/fractures, improved management of depression/psychiatric symptoms, improvements in behaviour, reduction in aggression/restraint and patient satisfaction (see Appendix 10 for full details). It is interesting to note that most of the outcomes for social care were health related.

### 2.2.2 Overview of key papers

For the purpose of theory development, the focus was on 51 key papers that contained more process information and detailed description of the intervention. This included three papers identified from secondary searches.(52-54) These papers were specifically sought to address gaps that were identified in Step Two (the learner is motivated and ready to learn).

Studies representing a broad range of countries, specialties and types of intervention were included. Studies were analysed from 15 countries including the USA, Canada, and numerous European and African countries (see Appendix 5 for full details; the key papers are shaded). Most were set in acute and tertiary care, including emergency departments and intensive care units. Fewer were in family medicine or primary care.(55-59) and community care and nursing homes.(60-64) Four studies were set in a mental health, neurobehavioral, learning disabilities or continuing care facilities.(65-68) Others were in specialist services such as stroke rehabilitation,(69) and paediatric diabetes outpatients.(70) These studies included single and multisite trials. Learners were doctors at all post graduate levels up to and including consultants/attendings, post qualification nurses working in a variety of specialties such as diabetes(70) and geriatrics,(71) bed managers(72) unqualified health care workers,(73) and allied health professionals such as pharmacists(74) and physiotherapists(69). Some interventions were designed for one professional group (75) and others were inter-professional(76-78) and the number of healthcare learners ranged from two,(71) to seven thousand.(76)
The content of training interventions covered a wide range of clinical care: hospital acquired infections, pneumonia and hand hygiene,(76, 79-86) errors in prescribing,(74) patient safety,(77) HIV and Aids management,(73, 87) diabetes,(55, 60, 70) falls,(63, 81) management of ureteral calculi,(88) venous thromboembolism,(89) asthma,(56, 57) advanced care planning,(61) oral health,(62) pressure ulcers,(90-92) urinary tract infections,(64, 93) hypertension,(58) correct technique for flushing 3 Fr Groshong™ catheters,(94) and cancer screening. The interventions also addressed support in elderly and acute care, mental health and learning disabilities.(65, 67, 78, 95) Some studies focussed on communication in cancer care,(96) managing aggression,(66, 71) improving nutrition,(97) and stroke rehabilitation.(69) Whereas, some studies evaluated the impact on service delivery of training staff to use QI methods(75, 98-100), improving bed management,(72) or the impact on quality of care following the introduction of an integrated training scheme.(101)

Study designs included twenty-one pre- and post-intervention studies, nine randomised control trials, and other designs such as prospective studies, an observational cohort study, experimental and controlled studies. Generally, follow up time was between 3 and 12 months post-intervention, but exceptions included Allen et al.(79) who collected data post-intervention for a duration of 37 months.

A wide range of patient outcomes were reported in the key papers, and the codes can be seen in Appendix 5 (shaded). These outcomes will also be discussed in the next section.

2.2.3 Four-Step programme theory

This section provides findings from a detailed analysis. It provides a fuller explanation, with supporting evidence, of the programme theory (Figure 4). It is important to note that each of the individual steps presented in the theory is unlikely lead to patient benefit on its own. The crucial element of this programme theory lies in their interaction and how each of the steps link, increasing the likelihood of patient benefit. Each of the steps have their own outcome that will facilitate the transition to the next step. The developed programme theory suggests that each of the step outcomes will lead into the context of the next step, thus the outcome sets up the necessary context for that step to be successfully in place. A lack of outcomes at each step will likely hinder the flow through to patient benefit, and could also hinder the positive outcomes that resulted from the previous steps.

Patient feedback also fed into these iterations, which is highlighted within the results. Overall, there was a great deal of support for the penultimate iteration of the programme theory when it was presented and discussed with the PPI panel.
### Transfer of Learning for Patient Outcomes Programme Theory

**Contexts**

<table>
<thead>
<tr>
<th>C1.1 Why was training initiated?</th>
<th>M1.1 Organisational awareness of need for change</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1.2 How was training initiated?</td>
<td>M1.2 Planning to ensure a measurable effect on patients</td>
</tr>
<tr>
<td>C1.3 Who was involved?</td>
<td>M1.3 Engagement &amp; commitment of personnel</td>
</tr>
</tbody>
</table>

**Mechanisms**

<table>
<thead>
<tr>
<th>C2.1 What was done to ensure that staff could attend?</th>
<th>M2.1 Enabling participation</th>
</tr>
</thead>
<tbody>
<tr>
<td>C2.2 What was done to ensure staff thought it met their needs?</td>
<td>M2.2 Perceived relevance &amp; benefits</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C3.1 How were learning needs identified?</th>
<th>M3.1 Learners recognise the need to learn</th>
</tr>
</thead>
<tbody>
<tr>
<td>C3.2 How did the design and delivery of education engage learners?</td>
<td>M3.2 Learners engage with learning</td>
</tr>
<tr>
<td>C3.3 How was transfer of learning considered during training?</td>
<td>M3.3 Learners anticipate implementing learning</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C4.1 How was new practice implemented?</th>
<th>M4.1 Learner is able to deal with resistance &amp; overcome barriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>C4.2 How was new practice maintained?</td>
<td>M4.2 Organisational commitment</td>
</tr>
<tr>
<td>C4.3 How was new practice spread across organisation?</td>
<td>M4.3 Culture change</td>
</tr>
</tbody>
</table>

### Step Outcome

- O1. Education or training is initiated & designed to demonstrate patient outcome
- O2. The learner is motivated & ready to learn
- O3. The learner learns successfully and has the commitment and desire to apply the learning
- O4. Learner has the capability and transfers learning into practice

**Figure 4. Summary of initial programme theory illustrating how education and training of health and social care staff transfers to practice and benefits patients (refined codes)**
2.2.3.1 Outcomes: Patient benefit from the intervention

Before we provide the explanation of how education or training of healthcare staff makes a difference to patient outcomes, a summary of the outcomes from key papers will be described. The table below (Table 4) illustrates all of the outcomes reported within each of the key papers. We will then go through each of the steps in turn, explaining how these outcomes were achieved (see Appendix 5 for a summary of all evidence illustrating patient outcomes).

**Table 4: Summary of Outcomes**

<table>
<thead>
<tr>
<th>Patient outcomes</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>O1 Clinical effectiveness</strong></td>
<td>(52, 55-58, 60-62, 66-73, 88, 97, 98, 101)</td>
</tr>
<tr>
<td><strong>O2 Patient experience</strong></td>
<td>(53, 65, 78, 95, 96, 98)</td>
</tr>
<tr>
<td><strong>O3 Patient safety, reduced errors and infections</strong></td>
<td>(54, 59, 63, 64, 74-77, 79-87, 89-94, 100, 102)</td>
</tr>
<tr>
<td><strong>O4 Financial outcome or reduced cost of care</strong></td>
<td>(70, 88, 93, 100)</td>
</tr>
<tr>
<td><strong>O5 No patient benefit</strong></td>
<td>(58, 59, 65, 70, 78, 82, 84)</td>
</tr>
</tbody>
</table>

**Outcome 1: Clinical effectiveness**

Clinical effectiveness refers to “the extent to which specific clinical interventions, when deployed in the field for a particular patient or population, do what they are intended to do, i.e. maintain and improve health and secure the greatest possible health gain from the available resources”.(103) Although clinical effectiveness is sometimes used as an umbrella term, incorporating broader elements of the patient experience as well as monitoring and evaluation, it refers to clinical and treatment outcomes in the current review.

Findings for clinical effectiveness were mixed. Several studies aimed to improve chronic conditions such as diabetes or asthma, and may have reported primary patient outcomes, such as blood glucose (HbA1c), as well as secondary outcomes such as dosage style or psychosocial outcomes.(70) Some studies succeeded, some reported positive trends that failed to reach statistical significance, and others failed to demonstrate an improvement.

A number of studies attempted to improve outcomes for diabetic patients through educational interventions. For example, Boyle et al.(60) reported positive findings with respect to hypoglycaemia, reduced ranges in HbA1c (but not overall mean levels) and cholesterol, which were maintained at follow-up. Bird et al.(55) reported a slight but non-significant improvement in HbA1c,
although patients were more likely to have been given relevant assessments and vaccinations. Christie *et al.* (70) did not find a significant improvement in HbA1c – their primary outcome, but found patients in the intervention group gained other benefits: they were taking higher doses of slow and quick acting insulin, were injecting more frequently, and reported psychosocial benefits (e.g. improved family relationships).

Several studies targeted improvements in care for patients with mental health needs and learning disabilities. Improvements in family inclusive working for mental health inpatients were reported by Stanbridge *et al.* (67) Stancliffe *et al.* (68) described a number of positive outcomes for individuals with learning disabilities following an active support intervention. These included: increased domestic participation, increased adaptive behaviour (personal living skills, community living skills, and broad independence), decreased challenging behaviour, and decreased depression. Improvements in agitation among residents in long-term care were reported by Landreville *et al.* (71), and Narevic *et al.* (66) found evidence for a reduction in physically aggressive behaviour by clients with neurobehavioral difficulties.

Two studies focused on asthma care. Cabana *et al.* reported improvements in urgent healthcare utilisation for asthma patients, as well as on the impact of asthma on daily living and sleep (57), particularly for patients with high baseline symptoms. Improvements in the use of asthma controller medications and patients possessing a written care plan were also found by Boychuk *et al.* (56) However, Boychuk *et al.* noted that they did not intend to link the education to quality of life improvements, and that the patient outcome may only partially be attributed to the educational intervention.

Remaining studies targeted a broad range of clinical effectiveness areas. For example, improvements in patients’ nutritional intake and nutrition-related care (e.g. help to cut food, feeling hungry) were observed by Pedersen *et al.* (97) Brede *et al.* (88) found that an educational intervention increased medical expulsive therapy prescriptions for ureteral calculi, and adverse outcomes were less common with this approach. A functional improvement in motor skills in both arms was reported following a stroke rehabilitation team training intervention. (69) Training on advanced care planning to reduce unnecessary hospitalisation of nursing home residents resulted in a decrease in hospital admissions and emergency calls. (61) An intervention to prevent HIV/AIDS found a significant improvement in the knowledge of target groups and trends suggesting a reduction in risky behaviours, but these were not significant, and sexually transmitted disease rates increased (73). One study found a significant positive difference on level of general behavioural disturbance, including improved depression and anxiety scores. (52)

An intervention to increase the time spent by trainee doctors in learning and teaching activities was not associated with a higher average length of stay or readmission rate, (101) representing a patient outcome of no change.

Cullen and Titler (98) described a nurse internship programme which initiated a range of projects encouraging evidence-based practice. The authors reported that projects have resulted in decreases in length of stay. A reduction in cancellation of operations was found following bed management training. (72) No significant improvements in smoking and physical exercise were evident following
training on hypertension management.(58) Finally, some improvements in denture plaque among nursing home residents were detected after the implementation of an oral hygiene intervention.(62)

**Outcome 2: Patient experience**

In this review, patient experience refers to the non-clinical outcomes for patients and their subjective experience of care, including satisfaction with care and quality of communication and interactions with staff. As with clinical effectiveness, the findings were somewhat mixed. For example, Lienard *et al.* (95) investigated the effects of communication skills training and found higher patient satisfaction for trained residents compared to controls. Cullen and Titler (98) reported that improvements in care have resulted in improved patient and family satisfaction following a nurse internship programme focused on evidence-based practice.

Hallman reported that, following a mindfulness intervention for staff within a child psychiatry unit, the number of restraints and seclusions decreased from the pre-intervention period to the post-intervention period.(53) Additionally, the number of 1:1 care episodes also decreased from pre-intervention to post-intervention. Strikingly, the number of 2:1 staff episodes also decreased from a pre-intervention.

However, Laird-Fick *et al.* (78) did not detect an effect of patient-centred care training on patient ratings of the patient-provider relationship. Similarly, McGilton *et al.* (65) reported improvements for nursing staff following communication skills training using solution focused brief therapy technique (SFBT), but this did not translate to changes in patient satisfaction with care. A review of communication skills training and patient outcomes in cancer care concluded that the evidence base was weak and, although there were a number of positive reports, no statistically significant difference was detected between training and control groups. (96)

**Outcome 3: Patient safety, reduced errors and infections**

In the current review, patient safety relates to avoiding harm or death in healthcare interactions. Examples include falls, pressure ulcers, death and hospital-acquired infections.

There were a number of studies regarding infection control, hospital acquired infections, and hand hygiene practices. Sopirala *et al.* (86) and Cagioua *et al.* (76) reported significant reductions in healthcare-associated methicillin-resistant Staphylococcus aureus (HCA-MRSA) Barsuk *et al.* (80) reported a reduction in Central Line-associated Blood Stream Infection (CLABSI), and Allen *et al.* (79) found lower CLABSI rates in one intensive care unit but not another. Picheanathian *et al.* (84) observed a significant increase in compliance with hand washing, but no differences were detected in nosocomial infection rates. Research on the ‘productive ward’ intervention found a decrease in hospital acquired infections.(100) Bingham *et al.* (82) did not find a significant reduction in ventilator-associated pneumonia (VAP) rates, but Ross and Crumpler (85) did report a reduction in VAP rates and an improvement in the oral health of patients.
Four studies focused on pressure ulcers. Lacey et al. (91), Rosen et al. (92) and Kwong et al. (54) reported a decrease in pressure ulcers. Frumenti and Kurtz (90) reported a reduction in hospital acquired pressure ulcers, but this was evident in both the control and intervention groups.

Five studies assessed the effectiveness of interventions to improve catheter use and infection control. Hansen (93) reported a 30% decrease in nosocomial urinary tract infections (UTIs) and Pettersen et al. (64) also reported a decrease in UTIs, but this was found in the control group as well as the intervention group. Holt et al. (94) focused on catheter occlusion rates for peripherally inserted central catheters. Similarly, they found that, although there was a trend for a reduction in occlusion rates, the difference between the control and intervention was not statistically significant. Positive outcomes were reported by Khouli et al. (83), who found a significantly lower rate of catheter-related blood stream infection (CRBSI) following simulation based training; and by Yilmaz et al., (102) who found lower rates of CRBSI, catheter-related infections (CRI) and exit site infections (ESI) following an education programme.

Brockbank et al. (89) reported an increase in hospital-associated venous thromboembolism (VTE), risk assessment and appropriate thromboprophylaxis, a decreased severity of VTE, and a modest reduction in VTE-associated deaths.

Two studies implemented an intervention to reduce prescribing errors. Alagha et al. (74) reported a reduction in error rates and their severity, and Daniels et al. (87) also found a large and statistically significant reduction in errors in the use of anti-retroviral drugs.

A reduction in wrong-side surgery was reported following aviation-based team safety training. (77) Rowe et al. (59) observed improvements in colorectal cancer screening rates following training, but reported that the increase was smaller than expected.

An intervention to increase ‘calling for help’ when a patient’s status deteriorated found that this early team response greatly increased patient survival rates from approximately 40% up to almost 100%. (81) A range of projects that were implemented in response to a quality improvement (QI) initiative focused on patient safety issues found that there was a reported reduction in patient safety concerns. (75) Finally, Lange et al. (63) found there was a declining trend in the incidence of falls among patients, following training on geriatric best practice.

**Outcome 4: Financial outcome or reduced cost of care**

Many of the reported patient outcomes in health and social care settings were associated with cost savings. For example, Brede et al. (88) found that medical expulsive therapy was associated with a 49% lower mean total cost per patient. Cullen and Titler (98) reported a $450,000 cost avoidance through a reduction in length of stay in one of the projects associated with a nurse internship programme. They concluded that “cost avoidance achieved through project implementation so far has far exceeded program costs”. Other studies reported cost savings related to treatment, reduced cost of care and shorter length of stay. (93, 100) However, Christie et al. (70) reported the CASCADE intervention was not cost-effective as it did not improve their primary outcome (HbA1c; metabolic control).
Outcome 5: No change in patient benefit

A number of studies failed to produce patient benefit, including seven key papers. These studies are critical for testing the programme theory and may offer important insights into why an intervention might not work. (104) Negative results were reported in seven studies. (58, 59, 65, 70, 78, 82, 84)
2.2.3.2 Step One: Education or training is initiated and is designed to demonstrate patient benefit (O1)

This first step in the programme theory describes the impetus to implement education, a training course, or an event (see Appendix 5 for a summary of all evidence illustrating Step One). In an environment with competing priorities, strong drivers are needed to initiate and support the development of a specific education or training intervention, and to make it available for appropriate staff to attend (Step Two).

Table 5 indicates the context and mechanisms that lead to the outcome of initiation of education or training that is designed to demonstrate patient benefit. These mechanisms relate to factors that influence senior managers in a healthcare organisation to make the decision to initiate training (why?) and practical considerations at the organisational level that ensure implementation and evaluation (how?). It also identifies the key players who initiate and influence educational programmes (who?). Whilst Kirwan’s model highlights the importance of climate and support in ensuring transfer to the workplace, our programme theory emphasises the importance of these contextual factors at the initiation and development stage, thus extending Kirwan’s model.

Table 5. Context mechanism outcome configurations for Step One

<table>
<thead>
<tr>
<th>Context</th>
<th>Mechanisms</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Why was training initiated?</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1.1.1 National or institutional policy</td>
<td>M1.1 Organisational awareness of need for change</td>
<td></td>
</tr>
<tr>
<td>C1.1.2 Translation of evidence base into practice</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1.1.3 Using quality improvement methods</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>How was training initiated?</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1.2.1 Problem identification</td>
<td>M1.2 Planning to ensure a measurable effect on patients</td>
<td>O1 Education or training is initiated and is designed to demonstrate patient benefit</td>
</tr>
<tr>
<td>C1.2.2 Project management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1.2.3 Patient consultation</td>
<td></td>
<td></td>
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<tr>
<td>C1.2.4 Financial support and resourcing</td>
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<td></td>
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<tr>
<td>C1.2.5 Ensuring systems are in place for implementing, monitoring and evaluating</td>
<td></td>
<td></td>
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<tr>
<td>C1.2.6 Design of evaluation</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Who was involved?</strong></td>
<td>M1.3 Engagement and commitment of personnel</td>
<td></td>
</tr>
<tr>
<td>C1.3.1 Programme initiators</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1.3.2 Organisational climate and senior management support</td>
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**Mechanism: Organisational awareness of need for change (M1.1) to initiate and support training (O1)**

With so many priorities to address in healthcare organisations, those that rise to the top of the list are driven by a high level of awareness of the need to make a specific change to service delivery, and that a key component of that change is an educational intervention.\(^{(56, 61, 63, 73-75, 77, 82, 88-90, 92, 96, 99-101)}\) For example, Brockbank et al.\(^{(89)}\) describes a view that disease prevention was regarded as the remit of primary care and public health, with secondary complications in acute care considered inevitable for a minority of patients. New requirements for documented mandatory risk assessment on every hospitalised patient changed this perception and was used as a driver for change in an acute care setting. An increasing awareness that hospital acquired complications are common, preventable, and costly\(^{(90)}\) was the driver for a systematic approach, which included educating staff. The need for change is driven by an evidence base responsive to the changing healthcare landscape, for example, technical developments in treatments,\(^{(76, 79, 80, 90)}\) residents’ duty hours,\(^{(101)}\) or demographic changes.\(^{(63)}\) The process of practice change has increasingly used lessons from industry\(^{(75, 99, 100)}\) to identify how care quality can be improved by streamlining service delivery and reducing waste. This mechanism was also highlighted as key during a discussion with our patient reference group, who noted the importance of having a supportive culture and management within an organisation (see Appendix 7, 8 and 9 for further meeting notes).

The key papers describe three contextual factors that raise awareness at the level of the organisation. These are 1) external and internal organisational drivers, such as adhering to new policies and improving performance against national targets or standards; 2) translating new evidence into practice; and 3) recognising opportunities for quality improvement.

**Context: National or institutional drivers (C1.1.1) raises organisational awareness of need for change (M1.1)**

Key drivers that raise awareness within an organisation of the need to change are national policies or institutional strategic goals, or achievement of care quality standards required for institutional accreditation for Foundation or Magnet status.\(^{(56, 63, 67, 69, 70, 76, 78, 88, 93, 97, 100)}\) On occasion grants have become available to pump prime policy driven educational initiatives.\(^{(63, 100)}\)

Internal drivers include improving performance against national benchmarks to reduce risk of morbidity, length of stay, readmission rates, or mortality\(^{(55, 64, 76, 78-80, 86, 92, 93)}\) and improve patient safety.\(^{(77, 78, 91)}\) Performance measures can also be linked to increased costs and financial penalties for the health care provider\(^{(79, 80, 86, 90, 93, 94)}\) or to financial benefits.\(^{(76, 100)}\)

Other organisational drivers at the operational level are the human resource implications of underperformance or poor communication between staff leading to job dissatisfaction,\(^{(78, 91, 94)}\) high staff turnover,\(^{(78)}\) skill shortage and potentially serious regulatory consequences.\(^{(66)}\)

**Context: Translation of evidence base into practice (C1.1.2) raises organisational awareness of a need for change (M1.1)**

Translational research aims to apply evidence from research into medical practice to improve health outcomes.\(^{(105, 106)}\) Comparison of current practice with the evidence base has raised awareness of
the need for change and led to the development of training aimed to improve adherence to the evidence base or evidence-based practice guidelines. Pilot studies were influential at this stage, particularly those that demonstrated improved patient outcomes. Barsuk et al. cited a ‘landmark study’ that showed adherence to a care bundle could reduce Central Line-Associated Bloodstream Infection (CLABSI) rates to 0%. This evidence, and further evidence for the effectiveness of simulation-based mastery learning to improve central line insertion, was used to persuade senior managers in other acute hospitals to provide support and resources, and to champion the intended training intervention.

Context: Using quality improvement methods (C1.1.3) raises organisational awareness of a need for change (M1.1)

In recent years healthcare organisations have increasingly used quality improvement (QI) methods developed in industry, such as the Toyota Production System (TPS), to review service delivery and improve patient care. Using QI methods involves reviewing current care processes to identify areas that are wasteful or ineffective and raises the awareness of the need for change in practice. In this review, articles describing QI alone have been excluded as there was no training or educational component. However, some training and education initiatives in a specific clinical practice were embedded within a QI project or aimed to teach staff how to use QI methods. These improvement methodologies aimed to mobilise the skills of a variety of professionals to be change agents, and achieve a greater impact on clinical practice.

Overall, policy, translation of evidence into practice, and quality improvement were found to be drivers to initiate education and training initiatives. However, one issue identified in studies of training that failed to be implemented or have an effect was the reprioritising of organisational aims. This was due to changes in senior management or new policies taking precedence over those that were being addressed by training, leading to reallocation of resources. Consistency over time of the aims and the organisational support are essential to initiate and realise the benefit of training.

Mechanism: Planning to ensure a measurable effect on patients (O1)

Setting organisational aims based on current drivers for change sets the direction of travel. Successful interventions will have defined and planned the steps that need to be taken to achieve their aims. Six contextual factors underpinned the planning and likelihood of observing a measurable effect on patients: examining the detail of the problem they are trying to address, managing the delivery and implementation process through a project planning framework, using strategies to clarify patient needs, adequate allocation of resources, systems in place to monitor changes in health professional’s behaviour in practice following an intervention and, an evaluation design aligned to the aims and objectives of the intervention that takes into account external factors and patient characteristics.
**Context: Problem identification (C1.2.1) to ensure a measurable effect on patients (M1.2)**

The identification of component tasks is a context that triggers action. This means breaking down the problem and identifying any discrepancy or gaps between actual and best practice, thus identifying the steps needed (component tasks) to achieve best practice. For example, Frumenti et al. developed a policy with an implementation framework with clear objectives. Some studies identified the importance of trainee involvement in intervention development and implementation. Pedersen et al. involved staff to help identify problems with the nutritional management of patients. The staff identified unhelpful behaviour, owned their lack of knowledge, and identified a need to develop positive attitudes towards nutrition. This led to some of the specific aims and objectives for their educational intervention.

Barsuk et al. points out that an intervention cannot simply be superimposed unchanged from one organisation into the next. As such, problem identification was most effective when it was site-specific and addressed specific context-dependent problems. The aims and delivery of education and training were often modified to the appropriate context; enhancing patient outcomes. Lacey et al. recruited nurse leaders with experience of different intervention sites to pool their knowledge and “modify the curriculum based on their needs.”

**Context: Project management (C1.2.2) to ensure a measurable effect on patients (M1.2)**

Project management will facilitate development, implementation and maintenance of an educational programme by managing the activities, resources, and actions needed to initiate and support training and change management. Many studies describe the formation of a project team to plan, develop and embed the training. It is also critical to support, monitor and review the impact of the training over time and likely lead to sustainability. A plan of action which addresses tasks and problems is best accomplished by engaging senior managers and key stakeholders in project management. This enables the necessary resources (administration, IT systems, equipment, staff time, facilities) to be deployed and maintains the focus of the project. Lange et al. identified three key elements to initiating and implementing their training; support of the institution, motivation of the participants, and strong project leadership. A further advantage of a project team is that it is less susceptible to changes in personnel and leadership within an organisation, and this consistency may improve the likelihood of success over time.

**Context: Consultation with patients (C1.2.3) to ensure a measurable effect on patients (M1.2)**

In some circumstances, the role of the patient has minimal impact on the outcome as the patient is passive (e.g. effect of surgical training on mortality during surgery). However, for some outcomes which depend on active patient adherence to advice and treatment, the role of the patient is a significant factor in whether the intervention will be regarded as successful or not. The likelihood of patients actively adhering to healthcare advice or treatments, and their capacity to benefit from a clinical intervention, are affected by their own characteristics and education. Despite the crucial role patients have in their care, we found minimal examples of patient or public involvement in the design or delivery of educational and training interventions. Consideration of
patient characteristics were largely considered in post hoc analysis. Feedback from our patient reference group led us to remove the fifth step of the original five-step programme theory (which largely focussed on patient consultation), instead incorporating patient consultation within the design phase of Step One in the current programme theory. The importance and power of patient consultation is most likely to occur during the developmental stage of training (see Appendix 8 and 9 for further meeting notes). This played a major role in our decision to amend the programme theory from having five steps to the current four-step theory.

Patients may be resistant to healthcare advice or treatments because the behaviours are habitual or addictive (e.g. smoking, exercise) and these behaviours are challenging to change. Variable levels of patient compliance were reported in the literature. For example, low uptake of the intervention and non-attendance of patients were problematic. Christie et al. described issues affecting many parts of the learning pathway, including variability in patient and parent compliance, motivation, and personality. Capacity to benefit was also impacted by age and severity of diabetes. The authors proposed that an alternative, more personalised and/or intensive, intervention may be required for some groups. Boychuk et al. and Rowe et al. also noted that patient videos were infrequently viewed and other materials were not read or were misunderstood. The roles of health literacy, individual motivation and interest were important contextual factors.

The interaction between patient’s ability to self-care and staff attitudes also impacted upon outcomes. De Visschere et al. found that nursing staff were reluctant to assist with tongue scraping as part of an oral hygiene intervention for nursing home residents, and noted particular barriers with elderly residents with dementia. These patients presented more challenging behaviours and were more resistant to dental care. This resulted in poor intervention outcomes on some measures for this high dependency patient group. However, other outcomes were better for this high-dependency group (e.g. denture hygiene), as the nurse aides (rather than patients) were responsible for changing their behaviour.

Successful interventions were therefore tailored to accommodate patient characteristics. Cabana et al. based their intervention on a series of studies to investigate the reasons why some patients may respond better to treatment. They tailored their intervention for each patient in response to their social, psychological, environmental and genetic profile, and severity of asthma symptoms. Following an unsuccessful intervention aimed at improving patient satisfaction, McGilton et al. suggested that a more tailored approach could be beneficial.

Ultimately, it is important to note that a perfectly initiated and executed training programme, with widespread uptake and transfer, may still fail if patient behaviour does not improve. Educational interventions that consider the role of the patient and tailor care and advice to meet patient needs are more likely to succeed.

**Context: Financial support and resourcing (C1.2.4) to ensure a measurable effect on patients (M1.2)**

Training needs to be developed with the appropriate resources. Decisions need to be made at a senior level to allocate funds and resources. This included the development of learning materials, back fill to release staff to be trained,
70, 73), administrative resources(52) and development of systems to implement, monitor and evaluate.(52, 53, 76) In some instances, government grants have become available to support uptake of new policy initiatives and to develop down loadable learning packages.(59, 63, 86, 100)

The level of resource allocation and planning in each organisation can affect the fidelity of the intervention. Christie et al.(70) found that in well-resourced sites staff were faithful to the patient education protocol, spent more time preparing their education modules, had suitable venues booked, and felt enthusiastic about the intervention. Without clerical support, staff found the intervention stressful to deliver whilst maintaining their clinical workload.(70) Thus, project planning to ensure sufficient resources and systems in place to administer and monitor outcomes, supports the initiation of education and training.

However, there are hidden costs that are often not considered. Precise costings for equipment and faculty time were provided by some authors,(79, 80) but these omitted the cost of simulation suites and manikins. In some cases, unfunded administrative tasks were carried out by clinical staff(70) or core funded research staff.(98) There was a lack of continuity where funding from research grants tended to be limited, reducing the time for delivery and evaluation.(92, 100)

Context: Ensuring systems are in place for implementing, monitoring and evaluating (C1.2.5) to ensure a measurable effect on patients (M1.2)

Systems were used as a learning tool to describe current practice and identify areas for improvement (55), along with gathering baseline and outcome data to assess the effectiveness of training.(52, 53, 74, 92) Systems for monitoring staff ensured that the clinical practice had in fact changed and helped to enforce new practice protocols through ongoing assessment and feedback.(76, 79, 82, 86). The use of systems also enabled interventions to be developed as clinical tools that could be communicated with other staff easily, including delivery reminders (59, 90, 93).

Context: Design of evaluation (C1.2.6) to ensure a measurable effect on patients (M1.2)

In several studies, it is possible that methodological and design issues impacted on the study’s ability to illustrate a measurable effect on patients. Most education and training could be regarded as a complex intervention and the design of evaluation should be informed by current guidelines.(110)

Patient outcomes used as a measure of intervention success should be clearly aligned to learning aims and objectives (79, 80). This also allows for monitoring of change over time (80). However, in some studies, the patient outcomes measured were not directly aligned to the aims and objectives of the training. Pimenta et al.(58) reported positive effects of an educational intervention on doctors’ prescription of appropriate antihypertensive drugs and advice given to patients (on diet, physical activity, individual risk and follow-up). However, this did not translate to an improvement in patient outcomes, possibly because one of the outcomes selected (smoking) was not directly affected by prescription medication, and the other outcome (physical activity) was not the primary focus of the intervention. The patient outcomes selected also have a considerable probability of patient resistance.
Some studies adopted a relatively broad range of outcome measures, whereas others focused on a primary patient outcome. (61) The likelihood of a statistically significant finding is increased with multiple measures, and a correction may need to be applied to the analysis.

Furthermore, health and social care organisations frequently have targets on specific metrics, and leaders want to see improvements on those metrics. As a result, some studies in this area measure patient outcomes which may not be directly affected by the intervention. (105) This ‘bandwidth fidelity’ issue (111) becomes problematic if the outcome used for evaluation is broad and could be affected by numerous factors, but the intervention is focused on a specific area. For example, length of stay and readmission rates may be included as patient outcome indicators but they are unlikely to be sensitive to the effects of an educational intervention for staff team working skills. (112)

The ability to demonstrate an intervention effect may be influenced by the study design. Many studies adopted a pre/post design and compared baseline and post intervention outcome data, (52, 54, 57, 76, 79, 80) sometimes with multiple post-intervention follow-up periods. (60) Some papers described and compared the implementation in two different units (79), which was helpful to understand important contextual factors. Other studies used a control group, (61) which helped to assess the effect of any external factors. Bird et al. (55) observed that RCTs, traditionally regarded as the gold standard for research, are not necessarily appropriate for organisational intervention research (complex adaptive systems). However, some studies using educational interventions did pursue this design. (70, 83)

Some studies observed positive trends of improvement, but these did not reach statistical significance, perhaps due to an insufficient sample size and statistical power. (52, 63, 88) Self-reporting can also be an issue due to response bias. (53) Sample bias was also noted. (52, 54)

The timing of measurements and assessments can also be important and may influence the study’s ability to show an effect of the intervention. For example, there may not have been sufficient time allowed for solidifying change in behaviours in some cases (63, 82). Floor and ceiling effects, when there is little room to demonstrate improvements due to very high or low baseline levels, were also highlighted as an issue that may have affected the measurable impact on patients. (62, 65, 79, 96).

In health and social care, interventions are typically implemented in complex, changing environments, thus isolating the effect of a single intervention is challenging. Outcomes may be affected by policy change, system change, staff turnover, patient turnover, funding allocation, concurrent initiatives, availability of data, and other organisational changes. (52, 54, 62-64, 75, 77, 82, 88) Therefore, outcomes often need to be interpreted with caution. (54) In one study, the parents of participants in the intervention noted that, although they had witnessed some changes since taking part in the intervention, they were unsure whether the changes were due to the intervention or to other factors (increasing maturity). (70)

Organisations will often have pre-existing training activities or may introduce several interventions concurrently, with the aim of improving practice and patient outcomes. Frequently, this is because multiple approaches are thought to be required to improve patient outcomes and offer the best chance of success. Sometimes the intervention itself may have several components. In such cases, it
is difficult to identify a cause and effect relationship and to isolate the effect of a specific part of the intervention. Some authors offered evidence for the power of the training over other changes by examining baseline and follow-up data at key points over the intervention period. The use of longitudinal data provided evidence for the efficacy of the intervention itself.

There is also likely to be a problem with outcomes if staff ‘work around’ problems to produce good patient outcomes albeit via a circuitous route. After the intervention is introduced, staff may be working more efficiently but there is no effect on patients. The Hawthorne effect (individuals modify an aspect of their behaviour in response to their awareness of being observed) could also result in this initial effect of the intervention.

**Mechanism: Engagement and commitment of personnel (M1.3) to initiate and support training (O1)**

Success is contingent upon people being willing and able to undertake the task of initiating the education or training. Clinicians or healthcare staff, or more commonly health professionals in partnership with academics, charitable organisations, or management teams need to be engaged by the aims of the study and committed for the duration of the project. Successful implementation depends upon gaining support across vertical and horizontal organisational tiers and divisions.

**Context: Programme initiation (C1.3.1) requires engagement and commitment of personnel (M1.3)**

The context of programme initiators is about staff or faculty being motivated or having an impetus to initiate and support training. Education or training described in the literature is often instigated by clinicians working with academic partners; funded by grants from foundations or charitable organisations, government, in-house or matched funding. Other projects were undertaken primarily by academic staff, clinical staff, and on occasion by managers, in partnership with nursing home staff, patient organisations or the World Health Organisation. Initiation activities included carrying out literature reviews, engaging with and presenting findings to senior managers and staff, visiting intervention sites, organising and carrying out consultation exercises to develop programmes and planning their implementation, delivery, evaluation and reporting strategies. Those initiating training may also be responsible for training staff, or training them to deliver and cascade training through organisations. Where clinical staff are involved, these tasks are often carried out in addition to their ‘day job’ and those undertaking the work need time and space to devote to this, as well as practical, administrative and management support. Where it can be integrated as an accepted element of the change agents role, the success of initiation is promoted and sustained.

**Context: Organisational climate and senior management support (C1.3.1) to engage and commit staff (M1.3)**

Transfer of learning is easier when the organisation is receptive and supportive of learning that changes practise. Efforts made to engage management can improve support and help initiate training. Barsuk et al. identified key people within the organisation, but also sought curriculum experts as external change agents. Support from management helped to engage learners and other healthcare staff, as well as
supporting the process and operationalising the action plans developed during the training (67). In multisite interventions the engagement of on-site managers ensured the availability of resources, co-ordinated activity, kept the executive leadership informed (91) and overcame local barriers (86).

Support should not only come from senior staff (82). Proudlove et al. (72) used bed manager networks to provide learner support. Cagioua et al. (76) used the term “from board to ward” to describe the range of people at all levels and in all specialties supporting the intervention across the organisation. One work-based learning programme (63) maintained the commitment of learners through a model of partnership working between academic faculty and acute hospital managers. Both institutions welcomed the opportunity for staff to learn an evidence-based approach to care. Learner engagement within the two institutions was mediated through clinical practice placement mentors, ensuring they felt supported, increasing their satisfaction and feelings of autonomy. Success will likely lead to further organizational commitment (98).

A ‘bottom up’ approach to change is successful where aims are aligned to the goals and culture of the organisation (75, 99, 100). However, Rosen et al. (92) found that where the culture of the organisation was ‘top down’, staff empowerment was not well received, and created a barrier to change. Their solution was to train managers to monitor the QI process being implemented by staff, promoting management to engage with the learning.

The inter-professional and organisational climate may create barriers to effective working when professional groups are not heard and decisions are made without consulting front line staff (78, 91). Where staff involvement in an educational programme had not been pursued, whether it was instigated without staff involvement or by a previous manager commitment to the training was low (70). De Korne et al. (77) found the complex interactions between social and organisational structures impacted on the effectiveness of team training. Self-employed learners had less commitment to improving team working, and hospital management had neither the position nor power to force them.
Summary of key messages from Step One

The aim of this step is to ensure education or training is initiated and designed to demonstrate patient benefit. Initiation of an educational intervention was found to be associated with three mechanisms that answer the questions why, how and who: awareness within the organisation of a need to change practice (why?), planning to ensure a measurable effect on patients (how?) and engagement and commitment of individuals or influential personnel to drive and champion the process (who?). Ideally training should be aligned to strategic goals of the organisation (and in some cases department) to succeed. The emphasis is primarily on the role of the organisation in setting aims, clarifying objectives and planning implementation, committing senior staff to oversee and support the initiation of training, and allocating resources. Sopirala et al. (86) sum up key components that are needed for the successful initiation of an educational programme:

“First, developing such a program required meticulous planning with prior approval from nursing and medical administration [...]. This gave us an opportunity to engage hospital management [...]. They not only provided moral support and agreed to implement this program but also provided financial support. Support came in the form of annual funding [...] in addition to the nursing time allotted for the link nurse activities. We believe this support was crucial to our success.”

The effectiveness of these components depends on resolving tensions such as the need for managers to persevere with a project when new priorities are identified, or the need to empower staff by encouraging ‘bottom up’ change whilst constraining and guiding change to meet ‘top down’ organisational objectives. Few studies have consulted with patients to ensure the programme is fine-tuned to meet their needs, risking patient non-adherence to recommendations, poor patient participation or responsiveness, and low fidelity of implementation.
2.2.3.3 Step Two: The learner is motivated and ready to learn (O2)

Once training has been initiated at the organisational level (Step One), the focus of the programme theory switches to the individual level and the role of individual agency in Step Two (see Appendix 5 for a summary of all evidence for this step). Step Two reflects the importance of ensuring the right people attend training, that they see the relevance and benefits for their own role, that they recognise the importance of the training, and that they have the scope to transfer learning. The outcome is a learner who is motivated and ready to learn (see Table 6).

Table 6. Context mechanism outcome configurations for Step Two

<table>
<thead>
<tr>
<th>Context</th>
<th>Mechanisms</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>What was done to ensure that staff could attend?</td>
<td>M2.1 Enabling participation</td>
<td>O2 The learner is motivated and ready to learn</td>
</tr>
<tr>
<td>C2.1 Overcoming barriers to participation</td>
<td></td>
<td></td>
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<tr>
<td>What was done to ensure staff thought it met their needs?</td>
<td>M2.2 Perceived relevance and benefits</td>
<td></td>
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<tr>
<td>C2.2.1 Incentives to participate</td>
<td></td>
<td></td>
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<tr>
<td>C2.2.2 Professional culture</td>
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<td></td>
</tr>
<tr>
<td>C2.2.3 Staff recruitment strategy</td>
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</table>

Increased motivation to learn is associated with better training performance and motivation to transfer. (113) Motivation to learn “refers to a condition when trainees believe that training is relevant and are willing to exert effort in the training environment [it] can influence whether individuals decide to attend training, the level of effort they exert toward learning during training, and the perseverance they demonstrate in applying skills on the job after training” (37). Readiness to learn refers to “interest in learning; receptiveness to learning and willingness and ability to participate in the learning process.” (114)

Christie et al. (70) specifically measured motivation to participate and they reported somewhat mixed findings. The majority of participants were keen to take part, but they did identify reticence, which was “generally the result of anxiety about lack of knowledge and experience, lack of control over the decision to take part, or lack of time to take on the delivery of the groups”. Individuals who were not motivated to attend and to learn were described by the authors: “...some attendees appeared to ‘not want to be there.’ Approaches were used to change this resistance...”.

Outcome Two is achieved through the activation of key mechanisms: enabling participation and perceived relevance and benefits; what was done to ensure staff can attend and what was done to ensure the training met their needs?
Mechanism: Enabling participation (M2.1) so that the learner is able to attend and is motivated and ready to learn (O2)

Enabling learners to participate in training is a critical first step, and it is important that barriers to attendance are addressed. For example, individuals or teams may be able to attend training because managers have agreed to release staff, colleagues have offered to cover tasks or shifts, staff are available for backfill, and there are no funding or travel issues that prevent participation. Overcoming practical barriers was identified as key to enabling participation. The importance of this mechanism was raised by our patient reference group, who highlighted the central role of management in resourcing, enabling participation, and supporting implementation (see Appendix 7, 8 and 9 for further meeting notes).

Context: Overcoming practical barriers to participation (C2.1) to enable participation in training (M2.1)

To enhance pre-training motivation to learn, the training should be perceived as a positive opportunity to learn. It is important to enable staff to participate in training by removing or minimising practical barriers to participation.

Issues related to the availability of time (including work demands, staff shortages and shift patterns) were frequently reported as enablers of, or barriers to, participation.(55, 70, 71, 75, 82, 86, 102) It was noted in one study that participants, who were generally enthusiastic about being involved, expressed concern they might not have the time or resources to do what would be required. Colleagues were unsure whether consultants who had agreed to be part of the study were aware of the extent of the work involved.(70) Sometimes participation required additional work to be completed, but staff were not always allocated duty time to work on a project.(82, 98)

Many studies attempted to overcome practical barriers to participation by altering timing and schedules to facilitate attendance, and arranging training and assessments during existing regular events to create minimal disruption.(52, 54, 99) Some authors noted that the convenience of locally held workshops made attendance easier and enabled the intervention to reach more staff members.(54, 70) However, Teri et al. noted: “Individualised sessions were unusual. Staff were unaccustomed to having appointments during the workday. Coordinating schedules and ensuring attendance was difficult.”(52) Shortening the interventions also helped to retain participation.(53)

The importance of managers enabling participation was emphasised (71, 98). Encouragement, facilitation and releasing of staff was thought to be crucial to high participation.(54, 71) To enable continued participation, it was important that managers recognised that training needed to remain a priority,(98) rather than getting distracted by competing priorities.(82) Teri et al. reported that they were encouraged by the positive response of organisations who identified the need for staff training: “Each fulfilled their commitment to release staff to attend training, allowed trainers to be on site regularly, provided meeting space, helped advertise meetings, and supported training goals”.(52) Cullen and Titler(98) reported that nurses were given paid release time to take part in the project. In one study, meetings for residence leadership were held to provide leadership with an overview of topics and opportunities to discuss site-specific issues that might hinder implementation or sustainability.(52)
If an organisation or department makes training mandatory, this conveys a message that the training is important and worthwhile for all staff (79, 92, 113) and should boost participation rates.(99) Rosen et al.(92) explicitly linked the use of mandatory training and attempts to increase perceived importance. Furthermore, staff were subject to disciplinary action in the case of non-participation and monitoring of participation was fed back to staff. Interestingly, poor uptake of training was reported in the post-intervention period when training was still available but no longer mandatory (and financial incentives were withdrawn). Allen et al.(79) also reported patient benefit following mandatory training, but no benefit following voluntary training.

**Mechanism: Perceived relevance and benefits (M2.2) so that the learner is motivated and ready to learn (O2)**

Enhancement of pre-training motivation may occur when trainees perceive the relevance and benefits of training. Relevance and benefits may relate to themselves, their career, their professional practice, their team or unit, and/or to patients. Theoretical models of training transfer stress the importance of relevance of the training to an individual's role.(38) This refers to the extent to which the training, and expectations of the training, are perceived to match the role and level of the person selected to attend. This also incorporates perceptions of whether training could be used in the workplace, given an individual's position and the scope for transfer. The importance of this mechanism was reiterated by our patient reference group (see Appendix 8 and 9 for further meeting notes).

The key papers identified a number of contextual factors that can trigger this perception of relevance and benefit, including: incentives to participate in training (e.g. financial, Continuing Professional Development credits), the professional culture and the staff recruitment strategy.

**Context: Incentives to participate (C2.2.1) affect perceived relevance and benefits (M2.2)**

This review identified several incentives to participate in training. Incentives were frequently incorporated into interventions with the aim of strengthening perceptions of benefits and relevance and increasing pre-training motivation to attend and learn. Incentives included Continuing Professional Development, course credit, certification or access to educational resources(55, 57, 60, 63, 72, 98), as well as financial incentives, lunches or refreshments, and prizes.(57, 73, 86, 92, 99)

Some studies reported more intrinsic incentives. Lacey et al.(91) discussed the importance of nurse participants creating and implementing their own projects. As front-line staff, they have unique insight into where change should be implemented and would presumably benefit from the projects they chose to pursue. Wright & McSherry(100) cited staff ownership and empowerment as enablers of success and engagement. Finally, de Korne et al.(77) aimed to stimulate intrinsic interest.

**Context: Professional culture (C2.2.2) influences perceived relevance and benefits (M2.2)**

Some professions have a culture of learning and Continual Professional Development. Individual members of such professional groups may assign greater relevance to training to update skills and knowledge; perceiving the value of training, facilitating greater pre-training motivation to learn and participate. Some professions are also required to demonstrate participation in Continuing
Professional Development activities and may need to revalidate or pass licensing assessments, which are also likely to increase motivation to attend and learn. One study reported several reasons why nurses took part in the training. Their motives reflected the professional culture of nursing and included: the opportunity for professional advancement by enhancing knowledge and nursing practice, a recognition of the growing importance and relevance of geriatric care in their professional practice, and a desire to improve patient care. This motivation was thought to lead to nurses’ motivation to attend and learn (a significant amount of work) outside of their normal working hours.

Where participants were required to complete work in their own time, motivation to take part was maintained when other mechanisms were activated and trainees viewed the training as important and as an opportunity for professional advancement. Participants in a nursing internship programme were required to demonstrate their motivation as part of a thorough application process. They were required to submit “letters of support demonstrating commitment to the project” as well as signed contracts from direct managers. Nurse Managers observed that the self-selection of learning topics was important: “staff nurses selecting their topics for the application was an important motivator for participation” as they could identify topics that they felt were important, relevant and would lead to improvements.

In order to recognise the relevance and benefits of training for them and their practice, individuals must first identify gaps in their performance and learning needs, compelling them to acquire new knowledge and skills (Step Three) and to adjust practices according to them (Step Four). This may be through formal processes such as performance appraisal, pre-training assessments or audits, or through reflection on practice, perhaps in comparison to benchmarks. Caguioa et al. described skill assessments for staff that highlighted a need for improvement and encouraged a change in attitude regarding management, resulting in a change of practice. Similarly Khouli et al. incorporated a simulation session which highlighted individual learning needs and prompted the recognition of a need to improve performance through training.

The framing of the training as voluntary may also have influenced pre-training motivation. If staff exercise autonomy and choose to attend voluntary training, they are likely to increase intrinsic motivation to learn. According to Gagne and Deci, autonomy “involves acting with a sense of volition and having the experience of choice”. This may be particularly important in professional groups which typically experience a high degree of autonomy, such as doctors. One study reported lower levels of motivation due to a “lack of control over the decision to take part”, which later presented as resistance during training.

**Context: Staff recruitment strategy for training (C2.2.3) affects perceived relevance and benefits (M2.2)**

The congruence between an individual’s job role, level of seniority and their ability to transfer training is important for motivation to learn. If a trainee regards the training as relevant and can clearly see how it is appropriate for their role, then they are likely to feel motivated to attend the training and to learn. However, if a trainee believes they do not have the authority or ability to implement training, then they are unlikely to perceive that the training is relevant or beneficial, and unlikely to feel motivated to learn. Some studies indicated that there
was incongruence between trained individuals and their ability to use and implement training (70, 75)

Summary of key messages from Step Two

Once training has been initiated at the organisational level (Step One), the focus of the model switches from the organisation to facilitating the individual’s participation and motivation. The aim of this step is to motivate the learner and ensure they are ready to learn. Step Two focusses on the importance of enabling participation (What was done to ensure that staff could attend?) and helping staff see the relevance and benefits for their own role (What was done to ensure staff thought it met their needs?) Achieving attendance involves removing practical barriers to access the training and may involve offering incentives or making attendance mandatory. However, the right people with the right scope of practice need to attend. Attendance alone is insufficient; individuals also need to be personally motivated to benefit from the education/training. Individuals can increase their motivation to learn if they recognise the importance and relevance of the training for them and their role. This could be achieved through incentives, the recruitment strategy or the professional culture.

If the two mechanisms of Step Two are not addressed, risks include poor staff attendance, the wrong people participating (i.e. those whose job role or level of practice is not relevant to the training), and lack of engagement during training. The outcome would be poor attendance, little impact and a waste of resources.
2.2.3.4 Step Three: The learner learns successfully and has the commitment and desire to apply the learning (O3)

This step is concerned with the design and delivery of training and the extent to which this enhances the learners' desire to transfer learning back into the workplace (see Appendix 5 for a summary of all evidence illustrating Step Three). It examines the relevance of the content, how teaching and learning meets learners' expressed needs, the credibility of the instructors, and the balance between content and application of learning into practice. Kirwan suggests that all these are indicators of the likelihood that learning will be transferred post training (38) (Step Four). See Table 7 below for the full CMO configurations.

Table 7. Context mechanism outcome configurations for Step Three

<table>
<thead>
<tr>
<th>Context</th>
<th>Mechanism</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>How were learning needs identified?</td>
<td>M3.1 Learners recognise the need to learn</td>
<td>O3 The learner learns successfully and has the commitment and desire to apply the learning</td>
</tr>
<tr>
<td>C3.1.1 Benchmarking and feedback</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C3.1.2 Reflection on practice</td>
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<td></td>
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<tr>
<td>C3.1.3 Challenging attitudes</td>
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<tr>
<td>C3.1.4 Assessment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How did the design and delivery of education engage learners?</td>
<td>M3.2 Learners engage with learning</td>
<td></td>
</tr>
<tr>
<td>C3.2.1 Preparation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C3.2.1.1 Overcoming barriers: evidence base and pilot work</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C3.2.1.2 Relevance to learners</td>
<td></td>
<td></td>
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<tr>
<td>C3.2.2 Resources</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C3.2.3 Teaching methods</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C3.2.3.1 Simulation and mastery</td>
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<tr>
<td>C3.2.3.2 Coaching, supervision and mentoring</td>
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<td></td>
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<tr>
<td>C3.2.3.3 Interactive learning through good facilitation and group discussion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C3.2.3.4 Delivery over time using multiple teaching methods</td>
<td></td>
<td></td>
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<tr>
<td>C3.2.3.5 Theoretical models</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How was transfer of learning considered during training?</td>
<td>M3.3 Learners anticipate implementing learning</td>
<td></td>
</tr>
<tr>
<td>C3.3.1 Action planning</td>
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<td>C3.3.2 Reality testing action plans</td>
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In an American study to reduce hospital acquired infections, Sopirala et al. (86) described the increased awareness and motivation to tackle hospital acquired infections following their training.
Other studies reported the positive impact of their education and training on awareness, commitment and desire to apply learning (including motivation). Increased confidence was also highlighted. Conversely, a randomised controlled trial aiming to train health professionals to deliver a diabetes management programme to patients noted, whilst staff rated the training as good, the outcome for some was doubt about the feasibility of implementation, feelings of anxiety, and lack of confidence in their own ability to implement learning.

To explain why these different outcomes for Step Three arose, we have identified three key mechanisms, underpinned by contextual factors, which facilitated successful learning and willingness and desire to change practice (see Table 7). These mechanisms relate to recognising the need to learn and change practice, learning what to change through engagement with training, and learning how to make changes in practice. Authors have reported issues with contextual factors that resulted in different mechanisms that are likely to have diminished the learning and desire to apply it to practice.

**Mechanism: Learners recognise the need to learn (M3.1) so the learner learns successfully and has the desire to apply their learning (O3)**

This mechanism is about recognising the need to learn and change practice, through increased interest, awareness of gaps between current and best practice, changing attitude, and a desire to improve performance. This drives successful learning and the desire to change practice. If potential learners think their current practice is adequate it is unlikely they will feel motivated to learn or change practice. Interventions have aimed to trigger this mechanism by incorporating elements in the curriculum or in the infrastructure supporting the intervention. Developing strategies that secure commitment, interest and motivation will engage trainees in prioritising issues which they may not have previously recognised as areas for improvement.

**Context: Benchmarking and feedback (C3.1.1) enable learners to recognise the need to learn (M3.1)**

Understanding the need to learn and change practice can be triggered by auditing, benchmarking performance, observation, monitoring and feedback; allowing learners to compare performance with other individuals, wards or organisations, or against new protocols. The process helps to identify practice gaps or poor performance to drive learning. It can be used to monitor and motivate individuals to change practice during training to inform reflection on current practice and to support learners’ development to enable them to apply new learning to practice. This review of performance is thought to be key to changing organisational culture and ultimately transfer of learning.

Performance evaluation maintains the focus on actual practice. Several studies asked their learners to self-rate their performance to provide a baseline measure for later comparison. Kirwan notes the limitations of self-assessment prior to training, as learners do not yet know what they don’t know, often underestimating their learning needs. However, when self-evaluation was compared with observed performance (e.g. use of video recording), learners gained insight and recognised shortfalls, which was a powerful stimulus to learn and change practice.
Feedback is also needed to help trainees identify poor practice and trigger learning,(95). Feedback can also be used developmentally, to support and develop learners to build their confidence to help them adopt new strategies and behaviour(68, 101), thus enthusing them to transfer learning to practice.

**Context: Reflection on practice (C3.1.2) enables learners to recognise the need to learn (M3.1)**

Providing opportunities for informed reflection was identified as a way of raising awareness of the need to engage in learning to make changes to personal practice by encouraging comparison with best practice, identifying learning needs, and undertaking professional development.(55, 58, 86, 97) Self-reflection was identified as a motivator to instil the need for lasting change(55); being more effective in changing performance than passive approaches to learning.

Reflection is not only an effective way of identifying gaps, but it is both social and active (77), leading to improved communications within teams and improved satisfaction (101). Actively engaging learners is underpinned by providing sufficient 'time and space' to reflect.(38, 77) Developing a supportive infrastructure (reducing clinical workload and call frequency for trainees) increased the amount of time available for reflective practice.(101)

**Context: Challenging attitudes (C3.1.3) enables learners to recognise the need to learn (M3.1)**

In order to engage with training, learners needed to adjust their attitudes towards life-long learning,(78) the efficacy of current practice(97) and emotional or social barriers to practice change.(67, 72, 77, 78) Negative attitudes, including frustration and pressure in their job, has been found to lead to resistance in the workplace(67) and ability to find solutions to problems.(72)

Reviewing trainee attitudes should, therefore, be used to modify the training and inform action plans; with the aim of challenging current negative attitudes and behaviours.(77, 97) For example, Laird-Fick et al.(78) modelled and explored interactions between tutors and students to challenge their current attitudes and behaviour. One training programme explicitly designed their curriculum to change attitudes that stigmatised HIV infected patients.(73)

**Context: Assessment (C3.1.4) enables learners to recognise the need to learn (M3.1)**

Commenting on current evidence that assessment drives learning, Wood(116) identified the additional benefits of repeated testing and feedback to enhance retention of content. Assessing competency at baseline was used to identify learning needs and inform feedback.(73, 85) Several studies built in competency assessment often with the requirement to repeat training until the minimum standard had been reached.(63, 76, 80, 85)

Demonstrating competency to trainers, to an examination board, to maintain registration or for revalidation is a powerful driver to raise awareness of the need to learn. One author noted that to motivate trainee doctors to learn about and implement QI, the acquired competencies need to be included in the curriculum of Accreditation Councils.(99) Assessment criteria also sets a benchmark against which actual practice can be compared and best practice can be enforced. Assessment can provide evidence for successful learning.
Mechanism: Learner engages with learning (M3.2) so learner learns successfully and has the desire to apply their learning (O3)

Although this literature review is concerned with outcomes at Kirkpatrick level 4b (in this case patient benefit), education needs to be a good experience that engages learners using relevant content (56, 73, 75) and sound teaching strategies (63, 90) increases awareness, (74, 93) knowledge and skills, and changes attitudes (outcomes at Kirkpatrick levels 1 and 2). These are essential prerequisites to successful learning and the desire to put learning into practice (O). (85) Design and delivery of training needs to interest learners, increase understanding of the need to change practice, (63, 74, 75, 77, 90, 93, 101) and increase learner confidence (63) in order to motivate learners to apply their new knowledge, skills or attitudes in practice. (62, 85, 95)

Initially, there were many contextual factors identified in the literature, resulting in a cumbersome list which was impractical to use. To simplify the model, we identified and grouped together three contextual factors that create a good learning environment that engages learners; thorough preparation, adequate resourcing; and expertly delivered teaching using methods predicated upon sound theories that focus on transfer of learning.

Context: Preparation (C3.2.1) facilitates engagement with training (M3.2)

Well-prepared interventions involved investigating the workplace to pre-empt barriers to implementation, (56, 57, 59, 80, 91, 97) based the intervention on previously successful or piloted interventions, (57, 64, 80) assessed training needs to tailor curricula to the context and recipients, (73, 90) and ensured that before and during delivery of the programme the content remained relevant to practice. (52, 54, 83, 88)

Overcoming barriers: evidence base and pilot work (C3.2.1.1)

The design, content and delivery of interventions were generally evidence-based, (54, 59, 68, 76, 77, 85, 88, 94, 95) based on pilot studies, (57, 64) or adapted from more extensive programmes. (78) We identified one study that used only a commercial training package. (92) If the intervention content and delivery is evidence-based, it engages staff as it provides credibility and clearly identifies what needs to be learned to improve patient outcomes.

Investigative and pilot work carried out in advance enabled interventions to be adapted to accommodate local service delivery and complex organisational structures, helped to identify additional resources, and were used to evaluate barriers to implementation, engagement and learning transfer. (52, 54, 56, 57, 59, 63, 64, 70, 80, 91, 97) For example, in one pilot study, learners complained that the system for reporting colorectal screening was cumbersome and ineffective, there was insufficient time, role confusion and poor teamwork (59). In this case, the problems were reported for future modification, giving voice to learner’s concerns, but could not be addressed prior to the study. Christie et al. (70) conducted a thorough process evaluation which allowed scrutiny of the implementation of the programme. Despite the evidence-based credibility of the staff training, delivery of the intervention to patients was problematic, both in terms of organisation, and staff needing more time to learn how to facilitate small groups using the behaviour change paradigm.
However, Bingham et al. (82) following a successful pilot study, found greater resistance to adoption of their programme in a new service due to “low level of acceptance and involvement from leadership and staff members”. Barsuk et al. (80) pointed out that successful pilot studies do not necessarily transfer to new locations and so designed their intervention using “external change agents performing site visits to ensure successful implementation.” Brockbank et al. (89) also found persistence was key to overcoming barriers to learning and implementing new protocols.

**Relevance to learners (C3.2.1.2)**

It was not enough for content to be evidence-based. It also needed to be relevant to the learners’ profession, level of practice and practically applicable in their organisation to engage learners. Clinical content (52-54) focused learners on what practice needed to be changed, but in order to build confidence to manage change, other qualities such as leadership needed to be developed alongside knowledge acquisition. Staff also needed ongoing support to develop professionally and increase their confidence in feeling able to transfer learning into the work environment. Christie et al. (70) found that some areas of the curriculum “were beyond [learner’s] expertise” which impacted on their willingness to implement this in practice as they ‘spent less time than intended on these sections when delivering the modules’ to patients. Teri et al. reported that they amended their training to be more suitable to the trainees’ level of written and verbal skills. (52) They were therefore successful in developing a program that appealed to direct care staff with diverse levels of educational and cultural backgrounds.

Relevance to learners was established and maintained primarily through discussion with participants using focus groups, surveys, feedback of audit or baseline data, and providing opportunities to discuss cases and reflect on personal practice. (57-60, 64, 75, 77, 91, 95, 97) Curricula were continuously updated to address learners needs, and ensure currency of evidence and relevance to practice. (54, 55, 64, 73, 81, 82, 88-91, 95) Teri et al. noted that staff were very quiet and hesitant to speak out, and managers often monopolized the discussion. (52) They therefore conducted separate training sessions to focus on their different experiences and needs.

**Context: Resources (C3.2.2) facilitates engagement with training (M3.2)**

Clinical training is often costly. (79, 80) Cost of equipment and staff time can be a barrier to adequately resourcing clinical training. (57, 65, 68, 70) Faculty development was seen as an important component to build capacity to offer high quality training. (57, 68, 79, 80, 98, 101) especially where the lack of educators with clinical skills or professional knowledge of behaviour change had limited the scope of the project. (57) Christie et al. (70) note that in sites where administrative support was available to organise training events for patients, venues were more appropriate, staff had more time to prepare material and were more likely to transfer their learning into practice according to the protocol.

Some teaching hospitals have access to a dedicated simulation laboratory (83) or fully equipped clinical teaching units (80, 84) in which to practice skills. However, simulation training can be achieved in less costly but well-equipped settings. (76, 83)

Teaching, learning and assessment resources (including; manuals, reading lists, handouts, videos,
notebooks, posters, reminder cards, PowerPoint presentations, guideline-based education and treatment protocols for staff, electronic records, and online resources) need to be sourced or prepared based on current evidence. Developing resources and systems to support the implementation of evidence-based practice is complex and may need revision following staff feedback. Materials need to be produced and trialled to enable the safe transition to new practice. Three studies described the use of online modules. Two used the modules for planning, managing, and implementing effective interventions. The other used them to increase knowledge of processes and tasks in the care of pressure ulcers. Online resources were also used in other programmes to a lesser extent to maintain learning.

Interventions were rarely delivered by a single instructor. Instead the intervention was delivered in partnership with higher education faculty and researchers working together, and/or clinicians offering complementary areas of expertise or work-based expertise or support, and they were often supported by ‘in-house’ clinical experts. Two programmes illustrated the importance of partnerships between schools of nursing and acute hospitals. Both studies highlight the time and commitment given to mentoring by advanced practice nurses and professional nurses undertaking project work for service improvement and its evaluation.

Clinical or workplace expertise assured credibility where training “was delivered by people who really understand what the subject is about.” An exception was training to improve patient safety using aviation expertise. The trainers were deemed ‘credible’ as there were similarities between aviation and health services in relation to risk management. They were also considered more effective as they were not influenced by the workplace management hierarchy and treated all staff in the same way.

**Context: Teaching methods (C3.2.3) facilitate engagement with training (M3.2)**

**Simulation and mastery (C3.2.3.1)**

Traditionally, the apprenticeship model of ‘see one, do one, teach one’ has been used to teach procedural skills in medicine. This mode of teaching could lead to variation in taught procedure and the risk of perpetuating incorrect practice. Simulation-based training supports the use of a standard procedural curriculum and mastery learning. Simulation provides opportunities to practice procedural skills with no risk of patient harm. Simulation can also provide opportunities to maintain skills and ensure competency when there are low numbers of patients to treat.

**Coaching, supervision and mentoring (C3.2.3.2)**

Coaching, supervision, and mentoring have overlapping features as described by authors, such as one to one discussion of performance, addressing specific concerns, ongoing personal development, facilitating change and receiving feedback. Trainers and mentors also model best practice by facilitating non-directive training, observing at the bedside, using video demonstrations, or demonstrating procedures.

One study refers to the use of mentors at director level whose role was to ensure sufficient
resources and coordination between departments and the executive.(91) They also refer to externally appointed coaches who provided ‘an external viewpoint to help facilitate the program’. The authors attributed the success of the project to a large extent to the role of the mentor, as they supported learners, helping them achieve small successes early on, and giving them confidence to continue. The strategy adopted by Frumenti et al.(90) coached patient care managers to become leaders so that they were more effective in terms of performance.

**Interactive learning through good facilitation and group discussion (C3.2.3.3)**

Kirwan describes the skills required for good facilitation of group discussion in adult learning.(38) Through a process of dialogue a facilitator can create shared understanding of an issue though questioning, explanation, challenging, and providing learners with support and feedback.(52) Training designs incorporating group participation are more active, and more likely to lead to transfer. Skilled facilitators can create a non-threatening environment to draw out learners’ experience and credible facilitators can contribute their expertise in the subject matter. Facilitated group discussion was an active element in most programmes.(52, 53, 56-58, 60, 63, 66, 70, 72, 73, 75, 77, 85) However, individualized sessions also allowed the trainer and trainee to address specific resident issues and engage in on-the-job practice of training strategies.(52)

**Delivery over time using multiple teaching methods (C3.2.3.4)**

Incorporating a number of different teaching methods into a programme promotes learning and learning transfer(38), and will engage learners with different learning preferences. Whilst there was a tendency to prefer one teaching method, many interventions actually used mixed methods.(52, 55, 57, 58, 63, 64, 78-80, 83-86, 101) Teaching and learning was generally focused on practical application and outcome.(52, 62, 85, 95) However, De Visschere et al.(62) trained trainers to cascade learning. Authors tend to agree that it was not possible to isolate an active ingredient that was causally linked to outcomes.(66, 79, 80, 101)

Kirwan recommends that training modules are distributed over time to allow opportunities to practice between sessions,(38) and to reflect on their experiences with peers and tutors in the following session, an approach frequently used.(57, 95) Another approach involved role play to enable learner’s to practice skills.(52, 67, 73, 96) Lienard et al.(95) focused on transfer of learning to clinical rounds through role play and by distributing training over time to allow time to practice skills between training sessions. McGilton et al.(65) explained the lack of impact of communication training for nursing staff on patient satisfaction was due to lack of time with patients beyond basic care giving, preventing them from practising enhanced patient centred communication. The design and delivery should focus on giving learners the confidence to apply their learning to practice.(52, 85)

**Theoretical models (C3.2.3.5)**

Theories and models used in the design of interventions inform educational teaching processes and strategies, and have the potential to predict learning and behavioural outcomes. Adult learning theory and learner centred approaches informed the design and delivery of three interventions.(52, 70, 94) Adult Learning Theory respects adults as autonomous learners who need to have a reason
for learning, they have a broad range of experience from which to draw and build upon, and they seek to learn things that they believe are important and that can be applied immediately. Learner centred education should result in the development of independent learners who take responsibility for their own learning, and learning activities should be developed to meet the learning needs of the trainees. In a review of communication skills training in cancer care, all but one of the interventions were based on educational theory.

Most of the models shaping the design of education and training were performance and quality improvement models, with some borrowed from industry. Participatory action learning, and Stages of Change theory were also used. Barsuk et al. concluded that education, combined with quality improvement methods, is needed to reach national quality goals. Embedding Quality Improvement theory into the design and delivery of training is more likely to lead to a desire to apply learning and create a more supportive environment to enhance the capability of learners to transfer learning. (96)

**Mechanism: Learners anticipate implementing learning (M3.3) so learner has the desire to apply their learning (O3)**

This mechanism is about ‘bridging the gap’ between learning and implementation. It is the moment when learners are asked to review what they have learned on the course and decide how they can apply knowledge and skills ‘on Monday morning’ when they return to work. Preparation to transfer learning included goal setting and action planning, as well as self-management which is concerned with how the individual deals with barriers to transfer in the workplace.

**Context: Action planning (C3.3.1) prepares learner to transfer (M3.3)**

Kirwan recommends sufficient time should be given to the creation of an action plan to commit learners to transferring learning to practice. The action planning process should include reflection on what has been learned, identifying one or two areas for improvement of relevance to the learner and that would have a beneficial impact, and for each action to be specified using SMART (Specific, Measureable, Achievable, Realistic, Time bound) goals. Cabana et al. notes that ‘interventions to change physician practice are more likely to be successful when they are interactive, multifaceted, and consistent with the perceived needs of the learner’. (57)

Action planning was incorporated into a number of studies. An online programme generated a choice of 16 action plans from which learners should select only three or four actions depending on the issues that have been identified in feedback from questionnaire and patient data. Choosing a few priorities to work on makes action plans achievable and ensures relevance of feedback. They also specified time limits for completion of action plans.

Transfer of learning into new settings or different contexts requires consideration of organisational culture and systems, challenging learners to resolve practical problems about implementing new practice. Managers’ and senior nurses’ involvement was crucial in championing and operationalising action plans. (67, 68, 97)
**Context: Reality testing action plans (C3.3.2) prepares learner to transfer (M3.3)**

Kirwan recommends giving action plans a ‘reality test’ by discussing them with colleagues and preparing learners to meet difficulties in making changes in the workplace. To troubleshoot and respond to evolving action plans, it is suggested that ‘reality testing’ should be a continuous process (e.g. embedded in training and regular meetings to revise plans). This will enable trainees to identify personal and organisational obstacles and stimulate facilitated discussion to find solutions. This will also obtain group buy-in and confidence during development and maintain compliance with the plan during implementation.

**Summary of key messages from Step Three**

Once learners have been recruited and primed to learn (Step Two) they need to first learn and then want to apply their learning in practice. The aim of Step Three is to ensure that the learner learns successfully and has the commitment and desire to apply the learning. The mechanisms focus on ensuring individuals recognise the need to learn and change practice (How were learning needs identified?), learning what and how to change practice through engagement with learning (How did the design and delivery of education engage learners?), and anticipating implementing learning (How was transfer of learning considered during training?). Learning needs can be identified via benchmarking, feedback, reflection or assessment. Since the learner is accountable for implementation (possibly resulting in challenges in the workplace), the trainers’ role is crucial in ensuring barriers are overcome and learners develop the necessary skills and knowledge. To bridge the gap between learning and changing practice, learners benefit from action planning and reality testing.

This step is about delivering work facing training. It is shaped by several strategies to encourage transfer of learning into practice. Without these there would be a loss of focus on the primary purpose of service improvement that benefits patients.
2.2.3.5 Step Four: The learner has the capability and transfers learning into practice (O4)

Step Four is the crucial aspect of the programme theory. The outcome of this step is that the learner has the capability to transfer their learning into practice (38, 57, 72, 78, 82, 90, 91) (see Appendix 5 for a summary of all evidence for this step) Fundamentally, health professional behaviour change - driven by training-related changes in knowledge, skills, attitudes and motivation – was a pre-requisite for patient benefit. Authors discuss the importance of having knowledge, awareness and expertise of the processes and tasks needed to perform the work (74, 88, 92, 98) An important component of this outcome is whether the individual is able to ‘close the gap’ between current service delivery and best practice through behaviour change or reconfiguration of service. (54, 57, 58, 63, 65, 72-74, 76, 78, 86, 90, 96, 99, 102) Trainees must be able to both implement and maintain change. (58, 71, 72, 78, 99, 101) The CMO configurations for the fourth step are shown in Table 8.

Table 8. Context mechanism outcome configurations for Step Four

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<thead>
<tr>
<th>Context</th>
<th>Mechanism</th>
<th>Outcome</th>
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<tr>
<td><strong>How was new practice implemented?</strong></td>
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<tr>
<td>C4.1.1 Support</td>
<td>M4.1 The learner is able to deal with resistance and overcome barriers to transfer</td>
<td>O4 Learner has the capability and transfers learning into practice</td>
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<td>C4.1.2 Individual factors</td>
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<td>C4.1.3 Logistical issues</td>
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<td><strong>How was new practice maintained?</strong></td>
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<td>M4.2 Organisational commitment</td>
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<tr>
<td>C4.2.1 Embedded in systemic change</td>
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<td>C4.2.2 Individual response</td>
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<td>C4.2.3 Incentives and credibility of the training</td>
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<td>C4.2.4 Leadership</td>
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<tr>
<td>C4.2.5 Networking for support and learning from each other</td>
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<tr>
<td><strong>How was new practice spread across the organisation?</strong></td>
<td>M4.3 Culture change</td>
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<tr>
<td>C4.3.1 Sharing of information back in practice</td>
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<tr>
<td>C4.3.2 Critical mass (whole-team) involvement</td>
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This indicates the context and mechanisms that lead to the outcome of the individual having the capability to apply their learning to practice.

Studies demonstrated improvements in infection control procedures; (79, 80, 83, 84, 86) communication skills; (57, 91) prescribing skills (74, 88); appropriate advice to patients; (58) surgical skills; (80) record-keeping; (67) patient assessment and evaluation; (60) oral hygiene; (85) and appropriate referrals. (60) The transfer of learning was also associated with improved recruitment,
staff retention and development. Development also included leadership, project implementation, teambuilding and promotions.

Studies also reported measures of staff confidence and empowerment to act (and be more accountable for one’s own actions). Improved performance was notable as a result. Willingness to change and motivation were also noted. Lange et al. reported that, despite barriers to the programme, the eventual outcome was a clear sense of pride and accomplishment.

However, there were also examples of health professionals failing to change their behaviour and not adopt trained skills appropriately or adequately. Proudlove et al. reported that although the majority of staff surveyed felt confident in their skills, it was only associated with a modest increase in performance. De Korne et al. also illustrated that their training was not always translated into sustained improvement in day-to-day care delivery. Pimenta et al. found evidence that transfer of training had occurred, with the intervention group out-performing the control group, however for some recommended behaviours, low proportions of participants had transferred the training (e.g. only 25% of patients were informed of their individual risk of cardiovascular disease). McGilton et al. reported that the lack of improvement in patient satisfaction was partly the result of low fidelity to the trained protocol, due to nurses having insufficient time. Christie et al. reported a number of issues that may have negatively influenced trainee adherence to protocol; finding it difficult or unachievable, finding it ‘deskilled’ them, which led to a lack of confidence.

Audit data was often used to assess staff performance after training, but compliance with protocols was not always measured. In several studies, audit data or monitoring processes indicated staff adherence to evidence-based protocols. However, observational data reported by Bingham et al. indicated poor compliance with oral care practice for ventilated patients, despite documentation suggesting oral care was more frequent. Organisational and logistical issues were also noted as critical components for the failure to demonstrate effectiveness.

Mechanism: Learner is able to deal with resistance and overcome barriers to transfer (M4.1) so learner has the capability and transfers learning into practice (O4)

The mechanism of being able to deal with resistance over time and overcome barriers to transfer was evident in the literature. Barriers to transfer should instead be replaced with factors that facilitate adherence to the new protocols.

Several barriers that hindered transfer were discussed in the literature. Bingham et al. reported that adoption of their intervention was much slower than originally anticipated. Brockbank et al. discuss how “not everyone will be on your side from the start (and some will be hostile).” Cullen and Titler also found that team coordination and communicating project developments with colleagues was both challenging and important. De-Visschere et al. also highlighted problems in dealing with this resistance to change.

Christie et al. discussed a number of barriers that they felt hindered their outcomes. For example, the four sites rated as having the lowest composite scores had difficulty organising the modules, which took up much of the time and lowered their enthusiasm. Some groups were also
held in problematic venues. There was a time gap between the training and setting up the groups, resulting in a loss of focus, confidence and skill. Staff turnover, absence and lack of flexibility around work hours also had a negative influence. Picheansathian et al. (84) also suggested a low adherence to hand hygiene following their intervention was due to a range of issues including forgetfulness, a lack of time, lack of knowledge of guidelines and a perception that hands were not contaminated.

A lack of time was repeatedly identified as a barrier to the transfer of learning in a number of studies. (59, 63, 65, 67, 82, 98) McGilton et al. (65) also highlighted increased workload or responsibilities as barriers to transfer. Intervention complexity was also noted. (59) The contextual factors discussed below illustrate how such barriers were overcome.

The contextual factors highlighted in this step, the majority of which are at the organisation level (e.g. support, becoming embedded in systemic change, whole-team learning), ensure that the necessary environmental factors are in place to facilitate the necessary processes of transfer (dealing with resistance, maintenance of learning, culture change).

**Context: Support (C4.1.1) enables the learner to deal with resistance and overcome barriers to transfer (M4.1)**

The level of support provided post-training was important. (73, 78, 86) This included providing time for learners to implement learning (55, 59, 74, 86, 98) and support to help overcome barriers. (86, 95) Pimenta et al. (58) also discussed the importance of senior staff visiting the learners in their own workplace and having an opportunity to discuss obstacles. Caguioa et al. (76) illustrated the importance of change champions. Lacey et al. (91) highlighted mentor support as key to successful transfer, strengthening the learner’s beliefs in their ability to implement the project. (98) Importance was placed on experiencing small successes early on, which mentors helped with. (59, 91) Stanbridge et al. (67) highlighted that training needs to be carried out in a positive way and provide support to staff through education and skills development to enable the setting of achievable personal and organisational goals.

Support from all levels, including technical support and supervision, is important for implementation. (54, 62, 67, 70, 73, 75, 76, 86, 89, 92, 100) The collective culture of colleagues encourages resistors to comply. Establishing ongoing relationships between the learner and the organisation is also vital to overcome barriers. (54, 70, 72, 76, 86) Where there was poor teamwork, key individuals (facilitators) helped overcome this. (59, 72, 86, 98)

Wright and McSherry (100) found that developing strategies that secured the commitment, interest and motivation of nurses was vital to the success and sustainability of the programme, and ward managers played a crucial role in engaging staff. (100) Management are more likely to be supportive where programme successes were seen or perceived. (66) Sopirala et al. (86) discuss how they addressed process gaps that had been identified and shared the results in monthly meetings. This garnered credibility and support for the programme. The continuing support and project evaluations helped to illustrate the impact on performance and patient outcomes, facilitating overall sustainability. (91, 98, 100) Cullen and Titler (98) extended their programme to allow time for project evaluation and integration, which increased project support.
Lack of resources was highlighted as a barrier (58, 67), which may have been overcome by increased project support. (59) Christie et al. (70) reported that additional administrative support would have also made the process much easier to implement alongside normal work responsibilities. No site had any significant level of administrative support for the organisation and running of groups. Rosen et al. (92) reported that the intervention could have been maintained by a highly motivated administrator without research support. Ajuwon et al. (73) highlighted the importance of support from policy makers. Pimenta et al. (58) suggested that physicians did not implement some of the guidelines because they did not have the conditions required for it. Better training, internal support, and regular feedback were requested for any future iteration. However some considered it contradictory to good patient care and impractical to conduct such a research project in a clinic that had limited resources. Christie et al. (70) reported that those sites with high delivery fidelity were relatively well-resourced teams in terms of staffing. Site educators who had prepared and organised their delivery were more successful. Modules that were most successful had trained and enthusiastic educators who worked out their module plan in advance.

Context: Individual factors (C4.1.2) enable the learner to deal with resistance and overcome barriers to transfer (M4.1)

Individual factors also played a role in an individual’s ability to deal with resistance and overcome barriers to transfer. (57, 84) Cabana et al. (57) stated that their intervention attracted physicians who were more likely to be interested in the intervention. This influenced overall performance. Christie et al. (70) reported that successful sites had site educators who had experience delivering groups, worked together for many years in the clinic so had good knowledge of the participants, and were enthusiastic. Early challenges were often overcome through increased confidence.

Stanbridge et al. (67) discussed personal issues such as a lack of confidence and a lack of learner assertiveness. Some studies discussed the role of anxiety and a lack of motivation in their study. (63, 65) McGilton et al. (65) suggested that trainees felt nervous performing in front of the mentor, and that this may have hindered the outcomes. De Visschere et al. (62) further suggested that some of their participants might have had problems in dealing with a resistance to change, weakening the intervention. De Korne et al. (77) further discussed issues with failures in organisational and personal management factors, such as the attitude and collaboration of key individuals.

Context: Addressing logistical issues (C4.1.3) enables learners to deal with resistance and overcome barriers to transfer (M4.1)

This contextual factor refers to practical logistical issues which enable individuals to deal with resistance and overcome barriers in the transfer environment. For example, an intervention designed to reduce ventilator associated pneumonia (VAP) rates involved a number of elements, including improved hand hygiene, oral care and patient positioning (head of the bed elevation). (82) However, patients were sometimes lowered for a valid reason but not returned to an elevated position due to interruptions or other demands on healthcare staff, and no change in VAP rates was detected in this study. Brockbank et al. (89) reported on an intervention to reduce venous thromboembolism (VTE) and found that staff disliked electronic learning and electronic risk reminders. The authors believed this was due to current lack of integration with the medical and education records systems, which are predominantly paper based. Christie et al. (70) reported
numerous logistical issues which affected fidelity, and likely contributed to the lack of improvement in HbA1c. These included: non-attendance of patients on agreed dates and low group numbers or groups with mixed ages, which made delivery of the sessions challenging; staff shortages which affected the availability of trained educators; inappropriate training venues with continual distractions and a lack of privacy; the time-consuming task of arranging group sessions detracting from preparation time for educators; and delays between training and delivery of modules. Finally, McGilton et al.(65) found that nurses had insufficient time to adhere to the trained protocol on patient communication, and no improvement was detected in patient satisfaction.

**Mechanism: Organisational commitment (M4.2) facilitates the learners’ capability and transfer of learning into practice (O4)**

Organisational commitment was identified as an important mechanism that facilitated the transfer of learning into practice following an intervention or training.(74, 84, 88) For example, Brede et al.(88) illustrated that, following an educational intervention, prescription behaviours continued to improve. In contrast, Rosen et al.(92) illustrated that the results of their intervention were not sustained, possibly reflecting the move from mandatory to voluntary training. Bingham et al.(82) further note the negative outcomes following at lack of maintenance.

Identified contextual factors included: rigorous training, a high level of monitoring, consistent leadership, and individual and team development.(56, 67, 78, 86, 93) Providing resources for all staff to stay up to date of recommended best practices and new evidence was important.(63, 82, 92, 98) This helped to prevent relapse, improve performance, improve service delivery and facilitate sustainability.(63, 79, 84, 98) Sopirala et al.(86) identified that the consistent presence and guidance of trainers and the availability of protocols to hospital staff supported the capability of an individual transferring into practice.

**Context: Becoming embedded in systemic change (C4.2.1) facilitates organisational commitment (M4.2)**

If the training or intervention became embedded in systemic change this promoted maintenance of learning and commitment.(93, 98) Giving sufficient time to implement the learning in practice was important for embedding changes.(55, 63, 65, 86) Wright and McSherry(100) discuss the loss of staff effort and commitment if there is a lack of support for the project. Viewing the project as a continuous improvement programme with the potential to change organisational working was considered vital. Brockbank et al.(89) highlight the need for feedback on the intervention and make appropriate changes where necessary. Responding to feedback increased staff trust in the change process, increased compliance, and the embeddedness of policy in the system over a short timeframe.(86, 89, 92) Bingham et al.(82) state how it would have been useful to develop short- and long-term goals to more effectively provide interim feedback to clinical staff and verify that projects were progressing as planned.

A number of trusts developed tools and processes to ensure the programme became embedded into the organisation.(54, 57, 66, 76, 78, 81, 92, 100) A model of sustainability was developed to highlight issues, celebrate achievements and embed changes.(100) Rosen et al.(92) discuss how all new staff were “required” to train, illustrating how the new procedures and standardisation of training
became embedded in the system. In contrast, Yilmaz et al.(102) suggest that the main reason for the
high infection rate post intervention was that the staff hired after the education period were not
satisfactorily informed about the prevention procedures. Cabana et al.(57) further highlighted how
faculty were only able to provide the seminar after participating in a standardised training
programme. Christie et al.(70) note that the intervention was not delivered consistently and could
have hindered the impact of the training. Sustainability and ongoing outcomes were also hindered
by new (untrained) staff.(84) De Korne et al.(77) discussed how initially no strict protocols were in
place, but following discussions, multidisciplinary standard operating procedures were agreed upon.
This resulted in an increasing application of (hospital-wide) safety supporting practices.

Minimising complications of procedures was important during training.(79) One study reported that
individualised plans were developed for each client to assertively manage behaviours.(66) Thorough
explanation of procedures, including checklists, were associated with improved documentation of
compliance. This was thought to impact upon positive outcomes.(79) Stancliffe et al.(68) emphasise
the development of protocols and practical products (tangible resources for staff to use during
implementation). These were used during interactive training. Memory tools were also used to help
with standardising procedures, sustainability of new protocols and increasing motivation and ease in
changing practice.(74, 76, 84, 92, 100) Pimenta et al.(58) reported that e-mail and phone messages
acted as reminders, supporting maintenance of the change. The timing of the reminders was
important, and affected effectiveness.(59)

Monitoring was found to be crucial for maintenance of learning.(53, 54, 58, 62, 65, 67, 73, 74, 77-79,
92, 93, 96, 98-100, 102) Monitoring also helped to maintain interest and focus.(67, 86, 98) Audit
tools and workgroups were used to assess impact of the programme and develop action plans.(53,
56, 65, 67, 75, 76, 91, 93, 96, 100) Workgroups provided opportunities to meet, update, feedback
and arrange extra training and support. Combining evidence-based practice with training and
competency assessments proved to be effective in bringing change; both cost and patient
outcomes.(53, 57, 65, 72, 74, 76, 86, 97, 100)

Observations were an essential aspect of monitoring.(65, 77, 84, 102) Continuous individual
feedback on performance was found to be essential for compliance with new procedures post-
intervention(56, 65, 74, 86, 96, 97); increasing awareness and motivation to change practice.(74, 84)
Providing feedback once, rather than on an ongoing basis, would not have yielded the positive
effects of training.(84) It had to be provided periodically and continuously, which would yield effects
when the persons realised that they were being observed. Feedback at monthly meetings
encouraged commitment to the programme(86) and staff were re-educated where necessary.(66,
67, 86, 93, 102) Barsuk et al.(80) set up a post-test checklist and residents who did not achieve the
required level underwent more deliberate practice until they reached a satisfactory level.

Ongoing education and repeated reinforcement were vital for successfully changing practice.(54, 56,
59, 73, 82, 84, 86, 89, 93, 96, 98, 100, 102) Being motivated helped to foster new habits.(84) Follow
up training and continuity of a programme helped to ensure maintenance of learning and prevent
relapse.(65, 67, 83, 94, 102) Allen et al.(79) strongly emphasised the importance of “refresher”
training for established senior physicians and reinforced the importance of documenting adherence
to best practice. Where there was no refresher training, no effect of training was seen.
Uitterhoeve *et al.* (96) highlighted the importance of transfer strategies in the training design. These are strategies that support the transfer of acquired skills from training to the workplace environment and highlight the importance of contextual and organisational characteristics of the environment where the learned skills need to be applied, especially the provision of supervisory support. Without this support it is highly unlikely that the new skills will be applied and probably the learned behaviours will be lost. Christie *et al.* (70) noted that site educators wanted (and needed) more supervision and the level of support for site educators was insufficient for them to achieve the sustained fidelity required.

**Context: Individual response (C4.2.2) facilitates commitment (M4.2)**

Empowerment and ownership of the intervention also facilitated maintenance of learning and commitment, ultimately supporting a positive change in practice behaviours. Rowe *et al.* (59) further stated that future implementation should utilise approaches that will increase a sense of mutual ownership between study investigators and clinic staff. This way, compliance with the intervention protocol will likely occur. Wright and McSherry (100) reported improvements in staff engagement, empowerment, personal development and morale following better patient care. Ajuwon *et al.* (73) highlighted that the project empowered primary health workers with knowledge and skills to educate others and to plan implement and evaluate community-based projects.

Findings from the literature highlighted that it was important that trainees understood the needs of their patients and learnt to tailor approaches to these needs. Involvement in positive patient outcomes helped to sustain and build on the intervention progress. Brockbank *et al.* (89) highlight how the use of patient stories improved practice by providing patient feedback.

Confidence following training was also important in facilitating maintenance of learning and commitment.Achieving goals early on was found to improve confidence. Being viewed as ‘experts’ on the project further enhanced confidence, leading to the development of ‘change agents’. Bird *et al.* (55) discussed how in their intervention, learners had the opportunity to build confidence in training activities. Reengagement with the training principles and continuous quality improvement was important, building upon prior learning. As De Visschere *et al.* (62) reported, individual factors related to the institutions and their compliance could have had an impact on the final results, weakening the influence of the intervention (patient outcomes). Christie *et al.* (70) illustrated that when learners did not engage or adhere to preparation needs, there was lowered performance. De Korne *et al.* (77) also noted that some surgeons indicated that reporting errors was still difficult and Rosen *et al.* (92) found that learning was not sustained; individual factors were a cause of this.

**Context: Incentives and credibility of the training programme (C4.2.3) facilitates organisational commitment (M4.2)**

Incentives were important in maintaining learning and commitment, ultimately improving performance. The use of financial incentives to help achieve goals was described in some studies and helped with sustainability. The motivation to transfer was also enhanced by the use
of non-financial incentives, such as competition, for sustaining the intervention in the workplace. (86) In one study, a winning (best performing) unit was selected each month using a three-strike method of an audit by a graduate student. (86) Cullen and Titler (98) reported that the end of the internship provided an opportunity for recognition and celebration. Brockbank et al. (89) described how executive endorsement ensured that work progressed and that becoming an “Exemplar Centre” forced them to “up their game” even further as they were in the spotlight. Participants were praised, and best practice was publicised by regular articles in trust-wide newsletters and certificates.

The combined strategy of care, education and competency assessment of all clinical staff proved to be effective both in cost and patient outcomes, which increased credibility. (76) This was supported in other studies. (57, 91) Picheansathian et al. (84) discussed how a better understanding of the effect of the training and impact on patient care may have facilitated adherence. Maintaining credibility for a programme is a challenging task. (86) Christie et al. (70) reported that the level of support for the intervention was inconsistent across teams and therefore hindered the impact of the intervention. Sopirala et al. (86) sought to overcome this by increasing the sense of empowerment in learners and educators. The authors discussed how they addressed process gaps that had been identified and shared the results in monthly meetings. They felt that this enhanced the credibility of the program.

Continuing Professional Development (CPD) and advancing career agendas were also important, (86) as were time and space to implement increased uptake of the intervention. Some trainees reported their experience as a valued opportunity for professional growth, increasing their incentive to participate. (98)

**Context: Leadership (C4.2.4) facilitates organisational commitment (M4.2)**

Improvements in the learners’ leadership skills also helped to maintain learning and commitment. (53, 62, 90, 92, 98, 101) Wright and McSherry (100) reported that their programme was found to develop skills in leadership, problem solving and personal development. Hallman et al. noted that participants became leaders and early adopters to change on the unit; therefore, despite only a third of the staff being trained to date, their influence could be seen in the initial positive trends. (53)

Benefits to both the team and wider organisation, stemming from sharing learning and better leadership, were noted. (53, 78) On-site leadership and change agents improved the success of the intervention. (59, 62, 79, 82, 98) Frumenti et al. (90) illustrated that high-level leadership performance on the part of unit nurse managers had a significant influence on the quality of clinical outcomes.

However, Bingham et al. (82) highlighted the negative impact of high staff turnover on leadership. Both facilities experienced significant changes in senior leadership as well as multiple changes in head nurses, a role critical for this intervention project. Most importantly, unit leaders changed frequently, resulting in a lack of consistent leadership to support the efforts of the change process for adopting and maintaining behaviours.
Networking for support and learning from each other (C4.2.5) facilitates organisational commitment (M4.2)

Networking for support and learning from each other also supported the maintenance of learning in practice.(54, 63, 66, 75, 78, 86, 98) Networks set up during training were important so that staff could share the same problems or identify new problems(64, 93); gaining support and advice from the group.(72) Learners were encouraged to consult with their colleagues to obtain group buy-in.(55, 81) This support was found to motivate them to continue with delivering the intervention.(65) Proudlove et al.(72) stated that study days provided a forum to share ideas and working methods, and to meet new contacts and sources of help. Leading by example also turned out to be a crucial factor influencing transfer.(77) It helped participants to identify and change safety-related patterns of behaviour between professions.

Without ongoing support from established networks, the effects of training are likely to dissipate.(54, 66, 94) Bingham et al.(82) also highlighted the need for better communication to promote a positive impact of the training.

Mechanism: Culture change (M4.3) enables learner to have the capability to transfer learning into practice (O4)

The spread of learning was also identified as an important mechanism in the transfer of learning.(54, 73, 98) This is the extent to which learning spreads through a service or organisation and is not retained in silos. A change in culture was also important.(61, 67, 77, 81, 99) This facilitated the application of learning.(55, 75, 77, 96)

The contextual factors that were found to facilitate this were the sharing of information back into practice and whole-team learning. The sharing of information was important,(99) but not always evident, leading to some staff being less prepared.(99) A team training approach was also thought to be effective in bringing about the cultural change required.(67, 75, 82) A lack of organisational change was found to hinder the transfer of learning post-intervention.(59)

Context: Sharing of information back in practice (C4.3.1) facilitates culture change (M4.3)

Sharing of information with colleagues and spread of learning was reported in many studies.(54, 62, 78, 98, 102) Frumenti et al.(90) reported that, after their study, two of the three attendees became coaches for others in the facility, teaching them about the application of the new procedure. This likely improved performance. Programmes that worked towards engaging all staff helped to increase compliance (86) and as a result benefited from the new behaviours.(91) Ajwown et al.(73) further reported that staff were empowered with the knowledge and skill to educate others and therefore charged with the responsibility of informing their colleagues about the intervention. Almost all of the teams replicated the training as expected. Holt et al.(94) highlighted the importance of the considerable cross training and sharing of information between nurses. The core nursing staff, who participated in the project, shared their new knowledge with nurses who had not received the educational intervention during the study period. This knowledge was shared and became integrated into the culture. Narevic et al.(66) were unable to illustrate an immediate effect of the interventions. Open support groups were not mandatory and therefore spread of learning was likely hindered. Cullen and Titler(98) stated that to keep the projects going and start others, groups need
to get together with the next group and share best practice, underlining the importance of dissemination.

De Korne et al. (77) reported an increase in the hospital-wide application of their safety supporting practices. Sopirala et al. (86) stated that effective programmes require the commitment of adequate resources and clear lines of communication among different layers within the health care structure. This sharing of information reinforced the efforts of the intervention. Christie et al. (70) highlighted that exemplar sites were those who had shown greater whole team dedication to the project. Caguioa et al. (76) discussed the importance of all staff involvement. Barsuk et al. (80) stated that hospitals can use interventions developed at other institutions to improve patient care. Wright and McSherry (100) further noted that it was detrimental to transfer learning when staff did not discuss the programme or report progress and achievements. Sharing information and reporting successes encouraged motivation and competition between wards. Contextual determinants affecting pace and spread of the programme included change in organisational conditions, issues such as, split sites and difficulties implementing on larger wards or in stable organisations that are resistant to change.

Context: Critical mass (whole team) and widespread involvement of staff (C4.3.2) facilitates culture change (M4.3)

Positive outcomes were found when all members of staff across the organisation were trained. (53, 54, 62, 66, 92) It was important that there was input from all team members in spread of learning and development. (56, 77, 89, 99, 100) Working as a cohesive team and understanding roles appeared to have benefits, particularly where different professional groups were engaged in the programme. (53, 54, 56, 59, 75, 86, 92, 99, 100) Stanbridge et al. (67) reported that a team training approach is most effective in bringing about the cultural change required. Wright and McSherry (100) reported that doctors were perceived as a harder group to involve directly in the work due to mindset and organisational culture. However, success and sustainability are largely dependent on teams working collaboratively with all staff involved in the programme. The principles and methodology must become embedded into the culture of the organisation. This may have been achieved if they were to develop and extend the programme to incorporate the whole organisation including nonclinical areas. Christie et al. (70) stated that it might have been helpful to have trained the whole clinical team to create a clinic environment that supported the delivery of the structured education groups. There was a failure to effect changes in the whole team approach owing to training only part of the clinical team. Greater involvement by consultants would have been beneficial to promote spread of learning, increase engagement and increase overall awareness.

Whole team training also meant more uniformity of supervision for residents and correct reinforcement and awareness of good practice. (54, 79) Authors noted that whole team learning can promote commitment to and consistency in the implementation of agreed strategies. (54, 68)
Summary of key messages from Step Four

Although learners may emerge from Step Three equipped with knowledge, skills, confidence, and commitment to change practice and desire to apply learning, the challenge is ensuring that they have the capability to achieve successful transfer of learning to improve practice. The aim of Step Four is therefore to ensure learners have the ability to transfer learning into practice – with the further aim of producing benefit for patients. This step is associated with three mechanisms that drive how new practice was implemented (ensuring the learner is able to deal with resistance and overcome barriers to transfer), maintained (ensuring organisational commitment), and spread across the organisation (through a change of culture). The support, organisational commitment, and workplace culture experienced by staff when they return to work after training, is likely to determine the extent to which new practice becomes the way things are done in the organisation. Ongoing support and becoming embedded in systemic change are critical to this. Managers’ support can also be important in offering support to transfer through mentoring and ensuring the support of workplace champions and peers.

Without a transfer strategy in place, education and training is often lost once staff return to the workplace and the impact of the intervention is diminished. Changing practice is challenging, often eliciting hostility from colleagues. Individual learners need considerable support from tutors, coaches, mentors, and their managers to increase their resilience and determination to succeed. Where whole teams change practice together, it is harder for individuals to resist the drive to practice differently.
2.2.4 Illustrating the fit between the developed programme theory and the evidence

There was a great deal of evidence for both positive and negative outcomes that has fed into the developed programme theory, however this report focuses on the 51 key papers that were chosen as they contained more detail to test, refute and refine the programme theory.

Interventions are more likely to fail to reach patients when key steps are missing or not achieved. Much emphasis is placed on Step Four, where learning is transferred. Seven of the 51 key papers illustrated negative outcomes. The programme theory can be used to explain why they failed. Example reasons for failure included a lack of leadership and staff acceptance, a lack of resources, a lack of alignment of assessment with intervention aims and objectives, inability to change ingrained patterns of working within medical hierarchy due to a lack of ongoing facilitation and whole-team training, and increased responsibility which reduced time spent interacting with patients.

The study by Christie et al. included a thorough process evaluation and identified failures in all steps across the programme theory that may have negatively affected patient outcomes. A summary is presented below.

A ‘train the trainer’ approach was adopted. Staff attended two one-day workshops then delivered a paediatric diabetic patient education intervention aimed at reducing HbA1c in 8-16 year olds. The process evaluation revealed some misperceptions on the part of lead clinicians about the extent of involvement of staff. The randomisation and recruitment process led to delays in the first delivery of the intervention and site educators found commencement of the project sometimes coincided with staff shortages or other service problems. Without organisational and clinical support, there was a lack of alignment between the goals of the intervention and normal service delivery. This led to staff feeling frustrated and annoyed (Step One).

Some sites found it difficult to release staff for training. Spreading the delivery of training over two weeks improved attendance where staff were able to fulfil other work commitments. Some site educators were not fully consulted about their participation and they felt both angry and anxious about coping with this additional responsibility and were resistant to participation (Step Two).

Staff were learning new psychological models and found it difficult to use unfamiliar person-centred approaches. In the report authors suggest that the brief training was insufficient to gain adequate skills and understanding about the theories and techniques being used. There was also a great deal to learn in a short time. Inexperienced educators felt there was not enough training time and wanted more training and opportunities to practice using role-play. They lacked confidence, and this led to stilted delivery and constant referencing to the manual. A long-term approach to developing an understanding of effective models and practicing modes of communication about self-management as part of nurse training was recommended. Whilst staff felt keen to participate, some were anxious about lack of basic diabetes knowledge and experience, and lack of time to deliver the programme. Instead of learning new styles of delivery, time was spent on improving staff basic knowledge and preparing them for the remainder of the training package (Step Three).
Usually a single site educator organised the patient groups and the venues without additional research project or clinical team support. Venues were often problematic. Many sites complained that they needed more administrative support and there was a need for better use of electronic media. High staff turnover, redeployment, sickness and absence, and lack of flexibility about shift hours led to disruption of the intervention leading to delays in delivery (sometimes 4 months between training and practice), heavy workloads and reduced time for preparation. As a result, educators were unprepared to deliver the modules, were more likely to depart from the delivery protocol and return to manual and stilted delivery, and they received lower patient ratings. They felt less able to keep people focussed on the task or deal with difficult group dynamics or quieter group members. Staff felt they required a refresher course (Step Four).

The authors reported a high rate (37%) of non-participation amongst patients randomised to the intervention arm of the study. They discussed several factors related to patient characteristics. For example, one critical factor may have been the severity of the condition: those with high levels of HbA1c were less likely to attend yet those patients would probably have had a greater scope for improvement. Similarly, older children (aged 13-16) were less likely to attend, but they would have had greater independence and scope to self-manage their diabetes. An awareness of the potential influence of these patient characteristics could strengthen the intervention design and its target. The intervention was designed to deliver different sessions appropriate to specific age groups, but organisers experienced a number of logistical issues associated with the varied ages. Amongst reasons given for dropping out were not wanting to miss school, exams, no available adult to bring them, bad weather, forgetting, and not being interested. In the process evaluation, despite piloting the intervention and making some modifications there were still problems with certain aspects of the delivery, for example the complexity of the concepts and the language used.

### 2.2.5 Summary of health economics evidence

To explore how cost effective educational interventions were, we aimed to examine the appropriate evidence from papers, which included any form of health economics analysis. However, after consultation with a health economist, the evidence and its analysis was not considered of sufficient depth or homogeneity to conduct a robust analysis. With the information being of limited economic analytic rigour, we opted to summarise the relevant papers.

Of all the papers included in the review, we identified 21 that offered some information on the costings of interventions and outcome estimates. Eighteen were U.S. studies, one from Taiwan, one from Germany, and one from Canada. Most of the economic estimates produced statements of cost savings or cost avoidance.

Three conducted a full cost effectiveness analysis,(118-120) thereby providing evidence that an intervention was cost effective, having taken into account the cost of the intervention itself. However, Rodriguez et al. and Moore et al.(118, 119) did not specify training costs separately from treatment costs, thus a conclusion about the cost effectiveness of training was not drawn. Teresi et al.(120) claimed that net savings were associated with a training programme to reduce falls and increase quality of life.
Outcome measures were costed in 14 of the reports, and in some cases, were based on estimations from the literature, or from extrapolating average costs from similar known cases.\(^{(79, 80, 91)}\) Outcomes were usually expressed as estimated cost savings, measured using a variety of metrics (average cost of stay, average cost of case, length of stay, reduced hospital visits). The patient outcomes included medication consumption reductions, experiences of treatment, infection rates, falls, and pressure ulcers (the most described patient outcome, included in five of the papers). The majority seemed to conduct their appraisal of possible cost savings from a health service perspective, rather than a patient, or societal/government perspective.

Six studies specified training or education costs, and a further 10 provided some details of intervention costs more generally (these could include “treatment” costs). Therefore, claims about cost savings, or cost avoidance, were often not specific to an educational or training intervention.
3 Multi-method testing of the programme theory

The realist synthesis presented in the previous chapter was used to revise and inform the programme theory to explain how interventions contributed to patient benefit. Although the emergent evidence-based programme theory describes a dynamic theory (Figure 4), linking the four steps that facilitate patient benefit, further data collection was needed to ‘test’, or evaluate the theory. This approach of using a realist synthesis followed by realist evaluation provides strong empirical support for theory development.\(^{(121)}\)

The emphasis in many of the published papers was to describe the intervention (what they did) and the outcome, with less emphasis on the processes (mechanisms) that made the intervention work or not. This mechanism is key as the outcome of each step is explained by these underlying mechanisms. We conducted several packages of data collection and analysis to further explore and evidence the ‘black box’;\(^{(122)}\) explaining the mechanisms between delivery and the outcome that cause change.

The primary motivation for further data collection was to test the refined Four-Step programme theory (initially five steps). However, it was also critical to the applicability of the theory to explore any gaps evident in the theory i.e. lack of evidence of Step Two or nuances that could provide further explanatory power.

To perform a robust evaluation, we conducted three further phases of data collection and analysis. The first was a series of five case studies Case study methodology provides the capability to offer qualitative evidence to substantiate the mechanisms required in realist evaluation. The second was an analysis of questionnaire data to explore the role of individually led continuing professional development (CPD) activity in transferring learning to benefit patients. The third and final phase was the exploration of linking routinely collected Trust-level data to workforce and educational variable associated with patient outcomes and experience. There is some evidence that Trusts that take part in research have been shown to be associated with reduced patient mortality.\(^{(123)}\)

By testing the programme theory further using a range of different types of data we hoped to challenge the programme theory in its completeness and explanatory power to explain real-world cases. We included analysis of routinely collected national data to examine associations between educational environment data and outcome data. However, without evidence of an educational intervention, the analysis of quantitative evidence was unlikely to test or inform the programme theory. Nonetheless, this analysis serves to explore the importance of educational factors that could in theory be linked to patient outcomes, and highlights the limitations of existing data educational data in the UK as a source of evaluating the impact of educational interventions.
3.1 Test Phase 1: Case Studies

3.1.1 Aims and objectives

To understand real world education or training interventions through the application of our modified programme theory.

The specific objectives of the case studies were:

1. To identify positive and negative outcomes of training or education that may be used to challenge or support the theory.(104)
2. To elaborate on mechanisms (barriers and facilitators) identified or not well evidenced in the synthesis of the literature, or identify new contexts or mechanisms not previously identified in the literature.
3. To describe and illustrate in further detail how mechanisms operate, in what context, and how this leads to improved patient outcomes.

3.1.2 Methodology

Evaluation involving primary data collection was crucial following the development of middle-range theories. Therefore, a realist evaluation was conducted to explore how each educational intervention worked, to explore the emerging programme theory and any inconsistencies, and to explore its applicability in different contexts. The realist approach that we adopted throughout also required comparisons with examples of negative outcomes.(104) This iterative approach involved the negotiation between stakeholders and researchers, adding more depth than most traditional qualitative approaches, which often involve less dialogue between the researcher and participant.(121)

A multiple case study design was adopted.(124) This enabled in-depth exploration of the complexities involved in a single intervention, within its real-life context. This design also allowed data to be collected from multiple sources to explore the processes through a variety of lenses.

Common to all chosen cases, there was both an intervention and an attempt to record or measure outcomes that benefit patients. Two of the cases used the same externally provided intervention. However, to test the theoretical replication and increase generalisability of the programme theory, different types of interventions were selected. This involved the collection of primary data for cases to unpack the ‘black box’(122) between the intervention inputs and the pattern of outcomes.

Qualitative methods were the primary focus of this evaluation. Qualitative approaches are favoured in the realist approach as they maximise the information gathered. The flexible and iterative approach to analysis allows further data collection to ensure all aspects of the programme theory are explored, developed and tested (CMOc). Qualitative data collection is particularly important in investigating mechanisms, enabling an understanding of the reasoning of stakeholders (those impacting upon the success of the intervention).
3.1.3 Case selection

Selection of appropriate cases proved to be challenging. Initially we approached the Head of Quality for the NHS in one region to ask which Trusts could provide good examples of a successful intervention. Of the four Trusts suggested, none of these could be followed up. The first refused to take part as, although the educational intervention had met with initial success, outcomes had reverted to baseline performance. The Trust was therefore reluctant to repeat apparent failure. The second felt they had not received any support from management and had not implemented the programme. The third had not measured patient outcomes. The final Trust was implementing a costly intervention, but no evaluation process was in place. Eventually cases were identified through personal knowledge and from published articles using criteria that allowed direct comparison between some cases, and variation in interventions in different contexts with a wide geographical spread across regions of England.

Five cases were selected as they targeted outcomes sought in our programme theory: clinical effectiveness, patient safety, and patient experience. Table 9 provides an overview of the cases sampled. The extent of the interventions and their successful outcomes in UK NHS Trusts led us to consider these interventions more closely.

<table>
<thead>
<tr>
<th>Study</th>
<th>Intervention</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A neurosurgical department in an inner-city UK Tertiary care NHS Trust</td>
<td>One day training on Human Factors in Patient Safety/ Crew Resource Management training, repeated five times over three months until all theatre staff had received training.</td>
</tr>
<tr>
<td>2</td>
<td>Five operating theatres in a UK Tertiary care NHS Trust</td>
<td>One day training on Human Factors in Patient Safety/ Crew Resource Management training, repeated three times and delivered alongside two system improvement interventions.</td>
</tr>
<tr>
<td>3</td>
<td>An acute care Teaching Foundation Trust Hospital</td>
<td>An educational programme designed to ensure IV practice was consistent and evidence-based across the Trust, with inbuilt evaluation.</td>
</tr>
<tr>
<td>4</td>
<td>An NHS Foundation Trust and University collaborative</td>
<td>A flexible, accredited work-based learning programme (Professional Practice Award) to support ongoing staff development needs.</td>
</tr>
</tbody>
</table>
3.1.4 Data collection

In evaluation research, particularly in process and development approaches, interviews are frequently the main tool used to generate data about intervention effectiveness. Interviews were conducted and recorded with clinical and non-clinical programme initiators, in house and external educators, research and project support staff, training managers, and administrators. A focus group was also held with learners. These interviews provided critical information on the implementation of interventions, key contextual factors, hypothesised mechanisms of change, the range of outcomes measured (including more detail on measures of patient benefit), and feedback on the development of interventions (including elements which did not work successfully).

The realist approach and case study design led us to use the prior development of theoretical propositions to guide data collection. An interview schedule was developed (see Appendix 11) to probe aspects of the newly developed theoretical model and was used selectively to ensure interviewees were asked relevant questions. The subject matter of all of the interviews in this project was the programme theory, the purpose being for interviewees to confirm, falsify and refine the theory. A realist interview method was therefore adopted. The realist interview involves explaining the programme theory being tested, and then having learned the theory, the experts are able to teach the researcher about the components of the intervention in an informed way. The teacher-learner role was interchangeable throughout. This co-created dialogue was recommended by Pawson & Tilley, as it is crucial for validating the researcher’s interpretation of what was or was not working and enable refinement of the programme theory.

In order to challenge the programme theory, participants were asked about the problems they had to overcome, unintended consequences, and about other interventions they have initiated which did not demonstrate patient benefit. The interviews were tailored to individuals according to the information already available in secondary sources from the Trust, and any published literature about the specific interventions. Probing questions were used to elicit views on the mechanisms that led to outcomes in each step. Where the evidence did not accord with the developed theory, the impact of this on outcomes was explored to challenge the programme theory. Interviewees were also shown a diagram of the programme theory and asked to comment.

The realist approach requires multiple types of information and evidence to be included, allowing for flexibility and inclusivity. Therefore, other sources of evidence for the case studies included: published papers, internal reports, relevant information on websites, organisational policies, course handbooks, focus group notes, PowerPoint presentations, learner testimonials and routinely recorded data. These were used to corroborate or challenge evidence – alongside the collected primary data via interviews. Interviews were transcribed and anonymised, then imported into NVivo.
3.1.5 Analysis

The analytic approach used at this stage was not a defined, separate stage of the process, but was an ongoing iterative method of placing pieces of data within a wider explanation. As with the realist synthesis, data was analysed using Context Mechanism Outcome Configurations (CMOCs), specifically using the developed programme theory as a framework. It was important to ensure strings of CMOCs configurations were extracted, rather than simply listing CMOs. Exploration of direct links were essential. It was also essential to look for components within the data that did not fit, as well as those that did. Exploration of the programme theory was the main focus, but there was also an awareness of exploration of the unexpected.

Framework Analysis

The realist approach highlights the importance of testing of the developing programme theory using primary data. The framework approach to analysis was the most appropriate choice of technique, given that we had already developed the initial programme theory from the literature. This theory acted as a framework for the ongoing analysis.

Framework analysis is a rigorous, flexible and systematic approach that leads to a meaningful interpretation of the data that is relevant to the projects applied needs. Its applied approach is useful for informing both policy and practice. Its ontological position adheres closely to subtle realism. This view maintains that the social world exists independently of subjective understanding of the individual, but is only accessible in qualitative research through participant interpretations, which are further interpreted by the researcher. This view very much follows the logic of realist evaluation.

The chosen approach also ensured transparency and offered clarity by allowing the data to be mapped to the existing programme theory. Both inductive and deductive reasoning were used. The framework approach involved five inter-related, but distinct, stages that allowed for theme-based analysis: 1) Familiarisation 2) Identifying a framework 3) Indexing 4) Charting and 5) Mapping and interpretation.

Familiarisation involved gaining an overall view of the data that had been collected. This involved reading the transcripts many times and noting the range, depth and diversity in the data collected. This helped the researchers to notice subtleties and assumptions. Regular discussions between the researchers also took place, ensuring thematic consistency. Analysis was shared between five members of the research team.

The second stage of this analysis involved identifying a framework, which we already had following the realist synthesis. The framework provided guidance to shape data collection and analysis, but was flexible enough to allow theory refinement and the development of new ideas. This stage of the analysis focused on a priori themes - themes that guided the aims of the project (the programme theory), emergent themes - themes that were raised by the participants, and analytic themes - themes that emerged from patterns and re-occurrences in the data. The analysis focused on refining the explanations as to how the proposed mechanisms unfolded or did not unfold. Alternative
mechanisms and explanations were sought. This was crucial in developing the CMOCs and ultimately supports answering the research questions.

*Indexing* involved applying the programme theory framework to the data. This involved reading the transcripts and marking sections of text, which related to components of the programme theory (coding). New components were added if appropriate. This was done using NVivo 10. NVivo was used to keep an audit trail of developments and allowed refinement of theories. NVivo also helped to provide an accurate and transparent picture of the data.\(^{(131)}\)

Key concepts were interrogated more deeply, and data was explored to test and refine the theories. These were compared with the existing concepts within the programme theory. Memos were a key tool throughout the process.\(^{(132)}\) Memos were written to capture concept meaning and their relationship to the programme theory, and versions of the file saved at different stages provided an audit trail of concept development. These decisions were also discussed within the research team.

*Charting* involved collecting all the selected sections under a particular theme and viewing the data as a whole for each theme. This process was made much easier using NVivo. Decisions at this stage were based on similarities and differences between the initial programme theory and themes becoming clearer through exploration of the data. This provided a test for a coherent causal chain within and between steps.

As experienced during the realist synthesis, many of the themes overlapped and at times it was unclear which context or mechanism the data best fitted. Although the data was coded using the programme theory, the relationship among them was not always self-evident. It was ensured that each component was explored in terms of its relationship with the other CMO components.

The final stage – *mapping and interpretation* - involved bringing the key themes within the data set together and drawing together the findings of the project to address the aims and objectives of the research project. Although the data sources were analysed separately, these were synthesised together at this point- comparing themes and checking against original transcripts, memos, discussions etc. to ensure appropriate CMOCs and to draw out the lessons learnt. This last phase determined which CMOCs offered the most robust and plausible explanation of the observed pattern of outcomes. CMOCs were refined and clarified.

### 3.1.6 Internal and external validation

To seek alternative interpretations of concepts, descriptions, explanations and their relationship to the programme theory, five researchers shared and discussed memos and feedback on case study reports (Appendices 12-16) in face-to-face meetings. This is in line with good practice in qualitative research.\(^{(121)}\) The researchers challenged assumptions and clarified the CMO configurations derived. Interviewees also raised alternative explanations for mechanisms and outcomes during the interviews. Summaries of each case study were sent to informants to check for accuracy, to comment on the resonance of the configurations, and to invite further elaboration.
The programme theory was also presented in a report to the projects expert advisory group and patient reference group for comment, to ascertain the credibility of the programme theory and to consider concepts missing from the evidence.

3.1.7 Ethical approval

In order to conduct interviews with health professionals and educators working in healthcare, ethical approval has been successfully sought from Durham and Newcastle University Ethics Committee. One member of the team undertook Disclosure & Baring Service (DBS) checks, Trust Induction, and health checks to gain an honorary contract and research passport to enable them to conduct the interviews. The research passport enabled access to all relevant NHS Trusts.

3.2 Case Study Findings

The selection of case studies across five acute UK NHS Trusts enabled us to test the developing programme theory across a range of clinical and non-clinical staff, across Trusts, at organisational, team and individual levels (see Table 9). Two Trusts had initiated a similar intervention of whole team training in theatres to address Human Factors in patient safety, allowing some cross comparison of context, mechanisms and outcomes between Trusts. One Trust had introduced a work-based learning programme focusing on developing individuals to implement ‘bottom up’ small-scale service improvement projects. This programme was available across the workforce enabling comparison of different professional and non-professional contexts.

3.2.1 Case study summaries

A summary of each of the five case studies is presented below. We have illustrated how each of the case studies both support and help to refine the programme theory (see section 2.2.3 for a breakdown of the contexts, mechanisms and outcomes). A report for each case study detailing further evidence for each are presented in Appendices 12-16.

Overall, exploration of the case study interventions support the developing four-step model. Where the implementation of the interventions adhere to the context, mechanism, outcome configurations identified in the model, the interventions were most successful in terms of reaching patient benefit.
Case Study One

Case study one took place within a neurosurgical department in an inner city UK Tertiary care NHS Trust. The focus of this case study was on the implementation of a one-day training course on Human Factors in Patient Safety. This was repeated five times, over three months, until all theatre staff had received training.

Sources of evidence

Interviews were conducted with the Department Head, the external trainer, and the regional Head of Quality Assurance. Other sources were a paper published by the first two interviewees (Mitchell and Dale, 2015) which included routinely collected patient data, the website of the training organisation, and a Course Handbook written by the Department Head.

Step One: Education or training is initiated and is designed to demonstrate patient benefit

Regarding Step One, routine performance monitoring of neurosurgery (C1.1.3) identified a series of errors. The average baseline error rate was one in every 300 sided procedures. The team introduced a checking system (‘The knife check’) which reduced errors for up to 1500 procedures but failed to eliminate the problem. There was pressure from senior management to resolve this (M1.1). To understand why the ‘knife check’ had not eliminated errors completely, the Department Head sought expert advice and was referred to a training organisation working in high risk industries including the NHS, using Crew Resource Management, an approach originally designed to improve teamwork and reduce human error in aviation. The trainers were commissioned to provide training (O1). The safety expert met with the Department Head and recalled the moment of realisation of the source of the problem (C1.2.1). Training delivery was primarily managed by the Department Head who project managed training for all 125 staff over three months (C1.2.2). Project tasks included defining the problem, commissioning external trainers, acquiring funding, organising service delivery around training, organising pre-course observation and course training venues and refreshments. To reduce the impact on service delivery a bespoke one day course was negotiated with external trainers. The implementation of the training was complex; there was a tension between ensuring theatres were working at capacity and finding time for training. There was no financial support from the Trust or University to commission training, however, the Strategic Health Authority (SHA) had set up a group to promote safe practise and was able to fund this project (C1.2.4).

Routine monitoring of surgical errors (C1.2.5) allowed the number of procedures carried out since the last recorded error to be used to compare performance pre and post training (C1.2.6). This outcome measure was regarded by the Department Head as ‘one of the most competitive measures in literature’ (M1.2) and could provide a meaningful outcome measure (O1).

Apart from the Department Head (C1.3.1), the initiative was supported by Safer Care North East (C1.3.2), a group within the SHA which met to share practice and evidence from local Trusts and over time was a significant driver for change in safe healthcare practice across the region (M1.3). The learning needs assessment and training was delivered by safety experts (C1.3.1) who were actively engaged with the regional safety agenda (M1.3). There was a symbiotic relationship between these
three programme initiators which drove implementation within the neurosurgical department (M1.3), maintained a focus on the outcome (O1), and raised awareness of the role of human factors in surgical error across the region. However, support for the means of improving performance was lacking from Trust management (C1.3.2) who were not interested in how errors were reduced, only in the outcome (O1).

**Step Two: The learner is motivated and ready to learn**

With regard to Step Two, Staff participation was assured (M2.1) by closing theatres (C2.1) so that staff could attend the mandatory training at work and repeated delivery of the intervention ensured that staff on all shifts and rotas were able to attend. Whole team training (C2.2.3) enhanced the relevance and benefits of the training (M2.2). High levels of participation of staff at all levels of seniority signified the importance of the training and motivated individuals to learn (O2).

**Step Three: The learner learns successfully and has the commitment and desire to apply the learning**

For step Three, staff were told about the problem of wrong sided errors (C3.1.1), they were encouraged to reflect on their own practice (C3.1.2) and they were observed in the workplace (C3.1.4) which challenged the adequacy of current practice (C3.1.3), helping them recognise the need to learn (M3.1) and increasing their commitment to engage with the training (O3). Whilst training was ‘off the shelf’ (C3.2.2) it was modified to suit the needs and resources of the department and staff (C3.2.1). Teaching methods (C3.2.3) were interactive and varied to ensure staff at all levels were able to engage with the content. Action planning (C3.3.1) bridged the gap between learning and practice with opportunities to try out and review (C3.3.2) new practice (M3.3) enhancing commitment to apply the learning (O3).

**Step Four: Learner has the capability and transfers learning into practice**

Coaching was used to support (C4.1.1) staff at all levels (C4.1.2) to implement training in Step Four. This was more effective if staff had been trained prior to coaching (C4.1.3). Key to the success of the programme was the persistence and leadership of the programme initiator (C4.2.4) in monitoring and enforcing new protocols so that they became embedded in the system (C4.2.1). The specialist trainer attributed the sustained impact of the intervention to the Department Head (‘he’s the super hero’). The Department Head proactively addressed inappropriate risky behaviours. Despite changes in staff and relocation to a different hospital, pre-operative briefing remained at 90% compared with 10% before training, and the ‘knife check’ was done universally and staff were corrected if they did not use the challenge response format.

The programme initiator also dealt with non-compliance (C4.2.2) by training staff (C4.1.1) to deal with resistance to change (M4.1) and maintained a learning network through the SHA. He attended each training session to lend credibility to the content (C4.2.3).
The organisational commitment manifested itself through the doctors and nursing team leaders (M4.2) who had all been through the training. They ensured staff implemented the protocols and supported less senior staff in the face of resistance (O4). The Departmental Head felt the continuity of leadership and team leaders approach to enforcing the new protocols led to a culture change (M4.3), thus enabling learners to transfer their own learning into practice (O4). However, in the absence of further funds to rerun the programme, he temporarily stepped down from his role to write a course handbook and trainer’s manual and produce other teaching resources in order to run the programme ‘in-house’ more cost effectively (C4.3.1). The production of this manual was supported and funded by the SHA. These resources have been used informally within the Theatres (C4.3.1), but Trust management were unwilling to dedicate audit days to reinforce the training and had not grasped the wider benefits of spreading the training across the whole organisation (M4.2). However, the Departmental Head has been invited to talk to other Trusts in the region and they have used his resource package (C4.3.1).

A critical factor that facilitated good teamwork, communication, and change in practice was training the whole team together (C4.3.2). All 125 theatre and allied staff were invited to attend. By training everyone (C4.3.2) the ideas and new procedures just became part of ‘the way things are done here’ (M4.3)) and even those reluctant to change found those around them were implementing new protocols tending to fall into line rather than being confronted (O4). More junior staff felt able to express their concerns (O4).

How did the intervention benefit patients?

This highly successful intervention describes improved patient safety after a one-off training programme. One of the most impressive aspects of this intervention is the longevity of the effect. There have been no further wrong side errors in the eleven years since training was delivered.
Case Study Two

Case study two took place in a UK Tertiary care NHS Trust. Crew Resource Management (CRM) training was delivered to staff in five operating theatres and a surgical ward by external consultants supported by in-house clinicians. The core CRM training uses didactic mini lectures and interactive discussion to explain the theory behind human error, focusing on quality processing, decision making, situational awareness, the impact of personality type on teamwork, leadership, communication, stress and fatigue. CRM was tested alongside two system improvement interventions, the introduction of Standard Operating Procedures, and process design using Kaizen Lean methodology.

Sources of evidence

Face to face interviews were conducted with the programme initiator, a member of the research team, and an external trainer. In addition, there were nine published papers and quotes from Sir Liam Donaldson in the National Archives.

Step One: Education or training is initiated and is designed to demonstrate patient benefit

For Step One, the intervention was initiated and designed to show a patient benefit (O1). To show an effect, the project team designed five parallel experimental studies, in which each of the five had a control group (C1.2.6). Senior management gave passive support (C1.3.2) for an initiative that was not well evidenced (C1.1.2). It was given the ‘go ahead’ as the academic element of the consultant’s contract (C1.3.1) who intended to contribute to the evidence base for CRM. The first two CRM only programmes that were run found training changed ‘team attitudes and in the way they interact with each’ (Surgical Programme Lead: SPL), but there was no significant impact on patients (O5). This led to a change of approach. The problem was that staff had learned what needed to change but not how to change the systems they worked within to reduce error (C1.2.1). This led to feelings of frustration. There was a need to train staff in change management methodology (C1.2.1) to ensure learning could lead to measurable improvements (M.1.2) that would benefit patients (O1).

Time limited financial resources were sought externally (C1.2.4) and invested in training partners, staff backfill and a highly effective research/project management team (C1.2.2). However, managing the training delivery proved a challenge (C1.2.2). Organising a short training programme took ‘months and months to arrange’ (SPL) to ensure minimal disruption to operating lists. There were a number of constraints to improving safety and quality in the Trust hospitals and staff found any change to routine difficult and threatening.

Research design included observations and feedback to identify problems (C1.2.1), developing monitoring tools and accessing routinely gathered data to evaluate performance (C1.2.5), and using controlled studies (C1.2.6) to ascertain the effectiveness of the intervention in terms of patient benefit. Although there is some support for involving patients in improving safety (Health Foundation 2013), patient consultation was not undertaken to develop of this intervention (C1.2.3). It was in fact a challenge to find a reliable patient outcome measure (M1.2). Routinely recorded
incidents might have provided a patient outcome measure directly aligned to the aims and objectives of the training. However, these are difficult to interpret.

The prevailing organisational climate (M1.3) presented barriers to learning that would lead to patient benefit (O1) by prioritising service delivery over training, and some managers exercised caution about implementing practice change (C1.3.2), necessitating ongoing feedback to keep them onside (M1.3). Some of the positive impact observed can be attributed to responding to problems staff experienced in implementing service improvement (C1.2.1) and strong project management and support for staff (C1.2.2). However, much effort was undermined by the passivity and lack of commitment of senior management (C1.3.2) and the organisation who might have done more to ensure adherence to best practice amongst all staff. Management reluctance may be explained by a lack of definitive evidence for this approach to safety improvement (C1.1.2).

**Step Two: The learner is motivated and ready to learn**

With regard to Step Two, it is unclear how staff were prepared for training, or felt motivated and ready to learn (O2). Much was done to enable participation (M2.1) through repeating the programme and paying for backfill to allow staff to attend (C2.1). Some staff saw the relevance to practice and maintain skills learned to the present day (M2.2). However, there was considerable resistance to adopting the principles in CRM (M2.2) with unwilling senior clinicians and factions of staff who had been involved in an alternative programme (C2.2.2). The recruitment strategy (C2.2.3) was to train all theatre staff including porters, nurses, technicians and clinicians but attendance was not mandatory. The external trainer was not convinced that all staff had attended, and his experience was resistance when coaching untrained staff who had not bought in to CRM as an opportunity for continuing professional development, or as a means to improve patient safety (C2.2.2).

**Step Three: The learner learns successfully and has the commitment and desire to apply the learning**

In Step Three, the learner learns successfully and has the commitment and desire to apply the learning (O3). Learning needs of staff were identified during a period of observation by senior clinicians. It tended to confirm the programme lead’s view of what needed to be done, rather than being an opportunity to increase understanding. This was considered a useful exercise for the trainers, but given the tensions around the introduction of CRM (C3.1.3) staff themselves may have failed to recognise the need to learn new practice (M3.1). Assessment of learning needs identified by staff (C3.1.2) and their learning expectations was carried out by the external trainer at the start of the course. At this point, staff, frustrated by lack of change (C3.1.2), recognised the need to learn about change management (M3.1) and were engaged by the prospect of learning (M3.2) how to make a difference to their practice (C3.2.1). This was most successful when staff were primed with pre-course information. The course material had been prepared and delivered in other NHS Trusts (C3.2.1) but was adapted to the specifications of the commissioning Trust to accommodate limited resources (time, availability of staff, cost) and its delivery was supported by a senior clinician to add to the credibility of safe practice in an NHS context (C3.2.2). Teaching methods (C3.2.3) were varied...
and interactive and kept those willing to learn engaged (M3.2). It was the mix of methods which appealed to staff rather than any particular component. The initial problem with action planning (C3.3.1) is that staff could not envisage how they would change practice (C3.3.2) even though they had the desire to change (M3.3). This experience highlights the importance of training to help staff understand not only how to implement plans (M3.3) but also what and why change is needed to focus action plans on achieving the intended aims and objectives of the training (C3.3.2). Action plans need to address meaningful components that focus on patient benefit. An ethos behind the training was to empower staff to change practice rather than continuing to work around problems through action planning (C3.3.1). However, action plans developed following the Lean only training did not address key safety aims of the intervention. The introduction of other forms of change management worked well when it was combined with the CRM training (O3), but not when delivered separately as there was a loss of focus on safety issues.

**Step Four: Learner has the capability and transfers learning into practice**

Step Four shows how learners capability to transfer learning into practice (O4) can be reduced in the workplace especially, in this case, in the face of resistance from senior staff. Senior clinicians (C4.1.2) were reluctant to relinquish the steep management hierarchy that puts them in control. One individual reportedly refused to put any new practice in place without explanation (C4.2.2). However, staff who were keen to implement new practice, in particular nurses, (C4.1.2), were taught to deal with resistance (M4.1). Staff were also coached and encouraged (C4.1.1) to try new practice in the workplace after training and were supported by the SPL (A Senior Clinician) which lent credibility (C4.2.3) to the application of newly learned concepts (M4.1). One barrier was that new national policies on the use of the WHO checklist superseded some practices encouraged in the training (C4.1.3) and gave staff a reason not to implement practice learned on the course (M4.1). Systems were developed to try to reduce error (C4.2.1) by improving communication between surgeons and the nursing staff. These system changes helped to embed (C4.2.1) and maintain (M4.2) new practice, however, small changes often required major systems review. The introduction of Standard Operating Procedures (SOPs) ensured there was a process that had to be followed by all staff (C4.2.1); “we do things this way round here” sort of thing.’(SPL) (M4.2). Thus safe practice became a habit embedded in practice. SOPs also acted as an aide memoire for staff to trigger their learning (O4).

The selection of improvement projects was problematic and, whilst it is important to support the empowerment of staff, it is also important to be able to guide and constrain the choice of project within a policy or evidence framework. Lack of guidance meant that a great deal of effort was expended on projects unlikely to benefit patients. The nursing staff continued to provide leadership (C4.2.4) in departments they moved to across the Trust (C4.2.5), although the leadership in theatres around CRM had tended to refocus on change management, diminishing the commitment (M4.2) to tackle the teamwork aspect of patient safety. One interpretation of this is that it was less challenging to implement process change than team structures.
New systems and operating procedures ensured staff were consistently following protocols and these were indicative of the commitment of the organisation (M4.2) to these changes. It was also important to recruit change champions from the leaders in each professional group (C4.2.4) to support the introduction of new systems and who demonstrated organisational commitment to change (M4.2).

A key to the successful adoption of team working was the response of individuals (C4.2.2) within the team to the training once they were back into the operating theatre. The response impacted upon the extent to which they contributed to the team and organisational commitment (M4.2) which enabled and supported transfer of learning (O4). Some responses were negative (C4.2.2), reducing team commitment (M4.2).

To counteract negative attitudes the external trainer explained that they aimed ‘to give [staff] more confidence to deal with difficult behaviour’. However, where a steep authority gradient is maintained (C4.2.4), it creates a culture (M4.3) where such responses from senior staff make it difficult for staff to challenge authority. The responses of others were more positive (C4.2.2), motivating staff through their leadership (C4.2.4), ongoing networking (C4.2.5) and commitment (M4.2) facilitating a lasting and wide impact on the organisation (O4). However, the SPL felt the impact of the training faded rapidly (O4) due to the negative reaction or indifference (C4.2.2) which tended to come from senior people (M4.2). The SPL explained this lack of interest in the training in terms of the medical model and professional autonomy of senior surgeons (C4.2.2).

The degree to which new practice had spread across the organisation was difficult to evaluate. There were still likely to be silos of practice change in theatres which had the highest concentration of people with some understanding of human factors and where it was still considered to be important. As previously mentioned some staff who had moved elsewhere in the organisation continued to be trained in order to share best practice in their new roles (C4.3.1).

The SPL considered the greatest influence on culture change were SOPs, such as the use of the check list which introduced a requirement for procedures that had to be adopted by all healthcare professionals (C4.3.2). These procedures just became the way things were done (M4.3) and this enabled individuals to change practice (O4). The SPL has continued to develop and support training to share best practice (C4.3.1) and believes that the key to transfer of learning is creating a culture change (M4.3) by ensuring that a critical mass of staff have been trained (C4.3.2).

**How did the intervention benefit patients?**

Complication rates (O5.3), Length of stay (O5.1), and readmissions (O5.1) showed a non-significant decline in only two studies using CRM and a combination of CRM and Lean methodology. In the study using the Lean methodology, the proportion of patients requiring transfer to other wards (O5.1) fell significantly (27% to 20%) and adverse events after transfer also declined (O5.3). The two that combined a systems improvement with the team work training were the two with the best results with respect to team work, use of the WHO checklist and Glitches (such as equipment failure).
The disappointing results are explained in terms of cultural resistance amongst medical staff for CRM, the need to consider the impact of small changes using Lean methodology on larger system-wide function that constrained implementation of change, and the tension between empowering staff to choose areas of improvement and keeping a focus on patient safety outcomes. There was also an inherent problem with outcome measures that were not directly aligned to the aims and objectives of the intervention and were subject to external influences such as restructuring services. It is also likely that staff moving around departments may have ‘contaminated’ the control groups.

This case study illustrates the complexity of transferring learning to the workplace. The steps of our model and CMO configurations are evidenced within the case study and show how and why there was a negative impact. Organisational commitment was lacking, leaving it difficult to deal with high status individuals who opposed the intervention. There was also a lack of constraint around the choice of service improvement, unlike other cases illustrated here where projects had to address organisational policies or strategic plans. Successes were difficult to evidence given restructuring of the organisation, pockets of resistance, and issues around choosing suitable outcome measures. Its strength was the role of the research team who supported innovations of the clinical teams.
Case Study Three

The setting for case study three was an acute care Teaching Foundation Trust Hospital employing 7000 staff across a range of specialties. The intervention was an education programme designed specifically to ensure IV practice was consistent and evidence based across the Trust, with the aim of reducing the incidence of bacteraemia intravascular infections.

Sources of Evidence

Initially data was analysed from a published paper and information available on the Trust website. The author was contacted by email and telephone and responded by sharing her dissertation on the role of management in implementing the change. The case study was analysed and sent to the author and the IV team by email who were subsequently interviewed.

Step One: Education or training is initiated and is designed to demonstrate patient benefit

The training was initiated in response to elevated levels of Methicillin Resistant Staphylococcus Aureus (MRSA) infections. Half the cases in one year were related to the use of IV devices. This galvanised senior management (M1.1) as Foundation status was dependent on achieving MRSA bacteraemia targets set by the Department of Health (C1.1.1). There was a need to improve practice in accordance with a strong evidence base (C1.1.2) indicating that the use of a ‘care bundle’ could substantially reduce the incidence of IV related MRSA infections. The programme initiator was the IV Lead Practitioner who claimed that the focus on IV access was used as ‘a tool to influence organisational change’ (M1.1). Using quality improvement methods (C1.2.3), and with increased awareness of the need for change (M1.1), the training programme was initiated and designed to demonstrate patent benefit (O1).

The IV team gathered baseline audit data and identified five areas for practice improvement (C1.2.1) which generated the mnemonic HANDS (Hand hygiene, Antisepsis, Non-touch technique, Documentation, Scrub the hub). Having defined the objectives, a project management group met monthly (C1.2.2) that mobilised resources (C1.2.4) for training and IT systems to record competency assessments, with the aim of standardising procedures and equipment, and setting up systems to monitor and evaluate implementation (C1.2.5). Monthly performance monitoring of infection control and audited practice (C1.2.6) was used to evaluate continuous improvements (M1.2) and to demonstrate patient outcomes following initiation of the trust wide training programme (O1).

The project meetings chaired by the Associate Medical Director (M1.3) involved the programme initiators: the IV team (C1.3.1), infection control leads, with support and input from key stakeholders including hospital executives and Clinical Directors, link practitioners, frontline staff from all specialties, and procurement (C1.3.2). Widespread involvement of personnel (M1.3) helped to standardise procedures and equipment to limit variation in practice. This contributed to the design of the intervention and systems to demonstrate patient benefit (O1).
Step Two: The learner is motivated and ready to learn

Through a collaboration with the nurse education and medical professional development, the training was included in the Trust mandatory training programme (C2.1) with updates for newly appointed staff, thus ensuring participation of all relevant staff (M2.1). To enable staff to attend (M2.1), training was carried out in the workplace at stations set up on wards (C2.1).

Learning needs were identified through pre-training audits which revealed that staff did not adhere to evidence-based practice or guidelines (C2.2.2). Information about the evidence base was posted on the intranet to inform and encourage staff to review their practice (C2.2.2) and raise awareness of the relevance and potential benefits (M2.2) of practice change. Competency assessments were recorded on staff profiles (C2.2.1) so they perceived personal benefit in participating successfully (M2.2). Conversely, those who failed competency assessments were required to retrain and be retested. This and the accessibility of training motivated staff to undertake and complete the training successfully (O2).

Step Three: The learner learns successfully and has the commitment and desire to apply the learning

All clinical staff identified their personal learning needs (M3.1) following individual competency assessment in the performance of infection control measures in relation to care of VADs and IV drug administration (C3.1.4). The authors claimed that the assessment led to a change of attitudes (C3.1.3), and recognition of the need to learn (M3.1) ‘resulting in a change of practice’ (O3). A dedicated intranet page, using the mnemonic HANDS (C3.2.1), reminded staff of protocols and the supporting evidence base for practice (C3.2.2). The education programme consisted of a variety of interventions for staff with different learning styles and abilities (C3.2.3) to engage staff (M3.2) from ‘board to ward’.

Training focussed on ‘consistent implementation of currently recommended preventative measures’ (M3.3). Transfer of training was achieved through assessment of knowledge and practice for each element of the care bundle and records were maintained for each member of staff. Staff were observed and assessed on their implementation of new practice (C3.3.2) and anticipated continued use of the new skills they had tested (M3.3).

Step Four: Learner has the capability and transfers learning into practice

Support to implement learning (C4.1.1) was available for individuals in all specialties, roles and at all levels (C4.1.2) of the organisation. Monthly infection control study days provided opportunities for updates, feedback, further training and support (C4.1.1). Multidisciplinary (C4.1.2) IV governance meetings chaired by the Associate Medical Director allowed issues about the standardisation of practice and equipment to be discussed (C4.1.3). Individuals were trained and assessed on site until they were able to demonstrate competency (C4.1.2). The infrastructure supporting the intervention, the leadership from senior management and peer practice made it harder to do the wrong thing (M4.1). As a result, staff at all levels were able to change their own practice and implement their learning (O4) and variation in practice and clinical errors was reduced.
The project was led and supported by senior management (C4.2.4) who showed personal commitment by modelling best practice. Meetings provided a forum to network, gain support and learn from those in different roles and specialties (C4.2.5). Over time the programme has been modified to respond to current needs. Standardisation of practice took some time to achieve with pockets of resistance across the Trust. This was addressed through persuasion, making some compromises in the early stages regarding equipment use, some enforcement by senior colleagues, and through comparison of performance across departments. After much effort and perseverance, the departments have fallen into line.

*How did the intervention benefit patients?*

The Trust recorded an ‘87.5% reduction of MRSA bloodstream infections related to IV devices […] for 2011–12’ (O5.3). Whilst this reduction is a high proportion, it represents a small number of patients in absolute terms (from 8 to 1 IV related MRSA infections from 2010 to 2012), however, the improvement was maintained until 2016 (1 infection). Practice improvement also led to a reduction in the overall Hospital Acquired Infection rate (from 19 in 2009 to 5 in 2016).
Case Study Four

Case study four took place in an NHS Foundation Trust providing acute hospital and community health services, and community health and adult social care services. Within the Trust there are three General Hospitals, four community hospitals, an integrated health and social care facility, an elderly care unit and three outpatients and diagnostic centres.

This case was chosen because it illustrates the dynamic between an NHS Trust and a local University working together to meet staff development needs. The educational programme is an accredited work-based learning programme. It involves developing a personal learning plan, learning contract, reflective account, and pieces of work related to service improvement (critical review of practice and policies, and a work based improvement project). It aims to develop staff as reflective practitioners with critical appraisal, change management and leadership skills. Credits can be accumulated to top up higher education awards up to degree level. Postgraduate certificate, diploma and Masters level credits are also available. Higher-level awards include leadership and management skills.

Sources of evidence

Interviews were conducted with the NHS training managers, two academic lecturers and four students. Four internal reports based on two staff surveys and two evaluations and one published article provided the background to the development of the model. Other documentation includes the annual contract and module handbooks. One of the programme initiators checked the case study for accuracy.

Step One: Education or training is initiated and is designed to demonstrate patient benefit

Step One was well supported by this Case Study. The Trust and the University responded to policy drivers highlighting the need to work differently to meet the educational needs of the workforce (C1.1.1). Policies within the NHS led to restructuring of patient services and challenged working practices, requiring flexible working and staff development. It was recommended that Trust management teams integrate plans for learning and service delivery to drive ‘health service reform and planned transformation’ to address skills shortages and to encourage wider participation ensuring that the NHS is an ‘employer of choice’. Universities also needed to respond to a recent report which emphasised workforce development through work based lifelong learning. Their internal policies aimed to create an employer-facing provider of education and training. Thus, employers were not offered a menu of available courses, but their needs were evaluated to develop bespoke programmes.

The Trust CEO expressed enthusiasm for staff that do not ‘work around’ problems, but eliminate them (M1.1), through critically appraising work practices and introducing more efficient service delivery using best evidence (C1.1.2) and quality improvement methods (C1.1.3). To respond to this, the university developed a flexible work-based programme, the Professional Practice Award (PPA), which was based on a ‘spiral’ curriculum aimed at developing academic skills (research, critical appraisal, study skills), change management skills demonstrated in a work-based project, and personal development through reflective practice and planning learning. This required staff to meet more demanding criteria through each iteration of the programme to achieve a higher award level.
The PPA programme which emerged following the staff survey was originally operationalised through an annual contract between the Trust and the University and was project managed (C1.2.2) through regular meetings over nine years. The curriculum development and delivery of the programme was managed (C1.2.2) over nine years with the three groups meeting regularly to ensure that the new format worked for the Trust.

Initially grant funding from the Strategic Health Authority (SHA) (C1.2.4) paid course fees. The Strategic Health Authority (SHA), and the Trust jointly funded approximately 60 students per year. The funding for the programme was later wholly absorbed into the Trust budget (C1.2.4). The Trust currently funds about 20 students per annum and those completing the Awards for the PPA. The impact of the PPA programme was evaluated qualitatively and quantitatively internally by research assistants employed by the Trust and internal reports completed. Senior management actively supported in the programme (C1.3.2) and showed their commitment it (M1.3).

**Step Two: The learner is motivated and ready to learn**

Step Two played a strong role in this Case Study. A careful recruitment strategy developed within the Trust ensured that staff could attend (M2.1), and they understood the relevance and benefits of the programme (M2.2). Staff were told that they could gain accreditation (C2.2.1) for learning about their service, evaluating it, and making service improvements to improve working lives and patient care. The programme was delivered on Trust premises (M2.1) to improve accessibility (C2.1). To widen participation the programme continued to be open to all clinical and non-clinical staff employed by the Trust and the level of entry was lowered to include staff from KSF level 1 (C2.2.3). Those offered a place came from a variety of disciplines including senior and trainee managers, nursing staff, allied health professionals, non-qualified clinical staff, administrators, and estates and buildings staff and were clearly keen to learn having cleared so many hurdles to gain a place (O2).

The relevance of the programme to the work place and roles was important (M2.2), helping to make connections across the Trust (C2.2.1). Projects made them visible in meetings with management, which they thought would help them seek new jobs within the Trust. The structure of the programme and assessed work mapped onto continuing professional development criteria to maintain standards for NMC revalidation, HCPC continuing professional development, and to maintain the learning record for Trust appraisal (C2.2.2).

**Step Three: The learner learns successfully and has the commitment and desire to apply the learning**

Inherent in the process was the development of the individual to critique practice and manage change, evidencing their personal development through accredited modules including producing a ‘learning contract’ and ‘managing own learning’ (C3.1.2). This reflective practice and self-assessment (C3.1.4) ensured commitment to learning to become an agent of change (O3). Using an emancipatory theory of learning with content explicitly related to the role of staff ensured their engagement (M3.2).

Action planning took the form of project development where the student was required to implement learning (C3.3.1). For work-based projects staff critically appraised and evaluated
baseline performance, usually by using routinely gathered data or audits (C3.1.1), to benchmark practice in order to measure the impact of their projects using PDSA (Plan, Study, Do, ACT) cycles (C3.1.3) which include the planning, implementation, evaluation and modification of actions. They also learnt about change management models (e.g. Lean) and strategies, such as stakeholder consultation, process mapping, and recruitment of project champions to challenge attitudes of peers (C3.1.3).

The Trust R&D team, a ward manager and an academic team in Northumbria University (C3.2.1) successfully piloted a 60 credit work based learning programme delivered in a community hospital which resulted in a number of improvements in patient care. Projects included improved liaison with care homes to reduce medication errors and readmissions, and reduction in falls through the introduction of a personalised patient exercise schedule.

Staff were keen to continue to accumulate credits to achieve a higher education award (M3.2). This led to the development of an accredited programme providing awards from Higher Certificate to Bachelor’s and Masters level. This was offered to all clinical and non-clinical staff and became a particularly useful vehicle to support the drive for all nurses to be qualified to degree level (M3.2). The original programme is now being phased out and has been largely replaced by The Foundation Degree designed to accommodate Trust development needs for staff at a lower entry level to the programme, and for management skills with management modules being included for the higher awards (C3.2.1).

Step Four: Learner has the capability and transfers learning into practice

Step Four supports the learner to deal with resistance and overcome barriers to learning transfer in the workplace (M4.1) to enhance their ability to change practice (O4). Each learner is supported by a robust infrastructure, which includes his or her HE tutor, the NHS tutors, a buddy (peer learner), their manager, and a work place facilitator (C4.1.1). The HE tutor helps the learner to focus on a project which is achievable in the timescale (M4.1). For those studying towards a Masters degree, the timescale is two years part time study in which a review, ethics, data collection and the project can be achieved (C4.1.3). For undergraduate projects the time scale is much shorter, projects needing to fit into a four month period, so necessarily on a much smaller scale (C4.1.3). Managers review progress during appraisals (C4.2.1) at which difficulties and challenges experienced by the learner can be discussed (C4.2.2). This support network helps the learner gain confidence regardless of their status or role (C4.1.2).

The credibility of the programme (C4.2.3) is enhanced by the involvement of senior managers who meet with learners to discuss aspects of their projects, come to end of year presentations, and, including the CEO, teach on some of the modules. Trust managers have shown leadership (C4.2.4) and commitment (M4.2) to the delivery of the programme and the service improvement projects which all address Trust strategic objectives (C4.2.4). Learners have commented that contact with senior personnel makes them feel visible and able to seek progression within the organisation (C4.2.3).
*How did the intervention benefit patients?*

Patient benefits in the community hospitals included; improved links with community care reducing the number of readmissions from care homes, better nutritional assessment in the community hospital using nursing staff with support from the Trust Dietitian based in a distant District general Hospital, better patient engagement through day time activities including reminiscence work and supported walks in the hospital grounds, reduction in falls using targeted physical exercise, and improved dignity of incontinent patients by reorganising the bedside availability of the correct size and type of incontinence pads.
Case Study Five

An acute care hospital in the North East of England developed the ‘Programme for Overseas Doctors’ (POD), a new intervention to support the transition of International Medical Graduates (IMGs). The Trust recognised that they had a high percentage of overseas-qualified doctors who were most at risk of underperforming and were struggling to adjust to UK practice. POD is comprised of multiple individualised training modules over the course of 1 year (including communication skills, cultural awareness, NHS structure and career guidance). Successful transition into the workplace was enhanced with the development of both induction training and a continuing support system (buddying/supervision).

Sources of evidence

Interviews were conducted with IMGs (both intervention and non-intervention), their supervisors, their peers, and those deemed as ‘experts’ (those who developed the intervention or are involved in policy around transition of IMGs). The Trust’s educational governance data (performance), retention data, and pre and post intervention questionnaire data, were also analysed. Observations of all aspects of the intervention took place across a two-year period. Further discussions took place with trainers and the POD development team. Literature on interventions for IMGs published internationally was also analysed. Comparison data was collected from other Trusts in the North East where no intervention was in place for their IMGs.

Step One: Education or training is initiated and is designed to demonstrate patient benefit

In Step One, the training was initiated (O1) as there were a high turnover of IMGs and performance concerns (M1.1). Current support was inadequate (C1.1.1) and review of the evidence base (C1.1.2) pointed to the need for ongoing support that addressed specific problems (C1.2.1). A project team (C1.2.2) chaired by a senior clinician steered the development and implementation of the programme, with the aim of addressing the issue of poor performing IMGs and ultimately address patient needs (C1.2.3). Funding within the Trust was supplemented by an external grant to pay for project management and trainers (C1.2.4). An infrastructure and communication network included key stakeholders and informed regional organisations (C1.2.5) and support learners. Locally monitoring and evaluation processes were put in place with before and after questionnaires, performance measures and interviews (C1.2.6). A Senior clinician and HR took an active role in developing and delivering the programme (C1.3.1) and engendered a climate of organisational support (C1.3.2). This engagement and commitment of personnel (M1.3) was instrumental in maintaining funding and ensuring attendance and reducing resistance to the intervention.

Step Two: The learner is motivated and ready to learn

Once the training was initiated, the next step (Step Two) was to ensure IMGs could attend and were motivated to participate. There were several barriers to participation (C2.1). A lack of resources and high workload was initially a major barrier to the implementation of the intervention (limited training, peer support or level of supervision). Engagement from IMGs with the intervention was also
hindered by high workload and staff shortages (cancelling meetings, not being let off the wards to attend etc.). However, during the second year of the research, the intervention was made mandatory. This led to increased engagement from all parties involved (M2.1). Learners were motivated to attend and learn once their needs were met (M2.2). They were also given a certificate (C2.2.1) for their e-portfoli (C2.2.2). All IMGs were expected to attend whether they perceived a need or not (C2.2.3). For many they welcomed the intervention and were already aware of their needs and ready to learn (O2). For others, they were made aware of their needs during the training (during Step Three). Ultimately, all staff needed to identify their learning needs, engage in learning, and consider how learning might be applied.

**Step Three: The learner learns successfully and has the commitment and desire to apply the learning**

By Step Three, learners recognised the need to learn (M3.1) following assessment and feedback (C3.1.4: C3.1.1), and enabled trainers to tailor the intervention to the individual. IMGs reflected on practise (C3.1.2) to raise self-awareness and needs assessments (C3.1.4) allowed attitudes to the programme to be challenged (C3.1.3). The design and delivery of training was based on IMGs experiences and tailored to meet individual needs (C3.2.1) increasing the desire to engage with (M3.2) learn successfully and apply learning (O3). Information, on-line resources, and simulation scenarios were available (C3.2.2) and experiential learning personalised the approach (C3.2.3). Learning was activated using Personal Development Plans (C3.3.1).

**Step Four: Learner has the capability and transfers learning into practice**

With regard to Step Four, staff learnt successfully and wanted to apply what they had learnt in the workplace. Support systems of peers, ‘buddies’, and supervisors meant that learners felt valued and increased their confidence (C4.1.1). Enhancing self-efficacy enabled them to deal with poor relationships within the workplace (M4.1) and improved their capability to transfer learning into practice (O4). Support was essential for those IMGs who were less able to change (C4.1.2) as they were less able to deal with negative attitudes (M4.1) and were more likely to leave (O4). Other individual factors (C4.1.2) that reduced motivation to learn or apply learning (M4.1) were related to culture, prior experience, or family circumstances. Negotiating admittance to the UK, the type of job role or location (C4.13) also impacted upon the ability of the individual to apply their learning (M4.1). As the intervention became embedded into the Trust recruitment of overseas doctors (C4.2.1) it could claim some success leading to greater organisational commitment (M4.2) and continuing support. IMGs did not share the same professional status or perceptions of their role in the workplace (C4.2.2). Resistance to change or negative attitudes undermined the intervention. However, the comprehensive care for IMGs increased credibility of the training and the Trust (C4.2.3) attracting high quality IMGs to apply to the Trust. The Trust set up (M4.2) local IMG networks (C4.2.5) which provided support and opportunities to learn from the group, supporting learning transfer (O4). The organisation used the intervention to raise cultural awareness (C4.3.1) to create a more supportive workplace climate that facilitated learning and learning transfer (O4). Key outcomes were fewer complaints and a reduction in reported errors (O5.3).
How did the intervention benefit patients?

Following POD, the evidence indicated that the performance of IMGs improved. This included career progression, fewer complaints and a decrease in reported errors. In fact, IMGs were performing better than UK graduates in the Trust. Retention also increased to 100% (including those in non-training posts). IMGs in other Trusts, who did not have access to such an intervention struggled and retention was low. Following POD, doctors were more motivated and confident in their practice within the host country. Increased performance likely led to reduced fitness to practise concerns (which have a high cost implication).

Each step of the model and the context, mechanism, outcomes configurations are evidenced by the case study partly because the intervention was based on a transfer of learning model, and because the intervention benefitted from strong engaged leadership and project management which was able to troubleshoot and gain organisational support.
3.2.2 Case study synthesis

In the following sections, we synthesise the exploration of the case studies and evidence how these have fed into the development and refinement of the programme theory.

Step One: Education or training is initiated and is designed to demonstrate patient benefit

The CMO configuration for the first step of the programme theory indicates the context and mechanisms that lead to the outcome of initiation of education or training that is designed to demonstrate patient benefit (O1). Initiation of an educational intervention was associated with three mechanisms that answer the questions why, how and who: M1.1 awareness within the organisation of a need to change practice, (why?) M1.2 Planning to ensure a measurable effect on patients (how?) and M1.3 engagement and commitment of individuals or influential personnel to drive and champion the process (who?).

Why was training initiated?

Why was education and training initiated (O1)? The findings from the realist synthesis suggested that this outcome is triggered when there is awareness within the organisation of a need to change practice (M1.1). This in turn is informed by three contextual factors: organisational response to national or institutional policy drivers (C1.1.1), awareness of new evidence that improves clinical outcomes (C1.1.2) and using quality and service improvement projects to improve performance (C1.1.3), particularly where routinely gathered metrics indicate low relative standing compared with other healthcare providers or over time.

CMO configuration

<table>
<thead>
<tr>
<th>C1.1.1 National or institutional policy</th>
<th>M1.1 Organisational awareness of need for change</th>
<th>O1 Education or training is initiated and is designed to demonstrate patient outcome.</th>
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</thead>
<tbody>
<tr>
<td>C1.1.2 Translation of evidence base into practice</td>
<td></td>
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<td>C 1.1.3 Using quality improvement methods</td>
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Across case studies, there was a link with at least one contextual driver for the initiation of training: policy, evidence, and quality improvement. Despite these common strands, the reasons for developing training at each site were complex. In Study 1, senior management put pressure on the surgical team to resolve the problem of wrong-sided surgery when they became aware of these errors (M1.1) through performance monitoring of neurosurgery incidents (C1.1.3). Similarly, in Study 3, routine monitoring (C1.1.3) revealed elevated levels of MRSA infections associated with Vascular Access Devices (VADs), a sensitive measure for management (M1.1) where poor performance may have jeopardised aspirations to achieve Foundation status (C1.1.1). Whilst there was an
organisational awareness of the need for change, the organisational response was quite different. In the first case, the surgical team were left to resolve the problem within their department under threat of dismissal, whereas management in Study 3 became heavily involved in developing the solution alongside their staff. In both cases, training was initiated as part of the solution (O1).

Another reason for initiating the training was the personal interest of a senior clinician (Study 2). He justified an employment contract that gave him time to pursue improvements in patient safety by referring to the need for a more robust evidence base (C1.1.2) and in the context of Department of Health drivers for improving safer care (C1.1.1). However, whilst the organisation was aware of his efforts (M1.1) and permitted him to proceed, it is unclear whether they were aware or convinced of the potential of this approach for improving patient safety, and so his work elicited little support.

In two studies, a workforce development need was identified (M1.1). In Study 4, management identified an organisational need to develop a culture of service improvement (C1.1.3) and leadership skills in a settled workforce (M1.1), in the context of policy drivers to innovate ways to develop a more flexible workforce (C1.1.1). In Study 5, a senior clinician raised awareness (M1.1) of the need to support International Medical Graduates (IMGs) facing personal and professional challenges during their transition into the UK, to improve staff retention and safe practice. In both cases, an evidence base was translated into an educational intervention (C1.1.2). In Study 4, a long-term collaboration with a Health Education (HE) provider started with a staff survey and a pilot study (C1.1.2), followed by incremental change to respond to changing workforce needs to improve the fit of the educational intervention. In Study 5, a realist review of the literature (C1.1.2) challenged current provision and led to a more robust educational programme to support transition.(133)

Quality Improvement (QI) methods were taught (C1.1.3) to encourage workplace innovation and problem solving in Studies 2 and 4. In Study 4, learning about QI was the tool used to develop staff as change agents (M1.1). In Study 2, this was introduced in response to staff feedback that they were unable to transfer learning into practice. In Study 3, the educational intervention was embedded in a larger QI programme (C1.1.3) implemented at organisational level (M1.1). In each case QI drove the initiation of training (O4).

In summary, organisational awareness of the need to change (M1.1) was triggered in three cases (1, 4, & 5) by workforce needs for remediation, development and support and were aligned to institutional policy (C1.1.1). These were key organisational drivers to initiate training (O1). The intervention in Study 4 was also driven by DH and HE policies that raised awareness (M1.1) about workforce development and the need for flexible approaches to training (O1). In studies 1 and 2, the organisation knew about the projects, but it is questionable that they were aware of its potential to improve safety across the Trusts; they simply saw the intervention as a local solution and permitted it to go ahead. Whereas in Study 3, management were completely engaged, could see the potential benefits for the organisation, and helped to shape the intervention (O1). All studies refer to an evidence base, some in published literature (Studies 3 & 5), and one based on pilot work (Study 4). Studies 1 and 2 were based on a growing theme in the medical literature, but the evidence base was in aviation and high-risk industries. This lack of robust evidence in medicine for the two patient safety projects could have explained the lack of awareness and lack of support around adopting the skills and techniques that were taught.
How was training initiated?

We were interested in further understanding how educational interventions planned to ensure an effect on patients (O1). The literature has evidenced six contextual factors underpinning the planning and likelihood of observing a measurable effect on patients (M1.2): clarifying the problem that educational interventions are trying to address in order to provide clear training aims and objectives (C1.2.1), managing effective delivery and implementation through a project planning framework (C1.2.2), using strategies to clarify patient needs (C1.2.3), adequate allocation of resources (C1.2.4), systems in place to monitor changes in health professionals’ behaviour in practice following an intervention (C1.2.5) and, an evaluation design aligned to the aims and objectives of the intervention that can show patient benefit (C1.2.6).

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<tr>
<th>CMO configuration</th>
<th>O1 Education or training is initiated and designed to demonstrate patient outcome</th>
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<tbody>
<tr>
<td>C1.2.1 Problem identification</td>
<td>M1.2 Planning to ensure a measurable effect on patients</td>
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<tr>
<td>C1.2.2 Project management</td>
<td></td>
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<td>C1.2.3 Patient consultation</td>
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<td>C1.2.4 Financial support and Resourcing</td>
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<tr>
<td>C1.2.5 Ensuring systems are in place for implementing, monitoring and evaluating</td>
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<tr>
<td>C1.2.6 Design of evaluation</td>
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The literature suggests that clarity about the nature of the problem and the solution (C1.2.1) is needed to target and align the aims and objectives of the educational intervention to specific knowledge, skills and behaviour. This planning is expected to lead to patient benefit that is associated with improving specific patient outcomes (M1.2). Defining the problem was often a challenge in the case studies. For example, procedural interventions had failed to resolve the problem of wrong sided surgery in Study 1. The department head was open to new solutions and after inquiry, recognised the need to understand the inadequacies of current practice to target the intervention. Openness to unexpected solutions rather than confirming personal opinion was key. Having preconceptions may prevent recognition of more complex reasons for failure: for example, having ‘already decided those were the people we were going to work with anyway’ (Study 2). To address IV infections (Study 3), baseline and audit data were collected to identify areas for practice improvement. In Study 4, preliminary work included a staff survey and interviews to understand what would motivate staff to undertake training for service improvement. In Study 5 a realist review identified challenges to IMGs and the inadequacies of current provision.

All studies reported project managing the intervention including obtaining funding, baseline assessment, sourcing venues, recruitment, back-fill, resources, credible educational providers, supporting learning transfer, and evaluation. This was time consuming, requiring many hurdles to be
overcome, over a long time. In two studies in theatres (Study 1 & 2) a single person managed the complexities of delivering the intervention which included either persuading managers to close theatres or paying back-fill to staff to maintain service delivery. In Studies 3, 4, and 5, this work was undertaken by a multidisciplinary team. The teams had different characteristics. In Study 3, multidisciplinary involvement was necessary to manage an intervention affecting 7000 staff. It was chaired by a senior manager, and stakeholder involvement raised the profile of the intervention across departments and disciplines enabling improvements to the original model, such as the procurement of standardised equipment that both limited the potential to vary practice and saved money. In Study 4 the project team consisted of representatives of HE working with Trust HR managers and the training department. With input from members of the project team, the educational programme was adapted to respond to innovation and change in both HE and Healthcare organisations, such as the delivery of half of the modules by NHS Trust personnel and the insertion of Leadership modules into the programme. The project team for Study 5 was embedded within the regular business of the organisation and included a researcher, a project champion, and co-opted support from external organisations i.e. the General Medical Council (GMC) and Health Education England (HEE).

Despite being highlighted as important by our patient reference group, none of the interventions consulted with patients (C1.2.3) in the development of their interventions. Indeed, in Study 4 learners were steered away from patient involvement as it took too long to gain ethical approval, although they did collect anonymised questionnaires on the ward to evaluate projects. Few papers in the literature review involved patients, but there were good examples of successful interventions based on research with patients, such as work carried out to reduce service use of patients with asthma.(57)

Part of the work of the project team was to secure funding and resources (C1.2.4). There was no NHS Trust funding for either of the patient safety interventions (Studies 1 & 2); the Strategic Health Authority (SHA) and external grants financed them. Funds were needed for the cost of external trainers for both studies, and in Study 2 for back fill to maintain service delivery, a small research team to gather data and support change projects generated by the training. Other resources which the Trusts did fund were consultant time, and closure of theatres (Study 1). No source of funding was indicated for Study 3. However, resources were staff time, IT systems to record competency assessments, and equipment costs. Funding for the remaining two case studies (4 & 5) was shared between the Trust and external grants. In Study 4, the SHA paid course fees for individuals and for a research assistant to evaluate the programme. When external funding ceased, the Trust absorbed the cost into their training and staff development budget. It was estimated by the training administrator that fees for an individual starting at Foundation Degree level, proceeding through BSc to Masters level would total approximately £10K. This has galvanised the Trust to increase their contribution to the teaching and the use of Trust premises to keep costs down, but with the added advantage to students that the programme was even more relevant to the workplace and that the full range of academic and NHS expertise was available to them. In Study 5, funding supported project management time and faculty, with IMGs attending free of charge. It also funded evaluation of the intervention. To keep costs down, external trainers were replaced by Trust faculty.
The Programme Lead in Study 1 pointed out that they had been unable to repeat the intervention over the past 11 years as the cost was prohibitive, despite reducing the length of class-based training from two days to one. The external trainer rarely got the opportunity to present the full programme, having to tailor the course to available resources. Cost reduction was the main reason for developing two handbooks to support internal delivery of the training (Study 1). The local Strategic Health Authority (SHA) funded the handbooks with a view to distributing these across the region. Finance and resources are often underestimated or hidden, such as the use of workplace facilities, project meeting times. It is clearly a challenge to deliver effective training given the high cost of external trainers, and the cost of service interruptions.

The evidence from the literature suggests that it is a project management task to ensure a measurable effect on patients (M1.2). The first part of this is to ensure fidelity of the intervention by monitoring staff behaviour change. This was achieved by ensuring systems were in place for implementing, monitoring and evaluating the intervention (C1.2.5). In Study 1 staff were observed and monitored, and critical incidents reviewed. In Study 2 independent observers used validated measures (C1.2.5) to evaluate changes in staff behaviour. In Study 3 IT systems were used to record competency assessments to monitor and evaluate implementation (C1.2.5). In Study 4 the University maintained records of attendance at class-based sessions, submission of work, extensions, or deferment for personal extenuating circumstances, accreditation, and awards (C1.2.5). The Trust used the Electronic Staff Record to record staff appraisals to monitor progress, record the personal development plan, book staff onto the programme, and record course completion (C1.2.5). In Study 5, pre and post intervention questionnaires and interviews (at 3 months and 12 months) with IMGs, IMG supervisors and IMG buddies took place.

The literature further suggested that the second measure required is an outcome measure. Two Studies (1 & 3) measured the direct intended outcome of their intervention; wrong sided errors in surgery, and MRSA infection rates. Patient outcomes less clearly aligned to the programme content were multiple outcomes of small work-based projects reporting Plan, Do, Study, Act (PDSA) cycles in Study 4, and in Study 5, educational governance data to look at all doctors’ performance at the intervention site across the study period (looking at both IMG and UK medical graduates).

In Study 2 it was a challenge to find a reliable patient outcome measure (M1.2). Routinely recorded incidents might have provided a patient outcome measure directly aligned to the aims and objectives of patient safety training. However, these are difficult to interpret. A reduction in reported errors may signify an improvement in patient care; an increase might be related to better incident reporting as a result of the training. To evaluate patient benefit (M1.2), routinely gathered data on complications, length of stay, and readmissions were used (C1.2.5). However, these NHS accountancy measures were more distal to the training objectives and outcomes could be influenced by external factors, such as policy change, making it difficult to demonstrate patient benefit (O.1).

The literature illustrated that project teams also need to design an intervention to show an effect of training (O1). Studies 1, 3, and 5 used a pre and post intervention design (C1.2.6). Whilst useful, these uncontrolled designs may be affected by other service improvements occurring during the intervention period making it difficult to attribute an effect to training. To show an effect (O.1), Study 2 used five parallel experimental studies (M1.2), where each of the five had a control group.
However, restructuring of departments within the Trust exposed this design to the risk of ‘contamination’ of controls where trained and untrained staff were mixed together.

Internal research assistants employed by the Trust evaluated the impact of Study 4 qualitatively and quantitatively and internal reports were completed. These included descriptions and schedules to list improvements made (C1.2.5). This evaluation was not repeated once SHA funding was no longer available. However, each student was taught to use a change management model, with the inclusion of a PDSA cycle, to evaluate the impact of his or her own work-based project (C1.2.6). These were presented at an annual poster display.

Measures used and the design of studies are difficult to interpret and implement. Ideally the aims, objectives, delivery of training, and outcomes should be constructively aligned. That is starting with the outcome and working backwards to consider what students need to be able to know and do to achieve the outcome. Outcome led learning enables trainers to focus on an exact measure for success. These are not always available, and routinely gathered data collected for another purpose may be a poor proxy for a direct outcome measure. The desired outcome in Study 1 was the elimination of wrong sided errors. Counting the number of procedures since the last error occurred, whilst a pragmatically derived measure, shaped the aims, and objectives of training, clearly demonstrating the extent to which these have been achieved.

Who was involved?

As the literature suggested, individuals in the case studies that were most likely to initiate an educational intervention were clinicians or healthcare staff (C1.3.1). More commonly, health professionals worked in partnership with academics, or charitable organisations. Successful implementation, maintenance and spread of learning depends upon gaining support across vertical and horizontal organisational tiers and divisions within the organisation, in particular senior managers C1.3.2). Programme initiators and senior staff working in a supportive climate were able to engage and commit staff (M1.3).

<table>
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<tr>
<td>C1.3.1 Programme initiators</td>
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The project teams in both studies 1 and 2 worked independently without support from senior management who created barriers by prioritising service delivery over training. However, in Study 1 managers had made their wishes clear and where surgeons did not comply with new procedures they took disciplinary action. This had the effect of engaging staff and reducing resistance to change (M1.3). The Department Head also had the benefit of support outside the Trust from the SHA Safer Care Group by sharing knowledge and funding the development of resources for dissemination within the Trust and across the region.
In Study 3, the IV team (C1.3.1) actively promoted the intervention and gained the support of senior managers who created a supportive organisational climate (C1.3.2) by taking a lead role in project managing the intervention and involving stakeholders, including hospital executives and Clinical Directors, link practitioners, frontline staff from all specialties, and procurement (M1.3). The ‘representation at these meetings from all specialties [...] raised the profile of the IV team and IV care across the Trust’ thus engaging and increasing the commitment of staff trust wide (M1.3).

Study 4 describes a complex intervention which was initiated (O1) through a tripartite management strategy between the university Faculties of Business and Health (C1.3.1), Trust managers (C1.3.2), and NHS staff who created an infrastructure to support service improvement novices. Implementation of the FD programme required long-term engagement and commitment from both organisations (M1.3) with senior NHS managers actively facilitating training delivery (O1) and supporting learners.

The programme initiator in Study 5 was the deputy medical director (C1.3.1) who secured investment and resources for the programme, which facilitated the engagement and commitment of Trust staff (M1.3) and HR who made training mandatory. The organisation already had a supportive climate, which the project team built on over three years, increasing the acceptance of training. Changing focus towards IMG career development promoted increased support and commitment of personnel (M1.3) and the delivery of training (O1). The absence of a change champion and poor leadership that did not push for a supportive and open culture was found to hinder intervention success.

Programme initiators (C1.3.1) are the people who have the idea for training and do the background research to support the intervention, often project managing delivery within the Trusts. They usually work in partnership with external providers. Clearly the organisational climate and support of senior managers (C1.3.2) was crucial to allocating resources, removing barriers to delivering training, and engaging staff to gain their commitment to the aims and objectives of the training (M1.3) and the initiation of training (O1).

**Step Two: The learner is motivated and ready to learn**

Once training has been initiated at the organisational or departmental level (step One), the literature suggests that the focus of the programme theory switches from the organisation towards facilitating an individual’s participation, motivating and preparing them to learn (O2). Step Two reflects the importance of enabling participation (M2.1) and helping staff see the relevance and benefits for their own role (M2.2).
What was done to ensure that staff could attend?

CMO Configuration

| C2.1 Overcoming barriers to participation | M2.1 Enabling participation | O2 The learner is motivated and ready to learn |

In studies 1 and 2 the whole team working in theatres had to be trained. In Study 1 theatres were closed for four separate days to enable staff to attend in work time, not their own time, and at their usual work venue, avoiding the need for travel (C2.1). Five courses were delivered on a rolling programme over three months to ensure that staff on all shifts and rotas would be able to attend. Attendance at one of the courses was mandatory, thus improving access for those with less professional autonomy, where managers might otherwise act as gatekeepers to training, and removing choice from those who may not wish to attend. These strategies ensured that all staff were able to participate (M2.1) and they recognised the importance the department placed on the training, which helped to motivate individuals to participate (O2).

In Study 2 there was pressure to maintain service delivery, so the Programme Lead paid backfill to keep theatres open. As with Study 1 the course was run on several occasions to accommodate staff shifts and rotas. However, the training was not mandatory, and the external trainer noted that not all staff had attended, some completing what was regarded as a rival programme.

Studies 3 and 5 also made the training mandatory (C2.1), which improved access for staff. Staff were less likely to be diverted to deal with high workload or staff shortages. Those with less professional autonomy particularly benefited. Mandatory attendance ultimately removed the choice not to attend, thus ensuring participation of all relevant staff (M2.1). The decision to make the training mandatory further illustrated the importance of the training to the organisation. All studies offered training in the workplace to avoid the need for travel. In Study 4, half of the sessions were delivered at the university so that students could access university library and IT resources and to inculcate a sense of studying at university. However, there were inconsistencies in providing study leave, some staff were expected to attend on days off or use their annual leave which was a little demotivating (O2), especially as the service improvement projects they were undertaking had been endorsed by their managers.

Learners identified problems accessing training through staff shortages, lack of backfill, and because managers who were gatekeepers to training were inconsistent about awarding study leave, some staff were expected to study in their own time. Potential practical barriers such as travel time to training venues were overcome in the case studies by offering training in the workplace on normal shifts. Learning resources were available in handbooks (Study 1 and 4) and on-line (Study 3). In Study 4, to provide an infrastructure to support learning, students received university library and IT induction and access to all university resources with half of the class-based sessions delivered on campus. All the case studies had developed plans to make the training accessible (C2.1) to enable participation (M2.1), in order to improve motivation to attend and learn (O2).
What was done to ensure staff thought the intervention met their needs?

**CMO Configuration**

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<tr>
<th>C2.2.1 Incentives to participate</th>
<th>C2.2.2 Professional culture (expectations of lifelong learning/CPD, identification of personal learning needs, voluntary participation in training)</th>
<th>C2.2.3 Staff recruitment strategy for training (congruence between the person, job role, level and ability to implement training)</th>
<th>M2.2 Perceived relevance and benefits</th>
<th>O2 The learner is motivated and ready to learn</th>
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Individuals responded to incentives to participate such as CME credits or Higher Education Awards (C2.2.1). Linked to this is the culture of lifelong learning (C2.2.2) enshrined in Continuing Professional Development (CPD) required for continued practice by the General Medical Council (GMC), Nursing and Midwifery Council (NMC) and Health and Care Professions Council (HCPC). Here the type of training tends to be selected by the individual to meet personal learning needs. These may be identified through appraisal, reflection on practice, or part of a personal development plan, or by feedback on performance. Staff recruitment for educational programmes needs to promote congruence with the learner’s job role, level and ability to implement training (C2.2.3). A poor match reduces the ability of the trainer to ensure relevance of the intervention to the individual and their ability to implement the learning.

In Study 1, staff were incentivised to attend by the provision of a free lunch (C2.2.1); ‘curry for lunch every day to encourage people to come’ (M2.2). There was also a strong professional incentive, the Medical Director having issued a warning to the surgical teams that a recurrence of wrong side surgery would cost jobs (M2.2). This motivated staff to participate and learn (O2). One positive element was the recruitment strategy (C2.2.3). No single individual was being held to blame for past errors, the issue being addressed was of consequence to them all, and all staff needed to play a part in reducing surgical error. Thus, the training was relevant to all staff regardless of role or seniority (M2.2), and the whole team were motivated to learn together (O2).

Recruitment and motivation of staff to learn in Study 2 was more problematic. There were political divisions amongst personnel where some staff held allegiance to alternative ongoing interventions, which made it difficult to recruit to Crew Resource Management (C2.2.3) and it is likely that staff would not be released where learning needs were perceived to have been met by alternative interventions (M2.1). Alternative models and ways of understanding issues (C2.2.2) may have reduced the perceived need for a new approach (M2.2).

In Study 3, competency assessments were completed for all staff concerned with the care of VADs and recorded on staff profiles (C2.2.1), so they perceived personal benefit in participating (M2.2) and were motivated to learn (O2). Revealing training needs through audit and assessment (C2.2.1),
being able to use information about the evidence base posted on the intranet for CPD (C2.2.2), and
the inclusive recruitment to training of all relevant staff, irrespective of role or seniority (C2.2.3)
underscored the importance of the training to service quality improvement and its potential to
improve patient outcomes (M2.2). This, and the accessibility of training, motivated staff to
participate and learn (O2).

In Study 4, accreditation was identified as an important incentive to participate in learning in the
staff survey (C2.2.1). HE awards were a transferable qualification which could be used for career
progression (M2.2) within the Trust or to support job applications in other healthcare organisations
and were an important motivation to participate and learn (O2). However, students’ motivation was
undermined by a recent change to the apprenticeship programme, meaning that the degree was not
a stand-alone qualification, restricting their future career pathway. Despite this, the relevance of the
programme to the work place and their roles was important (M2.2), helping to make connections
across the Trust (C2.2.1). Projects made them visible in meetings with management, which they
thought would help them seek new jobs within the Trust. The structure of the programme and
assessed work mapped onto CPD criteria to maintain standards for HCPC registration, NMC
revalidation, and to maintain the learning record for Trust appraisal (C2.2.2).

To widen participation the programme continued to be open to all clinical and non-clinical staff
employed by the Trust and the level of entry was lowered to include staff of lower training levels
(C2.2.3). Staff found out about the course from other staff, the intranet, communications bulletins,
at open days and during appraisal. Applicants were asked to attend an interview with a panel
consisting of at least one Trust manager (HR manager, training administrators or service managers)
and a university lecturer. At the interview, staff needed to have met all prior CPD and mandatory
training requirements as recorded on the Electronic Staff Record, to show they had their manager’s
support (M2.1), and to confirm that study leave had been agreed and there were no barriers to
participation (C2.1). The panel ensured the programme was relevant and beneficial both to the
individual (C2.2.3) and the organisation (M2.2) before being offered a place. Staff were keen to learn
having discussed expectations with senior educators and cleared so many hurdles to gain a place
(O2).

In Study 5 all IMGs were recruited to take part (C2.2.3) although some senior IMGs did not feel the
need to attend. Many IMGs stated that the course certificate for their e-portfolio was an incentive to
participate (C2.2.1), and that they were undertaking extra training after identifying their personal
learning needs during training (C2.2.2). Engagement with the intervention increased once their
individual needs and expectations were met (culture, UK practice, communication, career
progression etc.) (M2.2).

Incentivising staff to attend (C2.2.1) to gain some personal benefit (M2.2) improved participation
and preparedness to learn (O2). There was no clear incentive to participate in the intervention of
Study 2 where recruitment may have been a problem, and there was some resistance to
participation. Where participation was by choice in Study 4, the learner was prepared through
discussion with their manager and an interview to ascertain what personal and organisational
benefits would accrue, before being accepted on the programme (C2.2.3). In Studies 4 and 5 staff
saw the opportunity to use personal development planning undertaken during training for the
purpose of CPD (C2.2.2); assessed work submitted for the work-based programme in Study 4 having the advantage that it could be used for Trust appraisal and professional requirements for continuing practice.

Step Two is well supported by the evidence from the case studies. However, it is noticeable in the literature and the case studies that there is little mention of pre-course information to prime and motivate potential learners. In Study 3, supporting evidence-based information for the intervention was available on the intranet that could be used to prime learners. In Study 4, learners were extremely well briefed during the recruitment process (C2.2.3), which enabled them to evaluate the relevance of the programme to their role and whether they would benefit (M2.2) which enthused them and prepared them to learn (O2).
**Step Three: The learner learns successfully and has the commitment and desire to apply the learning**

Once learners have been recruited and primed to learn (Step Two), the literature suggests that trainees not only need to learn but must also want to apply their learning into practice. It is suggested that three key mechanisms facilitate successful learning, commitment and desire to apply learning (O3). These mechanisms relate to individuals recognising the need to learn and change practice (M3.1), learning what and how to change practice through engagement with learning (M3.2), and anticipating implementing learning (M3.3).

**How were learning needs identified?**

This mechanism is about recognising the need to learn and change practice (M3.1). Learners need to become aware of the gap between current and best practice. This can be achieved by using benchmarking and performance feedback (C3.1.1), reflection on practice (C3.1.2), challenging attitudes (C3.1.3), or assessment of skills and competencies (C3.1.4), facilitating a desire to learn in order to improve performance. This drives successful learning and the desire to change practice (O3). If potential learners think their current practice is adequate it is unlikely they will feel motivated to learn or change practice. To engage learners in the programme it is firstly important for learners to understand why they need to learn.

**CMO Configuration**

| C3.1.1 Benchmarking and feedback | C3.1.2 Reflection on practice | C3.1.3 Challenging attitudes | C3.1.4 Assessment | M3.1 Learners recognise the need to learn | O3 The learner learns successfully and has the commitment and desire to apply the learning |

In Study 1, routinely collected data on side errors provided a benchmark and feedback on performance over time (C3.1.1) so staff were aware that improvements had been made using the ‘knife check’ and the recurrence of another error. One strategy used concurrently with the training delivery was 15 days of specialist trainer observation (C3.1.4). A report was written to feedback observed practice (C3.1.1) that could lead to errors; for example, staff were using leading questions during the ‘knife check’ instead of a challenge response format. The observations (C3.1.4), debrief (C3.1.2), and feedback (C3.1.1) challenged practice and attitudes (C3.1.3) and in most cases prepared the learners to engage with training (M3.1) stimulating the desire to learn successfully and change practice to reduce wrong-sided errors (O3).

By contrast the pre-course observations in Study 2 were conducted ‘in-house’ and tended to confirm the people with problem behaviour: ‘we had already decided those were the people we were going to work with anyway’. Specific aspects of practice that could be changed were not fed back to the staff, therefore losing the opportunity to recognise what behaviour needed to change. Furthermore, there was less time during the course to explore learning needs as only one day of training had been
commissioned, due to time and financial constraints, curtailing the specialist trainer’s options for reflecting on practice (C3.1.2) and helping learners recognise their learning needs (M3.1). Whilst some staff were fully ‘on board’, others were not:

‘There was one anaesthetist [...] after going through all the training and not uttering a mutter, on the first day he was asked to do it in theatre, he just said, “no I’m not doing that” and no explanation.’ (Surgical Programme Lead)

Focussing on behaviour that can be changed and sharing this information helps staff see how they can improve. In Study 3, routinely gathered data on MRSA infection rates and pre-training audit compared overall performance to a national benchmark and evaluated compliance with best practice at clinical level (C3.1.1) enabling staff to recognise areas for improvement (M3.1). All clinical staff identified their personal learning needs (M3.1) following individual competency assessment in the performance of infection control measures in relation to care of VADs and IV drug administration (C3.1.4). The Programme Leads claimed that the assessment led to a change of attitudes (C3.1.3), and recognition of the need to learn (M3.1) ‘resulting in a change of practice’ (O3).

Because the focus in studies 4 and 5 was around personal development, several formal and informal methods of self-assessment were used to trigger reflection and enable learners to identify their learning needs. Students undertaking the work-based learning programme (Study 4) used a variety of methods to assess their learning needs depending on the module. They used reflective practice (C3.1.2) to prepare a personal development plan, a learning contract, and a reflective account of their learning journey. This allowed them to personalise learning objectives (M3.1). For the leadership and research modules learners completed a self-assessment questionnaire (C3.1.4) which clarified their development needs (M3.1) and set expectations for knowledge and the social skills required (O3). For work-based projects they gathered baseline data and critically appraised current practice (C3.1.1). One student summarised how he discovered his learning needs:

‘Learning from mistakes, appraisals, PDPs, reflection, SWOT analysis, service improvement sessions.’ (Student 3)

IMGs (Study 5) attended an Objective Structured Clinical Examination (OSCE) (C3.1.4) and received feedback (C3.1.1) enabling targeted planning of further training (M3.1). IMGs were required to reflect on their practice throughout the training sessions (C3.1.2). Feedback also facilitated this and helped to increase self-awareness. Individual needs assessment (C3.1.4) challenged attitudes (C3.1.3), increased self-awareness, and reduced resistance to learning and changes in practice (O3).

Studies 1 to 3 have used observation of practice to identify problem behaviour or assess competency. Observation is a useful way of assessing clinical practice where it focusses on behaviours that can be described and amended. Studies 4 and 5 have predominantly used self-assessment and reflective practice as both programmes were about the development of the individual in the working environment. All studies used one or more methods to identify learning needs (M3.1) in preparation for successful learning that supports practice change (O3).
How did the design and delivery of education engage learners?

The aim of Step Three of the programme theory is to ensure learners not only learn successfully, but also want to transfer their learning into practice. One of the mechanisms derived from the literature was learner engagement during training (M3.2), which is predicated on several contexts (described in section two) that have been grouped under the headings Preparation (C3.2.1), Resources (C3.2.2) and Teaching Methods (C3.2.3).

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<th>CMO Configuration</th>
<th>M3.2 Learners engage with learning</th>
<th>O3 The learner learns successfully and has the commitment and desire to apply the learning</th>
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<tr>
<td>C3.2.1 Preparation</td>
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<tr>
<td>C3.2.2 Resources</td>
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<td></td>
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<tr>
<td>C3.2.3 Teaching methods</td>
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As the same external trainer was commissioned to deliver the Human Factors/ Crew Resource Management training in studies 1 and 2, the design and delivery of the intervention was similar. The curriculum and delivery of training was a package that had been developed in the aviation industry and trialled in several NHS venues (C3.1.1). In both studies the training package was tailored to the needs of staff (C3.2.1) and the resources available (C3.2.2). In both studies resource constraints halved the training from two days to one, prompting the trainer to comment:

‘...the problem that we get is very rarely do we get a coherent, cohesive package’ (specialist trainer).

The specialist trainer was able to assess learning needs better in Study 1 having carried out the observations in theatres himself. Resources included the availability of credible trainers and the clinical expertise of the programme initiators (C3.2.2). In Study 1, the Department Head ‘came in every morning when we were running the whole day sessions’ (specialist trainer) to immerse himself in the process to gain further insight into the practice as well as theory, so that he could effectively support the trainers in engaging learners (M3.2). In Study 2, clinicians were more actively involved in the delivery:

‘There was a bit of a credibility gap with airline pilots telling them what to do in an operating theatre without having a surgeon standing beside them saying, “yes, this is how I see that relating to our work”’ (Surgical Programme Lead).

The blend of specialist trainers supported by senior clinical staff based in the workplace (C3.2.2) enabled learners to see the applicability of the intervention (M3.2) which underpinned successful learning and the commitment and desire to apply the learning (O3).

Curriculum for both courses was the same. PowerPoint slides were used (C3.2.2) to support didactic mini lectures and interactive discussion (C3.2.3) to explain the theory behind human error, focusing on quality processing, decision making, situational awareness, the impact of personality type on teamwork, leadership, communication, stress and fatigue. The Department Head (Study 1) was sceptical of the value of personality typing in improving safe practice but staff enjoyed the topic and
it acted as a hook to engage learners with the remainder of the course (M3.2). The trainer adopted a no-blame approach (C3.2.3) that promotes informed reflection on experience (C3.1.2). The programme initiators regarded the training package as ‘a whole with no single active ingredient’ that worked for all.

Using an evidence-based curriculum (C3.2.1), delivered and supported by credible instructors (C3.2.2), and using a no-blame approach that encouraged interactive learning (C3.2.3) and promoted experiential learning (C3.1.2), enabled learners to gain insights into how errors occur (M3.2), how the risk of human error can be reduced and a commitment and desire to apply the learning (O3). However, in Study 2, staff reviewing the impact of the training (C3.1.2) were frustrated by lack of change and the resistance to change of influential team leaders. Staff identified a need to learn about change management (M3.1) and were engaged by the prospect of learning (M3.2) how to make a difference to their practice (O3), at which point a change management programme was developed. One interpretation of the change of focus is that it was less challenging to implement process change rather than changing the practice of influential colleagues embedded in hierarchical team structures and was seen as an alternative strategy to provide safer care. Certainly, the Department Head in Study 1 experienced strong resistance to implementation of new safe practice. In both studies the strategy was to ensure the rest of the team were trained to deal with people who resist change, and that they were adhering to best practice which made it difficult for resistors to behave differently. In Study 1, ultimately the Department Head enforced practice change through disciplinary action.

In Study 3, a dedicated intranet page, using the mnemonic HANDS (C3.2.1), reminded staff of protocols and the supporting evidence base for practice (C3.2.2). Hand hygiene stations were set up in clinical areas (C3.2.2), staff were required to learn and satisfactorily demonstrate hand washing and hygiene procedures, and standardised equipment was used (M3.2). The education programme consisted of a variety of interventions for staff with different learning styles and abilities (C3.2.3) to engage staff (M3.2) from ‘board to ward’. Clinical staff were trained to ‘achieve uniformity in standards of teaching and assessment’ when delivering the programme throughout the Trust (C3.2.3), promoting credibility of the aims of the programme, promoting engagement of staff (M3.2), helping them to learn successfully and wanting to comply with the new standards (O3).

The design and delivery of the education programme developed in Study 4 was characterised by a continuous long-term collaboration between the Trust and the University. The programme was based on extensive exploration of staff needs and a pilot study (C3.2.1) resulting in an accredited, quality assured, flexible work-based learning package, delivered on Trust premises, which could be used as a vehicle to incorporate a range of modules to provide a bespoke educational programme to fit both organisational and individual needs (C3.2.1). This was offered to all clinical and non-clinical staff and became a particularly useful vehicle to support the drive for all nurses to be qualified to degree level (M3.2). The latest iteration of this collaboration, The Foundation Degree, has been designed to widen participation to develop staff at a lower entry level and to incorporate leadership and management modules in higher awards (C3.2.1). Staff were engaged with learning as the programme met their career aspirations and provided training for highly desirable management skills at the higher award level (M3.2).
Learning was delivered both on campus and in the Trust Education Centres, including an ‘on campus’ induction to the university library and computing facilities (C3.2.2). All students were provided with module handbooks providing detailed description and marking criteria for each level (C3.2.2).

As with previous studies, it was crucial to provide credible tutors who had expertise in the subject and, in this case, the NHS organisation (C3.2.2). Such broad-based knowledge is rare, so the programme used a blend of academic and NHS staff to deliver training, with modules ‘owned’ by the Trust but quality assured by the University and given credit equivalence. Trust lectures (C3.2.2) were highly relevant to the learner’s role (M3.2), and clarification of the management perspective directed their efforts and motivated them to apply learning in practice (O3).

The programme aimed to develop critical thinking through reflection and questioning to challenge assumptions and transform workplace problems and dilemmas to enable the learner to make them more transparent and available to change (C3.2.3). This approach is personalised, meaningful, and relevant to each individual (M3.2) and is grounded in the way the individual makes sense of the workplace environment, developing insights into work practice and is focused on transformation (O3).

This focus on individual development is mirrored in Study 5. Understanding IMGs’ prior experiences and training, and relating these to new experiences, was important to ensure the training was appropriate and that IMG practice was safe and improved over time (C3.2.1). Information containing educational resources and e-learning was also made available (C3.2.2), training was delivered by local faculty over several weeks, offering repeated sessions to support participation (C3.2.2). Core training content, developed from the literature, included communication skills (containing role-plays), host-country culture, local culture, health system structure, medical practice guidelines and ethical issues (C3.2.2) and was adapted to suit individual learning needs (C3.2.1). Experiential learning within a safe environment and working with small groups facilitated learning (C3.3.2); increased self-efficacy, transformative learning (self-awareness, beliefs, behavioural) and reduced anxieties (M3.3).

Whilst the context, mechanisms and outcomes within the programme theory can be mapped across case studies despite the different aims and approaches, mechanisms leading to the outcome were triggered in different ways. In studies 1 and 3 there is an element of ‘carrot and stick’ to motivate and enforce staff to apply learning to practice. Enforcement backed by disciplinary procedures or remedial training until competencies can be ‘signed off’ focusses the learner (M3.2), engendering a commitment to apply learning to practice (O3). In Study 2 this is evidently not applicable, with staff who have become committed to apply their learning and unable to do so due to the resistance of senior staff, seeking alternative strategies to bring this about. Studies 4 and 5 both adhere to transformative learning approaches to develop the individual and the way they are able to function in the workplace. Its individualised approach (C3.2.1) with clear relevance to workplace practice, motivates learners to engage (M3.2) and want to apply what they have learned in their job role (O3).

**How was transfer of learning considered during training?**

This mechanism is about ‘bridging the gap’ between learning and implementation. (38) It is the moment when learners are asked to review what they have learned on the course and decide how
they can apply knowledge and skills when they return to work. Analysis of the literature found that preparation to transfer learning includes goal setting and action planning, as well as self-management which is concerned with how the individual deals with barriers to transfer in the workplace. Kirwan recommends sufficient time should be given to the creation of an action plan to commit learners to transferring learning to practice. The action planning process should include reflection on what has been learned, identifying one or two areas for improvement of relevance to the learner and that would have a beneficial impact, and for each action to be specified using SMART (Specific, Measureable, Achievable, Realistic, Time bound) goals.

**CMO Configuration**

<table>
<thead>
<tr>
<th>C3.3.1 Action planning</th>
<th>M3.3 Learners anticipate implementing learning</th>
<th>03 The learner learns successfully and has the commitment and desire to apply the learning</th>
</tr>
</thead>
<tbody>
<tr>
<td>C3.3.2 Reality testing action plans</td>
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</table>

The Human Factors in Patient Safety programme, delivered in studies 1 and 2, was work facing and included key learning points to transfer into the workplace such as learning from every day events and the role of feedback and effective debriefings in developing a positive, safer working environment (M3.3). The course included some action planning (C3.3.1), enabling the learners to test these actions (M3.3), and promoting commitment to apply the learning (O3). Learners were also encouraged to submit their past practice changes to scrutiny to consider what did not go well and what was successful. This allowed their planning and practice change processes to be given a reality check (C3.3.2). Anticipating problems, considering solutions to these, and learning from previous success (C3.3.2) prepared them to transfer learning into practice (M3.3) and increased their desire to apply learning (O3).

However, in Study 2, action plans developed did not address key safety aims of the intervention. Having convinced staff that they had the power to decide what to do, the feedback suggests that staff did not understand how to implement plans (M3.3) or what and why change was needed:

‘So [there was] a programme of work there for quite a long time [...] which [...] was probably not going to improve any [patient safety outcome] measures.’ (Surgical Programme Lead)

This experience highlights the importance of action planning focusing on achieving the intended aims and objectives of safer care (C3.3.2).

In Study 4 all action plans for service improvement were constrained and guided by the Trust vision, strategic objectives and policies, rejecting project proposals that did not meet these criteria.

The education and training strategies in Studies 3 and 5 were both focussed on implementation of learning (M3.3), yet achieved this in different ways. Practice taught, observed, monitored and assessed in the workplace was described in Study 3, resulting in ‘consistent implementation of currently recommended preventative measures’. In Study 5, reflective practice, leading to a personal development plan including action plans, and support to implement learning and review progress,
represented an experiential learning cycle that helped learners anticipate making changes to their practice (M3.3).

Kirwan recommends giving action plans a ‘reality test’ by discussing them with a colleague and preparing learners to meet difficulties in making changes in the workplace. (38) To troubleshoot and respond to evolving action plans, it is suggested that ‘reality testing’ should be a continuous process. This is integral to the experiential learning cycle. The HE lecturer in Study 4 explicitly describes how project plans and aims are monitored.

‘I look at stuff like contingency planning, how do you deal with conflict, how do you get buy in, [...] and you need to remember that everybody’s got different skills [...] , who do you want on the team and what function because we’ve all got different strengths, weaknesses and functions. So [...] you need to sell this project and get people on board, if you can’t we need to relook at your proposal’ (HE Lecturer 1)

In Study 4, the action planning process was seen as a learning opportunity. Classroom sessions included health professionals such as Occupational Therapists and nurses, as well as pharmacy assistants, administrators, and staff from estates and buildings. Discussion of student projects in this forum enabled students to gain a broad perspective of the different inputs from departments across the Trust and insight into the complexity of the service (C3.3.2) and how it should be improved (M3.3). Time was spent ensuring plans accord with Trust policies and goals, adhered to SMART objectives, and were feasible. However, leaving the choice of action plan to staff may not result in outcomes that reach patient benefit (Study 2). The other studies 1, 3, and 5 incorporated implementation of learning into their theoretical approach to teaching (e.g. experiential learning) and practical delivery (observation and competency assessment).
Step Four: The learner has the capability and transfers learning into practice

The programme theory suggests that learners emerge from Step Three equipped with the knowledge, skills, confidence, and commitment to change practice and the desire to apply learning in their workplace. The next challenge is to ensure they have the capability to achieve successful transfer of learning to improve practice. Step Four sets out the conditions and drivers that facilitate staff and enhance their ability to transfer learning into practice (O4) that leads to patient benefit (O5). The support, organisational commitment, and workplace culture experienced by staff when they return to work after training is likely to determine the extent to which new practice becomes the way things are done in the organisation. This step addresses contexts associated with three mechanisms that drive how new practice was implemented (M4.1), maintained (M4.2), and spread across the organisation through a change of culture (M4.3).

How was new practice implemented?

For learners to deal with resistance and overcome barriers to transfer (M4.1), the literature suggests a need for support (C4.1.1), enhancing the confidence and resilience of the individual (C4.1.2), and their ability to deal with the logistics of historically evolved work processes, the complexity of change, and constraining external factors (C4.1.3).

CMO Configuration

<table>
<thead>
<tr>
<th>C4.1.1 Support</th>
<th>M4.1 The learner is able to deal with resistance and overcome barriers to transfer</th>
<th>04 Learner has the capability and transfers learning into practice</th>
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<tr>
<td>C4.1.2 Individual factors</td>
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<td>C4.1.3 Logistical issues</td>
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In Studies 1 and 2, ‘bridging the gap’ between learning and implementation is facilitated by coaching (C4.1.1). The trainers visited theatres observing and coaching whilst the training was ongoing:

‘...if somebody didn’t do a briefing they’d say, [...] why don’t you try briefing this time, doing it this way’ (Department Head).

Having support in the work place (C4.1.1) enhanced their ability to overcome personal and practical barriers (M4.1) and gain the confidence to put their learning into practice (O4). Debriefing also depended on a conducive work climate as, without support, issues were not raised between colleagues for fear of upsetting them (Study 2).

People attending the course in Study 1 had differing levels of seniority, different attitudes and beliefs about the systems in place and the extent to which they perceived themselves at risk of committing an error (C4.1.2). Surgeons who were early adopters were enthusiastic. Two surgeons approaching retirement were highly resistant. The specialist trainer thought the best approach ‘was [...] to train everybody else to deal with the difficult people (M4.1), [...] that’s really important that you work around them and when they realise they can no longer get away with their inappropriate, unprofessional behaviour fine’(O4). In Study 2, they identified professional differences between
individuals (C4.1.2) who could drive learning and change (M4.1) with nurses most likely to improve practice, anaesthetists in the mid-range, and surgeons least likely. In a hierarchical management structure, surgeons would have the greatest influence on the ability of staff to implement their learning (O4).

Some improvements were not practical to maintain. In both studies post-operative debriefing was difficult to organise at the end of the day as staff finished at different times (C4.1.3). The surgical Programme Lead in Study 2 also felt there was a negative impact of the introduction of the WHO checklist which staff felt replaced the need for briefing and debriefing.

The switched focus towards change management training in Study 2 created time and workload pressures in coping with the complexity of the change process (C4.1.3) (e.g. background research, data collection, arranging meetings, booking rooms, organising stakeholder consultation) (M4.1). The research project team provided practical support by carrying out multiple tasks (C4.1.1) to overcome workload barriers (M4.1) enabling action plans to be implemented (O4). The team were grant funded, but resource constraints are likely to make this kind of support unsustainable (C4.1.3).

In Studies 3, 4 and 5, a comprehensive infrastructure was developed to support learners to overcome barriers and implement practice improvement. In Study 3 the infrastructure to support implementation of learning (C4.1.1) was available for individuals in all specialties, roles and at all levels (C4.1.2) of the organisation. Monthly infection control study days provided opportunities for updates, feedback, further training and support (C4.1.1) for link practitioners (C4.1.2). Multidisciplinary (C4.1.2) IV governance meetings chaired by the Associate Medical Director allowed issues about the standardisation of practice and equipment to be discussed (C4.1.3). Individuals were trained and assessed on site until they were able to demonstrate competency (C4.1.2). The infrastructure supporting the intervention, consistency of the equipment, the leadership from senior management and clinicians, and peer practice made it harder to do the wrong thing (M4.1). As a result, staff at all levels were able to change their own practice and implement their learning (O4) and variation in practice and clinical errors was reduced. It would give an inaccurate picture to suggest that this was easily accomplished. The IV lead practitioner spent a great deal of time persuading influential resistors, showing them the evidence and suggesting they take on a training role. It took a year to achieve full compliance.

Similarly, in Study 4, learners were supported by a robust infrastructure, which included their HE tutor, the NHS tutors, a buddy (peer learner), their manager, and a workplace facilitator (C4.1.1). The workplace facilitator was a more experienced colleague chosen by the Human Resources team and trained to provide organisational, professional and specialty expertise, as learners worked in many different departments and roles. They helped the learner make links with people across departments, at all levels of management, and they supported the student to network and meet key stakeholders (M4.1).

For IMGs (Study 5), having supportive and empathetic figures (C4.1.1) facilitated Cultural Health Capital (wellbeing, resources, resilience, optimism), and transformative learning; further facilitating IMG engagement, self-efficacy, (M4.1) and the transfer of learning into practice (O4). Like the workplace facilitators of Study 4, supervisors received training and were able to facilitate peer relationships to overcome problems in the workplace (M4.1). A system of ‘enhanced supervision’
provided targeted training to support clinical and educational supervisors of IMGs. A tutor was also specifically allocated to work with IMGs in non-training posts.

Personal circumstances and characteristics (C4.1.2), such as a capacity to adapt, influenced the ability of IMGs to overcome barriers in the workplace. Additional support was given where needed, although individual differences also extended the capacity to seek and engage with support.

External barriers to transition into clinical practice included difficulties entering the UK to work, an infrastructure that excluded doctors not in training, and being in rural practice (C4.1.3) especially where resources were not available.

Support was available from tutors, peers, facilitators, and managers, who opened doors, created links, and enabled learners to deal with resistance, and overcome barriers to practice improvement. Individual characteristics, work climate factors, and external logistical factors influence the degree to which support was accessed and learning transfer was achieved. These contextual factors required an infrastructure that allows different ways of accessing support, and a flexible approach to identify those who are excluded or may be invisible as they are not working in a training structure.

**How was new practice maintained?**

**CMO Configuration**

<table>
<thead>
<tr>
<th>C4.2.1 Embedded in systemic change</th>
<th>M4.2 Organisational commitment</th>
<th>O4 Learner has the capability and transfers learning into practice</th>
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<tr>
<td>C4.2.2 Individual response</td>
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<td>C4.2.3 Incentives and credibility of the training programme</td>
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<td>C4.2.4 Leadership</td>
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<tr>
<td>C4.2.5 Networking for support and learning from each other</td>
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Study 1 was exceptional in maintaining performance after the intervention. Eleven years earlier staff received one day’s training and some coaching in the workplace with no follow up training. Despite changes in staff and relocation to a different hospital, pre-operative briefing remained at 90% compared with 10% before training, and the ‘knife check’ was done universally and staff were corrected if they did not use the challenge response format. These checks became standard operating procedures embedded into the system (C4.2.1). Poor pre-operative briefing (‘he did it in a half-hearted way’) occurred where one surgeon was forced to comply with the standards (C4.2.2).

The key to maintaining performance was leadership of the team (C4.2.4). The specialist trainer attributed this sustained impact of the intervention to the Departmental Head (‘he’s the super hero‘; *External trainer*). The Department Head, on the hand, attributed improved performance to the continuity of the leadership team including himself (C4.2.4), who proactively reinforced the protocol by monitoring and challenging high-risk behaviour, achieving full compliance after eight years. The
Departmental Head also networked with other Trusts (C4.2.5) though the aegis of the SHA Safer Care North East group, to learn from others about how to make care safer.

The organisational commitment (M4.2) manifested itself through the doctors and nursing team leaders who had all found the training credible (C4.2.3). They ensured staff implemented the protocols (C4.2.4) and supported less senior staff in the face of resistance (O4). There was little support from the Trust senior management who were not involved.

In Study 2, the response to challenges to the CRM training (C4.2.3) was to introduce Standard Operating Procedures (SOPs) to improve communication between surgeons and the nursing staff to reduce error (C4.2.1). The SOPs mapped out a process that had to be followed by all staff (M4.2). SOPs also acted as an aide memoire for staff to trigger their learning (O4).

It was also important to recruit change champions from the leaders in each professional group (C4.2.4) to support the introduction of new systems demonstrating organisational commitment to change (M4.2). In the various iterations of the intervention (Lean, SOPs, team work), it was the addition of team working that improved results (O4) as staff at all levels (M4.2) were able to support and learn from each other (C4.2.5).

However, the Programme Lead felt the impact of the training faded rapidly (O4) due to the negative reaction or indifference (C4.2.2) which tended to come from senior people (M4.2). The Programme Lead explained this lack of interest in the training in terms of the medical model and professional autonomy of senior surgeons (C4.2.2). The research assistant pointed out that management did not adopt the initiative (M4.2) which damaged its credibility with staff (C4.2.3), limiting the ability or desire of staff to transfer learning into practice (O4).

In Study 3, systems were developed to assess competency for VAD insertion and drug preparation and administration and results were recorded on an electronic database (C4.2.1). This surveillance system allowed the IV team to monitor and evaluate the adherence to five performance indicators monthly. Individuals who might resist change, could not deviate easily where equipment and practice of peers and senior staff was standardised (C4.2.2). Staff were required to adhere to protocols to be ‘signed off’ as competent to practice or be retrained to remediate non-standard practice (C4.2.3).

In contrast to Study 2, the project was led and supported by senior management (C4.2.4) who showed personal commitment by modelling best practice (M4.2). Monthly meetings chaired by the Associate Medical Director (M4.2) provided a forum to network, gain support and learn from those in different roles and specialties (C4.2.5).

 Provision of a systems infrastructure (C4.2.1), training new staff (C4.2.2) monitoring (C4.2.3) and remediating poor practice (C4.2.2), managing the process (C4.2.4) and developing networks (C4.2.5) were both a product of and also engendered organisational commitment (M4.2) which ensured that all staff could and did change practice (O4), maintaining the intervention and its impact in reducing infection rates to the present day (Personal Communication with JC: June 2018).

In Study 4, there was a whole organisational commitment to the aims of the programme. Managers reviewed learners progress during appraisals (C4.2.1) at which difficulties and challenges
experienced by the learner could be discussed (C4.2.2). The credibility of the programme (C4.2.3) was enhanced by the involvement of senior managers who met with learners to discuss aspects of their projects, came to end of year presentations, and, including the CEO, taught on some of the modules. Trust managers showed leadership (C4.2.4) and commitment (M4.2) to the delivery of the programme and the service improvement projects which all addressed Trust strategic objectives (C4.2.4). Learners were encouraged to network with the increasing number of graduates in the Trust who understood and supported service improvement projects (M4.2) to increase their sense of self efficacy and to share learning (C4.2.5).

In Study 5, the positive outcomes of a continuing support system (C4.2.1) in reducing turnover of IMG staff was recognised, facilitating organisational commitment (M4.2) and further support. As a result, all IMGs were systematically identified by HR for training at recruitment. The intervention clarified their role in the clinical team, reducing notions that they had simply been employed to fill a gap (C4.2.2) which increased their commitment to the Trust (M4.2).

Early negative attitudes of IMGs (C4.2.2) towards referral to the intervention and assessment were reversed after benefitting from targeted support, increasing their commitment to the organisation (M4.2) and their capability to adapt to practice in the UK (O4). Following dissemination of the evaluation of the intervention the Trust reputation for offering support (C4.2.3) attracted IMGs to apply for posts in the area.

As part of the intervention, local support networks were developed (C4.2.5) that enabled IMGs to share information and ask questions without the risk of feeling inadequate or inferior. This community fostered a sense of belonging (M4.2), confirmed a positive role identity and built lasting relationships, enabling them to function more effectively in their clinical role (O4).

The mechanism of organisational commitment acts to maintain new practice and conversely can be changed by the intervention. This was particularly evident in Study 3 where organisational commitment has facilitated the intervention, which in turn increased organisational commitment (M4.2) through the development of new infrastructure to monitor performance (C4.2.1), new multidisciplinary networks to spread best practice (C4.2.5), and standardisation of practice across the whole Trust (C4.2.1). Similarly, in Study 4, the commitment and engagement of all management strata has created a change aware workforce who can support learners (C4.2.5). In Study 5, an initially reluctant organisation became aware of the benefits in supporting IMGs, enhancing the credibility of the intervention (C4.2.3), which has increased their commitment (M4.2), to support new internationally recruited staff. Lack of organisational commitment reduces the credibility of the programme making its implementation a matter of personal choice (C4.2.2) reducing its impact. Study 2 has been particularly disadvantaged by lack of organisational commitment. However, the senior surgeon who initiated the programme has been remarkably persistent in finding alternative solutions such as the introduction of SOPs and introducing Lean methods to improve patient safety and to try to change the current climate.

Leadership of senior managers (C4.2.4) over extended periods of time has been critical in maintaining practice by monitoring practice (C4.2.2) and enforcing implementation of standard operating procedures (C4.2.1) (Studies 1 and 3). Studies 1 and 2 also show the influence of staff in
different professional roles who regard the training as credible and understand its potential (C4.2.3), and then support its implementation (C4.2.4).

**How was new practice spread across the organisation?**

Culture change (M4.3) in this step refers to a change to norms of practice brought about by learners working within teams or across organisations which enhances their capability to change behaviour and transfer their learning into practice (O4). The contextual factors that were found to facilitate this in the literature were sharing of information back in practice (C4.3.1) and whole-team learning (C4.3.2).

**CMO Configuration**

<table>
<thead>
<tr>
<th>C4.3.1 Sharing of information back in practice</th>
<th>M4.3 Culture change</th>
<th>O4 Learner has the capability and transfers learning into practice</th>
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</thead>
<tbody>
<tr>
<td>C4.3.2 Critical mass (whole-team) involvement</td>
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The Departmental Head in Study 1 felt the team leaders approach to enforcing the new protocols contributed a culture change (M4.3) where new protocols were the norm thus enabling learners to transfer their own learning into practice (O4). He temporarily stepped down from his departmental role to write a course handbook and trainer’s manual and produce other teaching resources in order to run the programme ‘in-house’ more cost effectively (C4.3.1). The production of this manual was supported and funded by the SHA. These resources have been used informally within the theatres (C4.3.1), but Trust management were unwilling to dedicate audit days to reinforce the training and had not grasped the wider benefits of spreading the training across the whole organisation. However, encouraged at the time by the SHA, the Departmental Head was invited to talk to other Trusts in the region and they have used his resource package (C4.3.1).

A critical factor that facilitated good teamwork, communication, and change in practice was training the whole team together (4.3.2). All 125 theatre and allied staff were invited to attend:

‘We taught everybody we didn’t just have it for the interested or for the consultants […]. Everybody in theatre went through it and I think that meant that they all felt included and it was something that we were doing as a department and […] having these big groups of twenty-five people and there was a mix […]. There would be orderlies and porters and […] consultants and juniors and sisters […] and I think it was that, that enabled us to get a kind of cultural change going (M4.3) […]. Everybody started doing briefings before lists (O4) people getting more aware of […] human factors and so on and it was a critical mass thing (C4.3.2).’

(Departmental Head)

In Study 2, the impact of CRM was patchy. There were silos of practice change in Theatres which had the highest concentration of people with some understanding of human factors and where it was
still considered to be important. Some staff had moved elsewhere in the organisation and continued to be trained and to share best practice in their new roles (C4.3.1).

However, the pre-existing culture in the organisation may outweigh the new culture. The Programme Lead had developed scenarios where a nurse assertively challenged the consultant. Senior nurses in the Trust wrote to him to say that “no nurse would ever speak to a consultant like that”. The Programme Lead had worked in a hospital in another city, prior to his present post, and found that the culture in that hospital was less hierarchical and more conducive to junior staff challenging senior staff. So, the strength of the accepted current culture is likely to impact on the practice of the whole team despite the effect of training.

SOPs were considered to have the greatest influence on culture change as there was a requirement for procedures to be adopted by all healthcare professionals (C4.3.2). These procedures just became the way things were done (M4.3) and this supported individuals to change practice (O4).

The Lead IV Practitioner who initiated the programme for Study 3 argued that the introduction of the ‘care bundle acted as a tool to influence organisational change’ (M4.3). This was achieved by sharing information in practice (C4.3.1) through multidisciplinary meetings. They also trained all clinical staff in the Trust (C4.3.2). To achieve this ‘immense task’ the programme initiators worked with the practice development team to develop and deliver ‘Train-the-trainer sessions [...] to achieve uniformity in standards of teaching and assessment’. The critical mass of trained staff (C4.3.2) gave momentum to a collective culture (M4.3) which determined how things were done, giving individuals the green light to implement their learning to improve their own practice (O4).

In Study 4, key to gaining support for change (O4) was the ‘buy in’ of colleagues (M4.3) for service improvement through sharing information (C4.3.1). Another source of support was from staff who had already completed the degree who were more open to service improvement ideas (M4.3). A common understanding amongst those who were undergoing or who had completed the programme supported a culture of service improvement (M4.3) that enhanced the learners’ ability to implement their projects (O4). Conversely, students had problems with ‘Bank Staff’ who did not share the culture, who were not in touch with new procedures, and did not comply with changed processes.

Over time, the Trust has supported many staff to undertake work-based learning, building the number of change agents employed in key positions (C4.2.3) who have transferred their skills from their original project to other aspects of service development. This has created a culture (M4.3) of critical appraisal and openness to service improvement, which is supportive of learners’ projects (O4).

Culture change came about through shared knowledge and understanding of most staff who were working together. It came about either because staff trained together as in Study 1, or because there was an accumulation of trained staff over time (Studies 3, 4 and 5) who became a resource to learners. It is also likely that the infrastructure put in place to support learners shaped the culture. Increased staff cultural awareness in Study 5 facilitated the development of a supportive culture. This was key to the interventions success.
How did the intervention benefit patients?

Step Four of the programme theory explains the contexts and mechanisms that lead to the outcome that the learner has the capability and transfers learning into practice (O4). This change in practice should lead to the desired outcome of patient benefit after all the other outcomes of the programme theory have been achieved: the programme is initiated (O1), staff are motivated to learn (O2), they learn successfully and want to apply their learning into practice (O3), and they have the capability and transfer learning into practice (O4). All the case studies have a patient outcome and indicate patient benefits. These are summarised below.

**Study 1:** There have been no further wrong side errors in the eleven years since training was delivered:

‘...it reduced the error rate from, [...] one in three hundred wrong sided operations but that includes pretty trivial errors like the wrong side of the back and I think it went down to about one in fifteen hundred...and then we introduced this training and then it’s been about twenty-two thousand (procedures without any error) since then’ (Programme Lead).

**Study 2:** Complication rates, length of stay, and readmissions showed a non-significant decline in only two studies using CRM and a combination of CRM and Lean. In the study using Lean methodology the proportion of patients requiring transfer to other wards fell significantly (27% to 20%) and adverse events after transfer also declined.

**Study 3:** The Trust recorded an ‘87.5% reduction of MRSA bloodstream infections related to IV devices [...] for 2011–12’ and performance has been maintained.

**Study 4:** Several small projects identified patient benefit. For example, there have been improved links with community care reducing the number of readmissions from care homes; better nutritional assessment in the community hospital using nursing staff with support from the Trust Dietitian based in a distant District General Hospital; better patient engagement through day time activities including reminiscence work and supported walks in the hospital grounds; reduction in falls using targeted physical exercise; improved dignity of incontinent patients by reorganising the bedside availability of the correct size and type of incontinence pads.

Several small parts of a larger QI programme and were not able to show benefit, such as collation of data on surgical site infections to inform and evaluate an intervention.

**Study 5:** A number of positive outcomes were found, including; a reduction in complaints and reported errors, increased performance which is likely to lead to reduced fitness to practise concerns (which have a high cost implication), and retention has increased to 100% (including those in non-training posts).
3.3 How do the case studies refine the programme theory?

Critical interpretation of Study 4 has highlighted that the motivation and transfer of learning is not exclusively initiated at the organisational level, thus as well as corroborating the elements and processes in the programme theory, the case study evidence offers alternate routes through the programme theory, from staff education to patient outcomes.

In study 4, work-based learning was a way of formalising individual-led learning and making it more effective. The training manager noted the improved quality of staff reflections pre and post participation when they reviewed appraisal and Personal Development Planning recorded on the Electronic Staff Record. Staff were required to undertake a work-based project.

One project undertaken for the Professional Practice Award (Case Study 4) earned the Laundry Manager a national adult learner’s award. Having left school at fourteen she wanted to demonstrate to herself that she was capable of achieving a higher education award. Her mother had recently died due to MRSA infection acquired in hospital. As a result, she was personally motivated to use her work-based project to investigate how her job role could contribute to MRSA prevention (O2). With support from the HE tutor (C3.3.1) she looked at evidence that bedside curtains harboured dust and required frequent changing to reduce Hospital Acquired Infections which was time consuming for staff (C1.1.1). She sourced a fabric which reduced the retention of dust particles and fixings which reduced time spent changing curtains (O3). After presenting her evidence and project proposal to the Director of Nursing (M4.2) the Trust made the decision to invest in new curtains throughout the hospital trust. This was one of many measures taken to reduce infections at the time (M1.1) and so it is difficult to attribute the fall in Hospital Acquired Infections to this project alone.

It is important to note that not all projects resulted in large scale Trust wide change. There were many small projects to upskill staff to provide a service needed in a department or improve patient care in several small ways. Learners found support (C4.4.1) from previous graduates of the programme who understood the nature of the projects undertaken (M4.1). The skills learned could be transferred to other service delivery problems (C4.3.1) and foster a culture of innovation and service improvement across the Trust spread by programme graduates (M4.3).

Whilst we have highlighted how individual CPD fits into our programme theory, the evidence suggests that starting at the organisational level will have greatest impact on patient outcomes, hence the programme theory starts at the organisational level (Step One). The case studies have illustrated how an individual can take their learning back into the organisation (starting at Step Two), then progressing through the steps from Step One to ensure patient benefit. As the programme theory illustrates, transfer at the individual level, rather than organisational level, will likely face more resistance and will have less of an impact on patient benefit compared to whole-team learning (where for some learners, the process may begin at Step Four via spread of learning and culture change – without having experienced the intervention).
Summary of key messages from Testing Phase 1: Case Studies

The purpose of the case studies was to test the programme theory that we developed from the literature, also serving to build and refine the emerging theory. As is illustrated throughout this chapter, the case studies largely supported the programme theory through in depth analysis of how the mechanisms achieved outcomes in these contexts, therefore addressing objective three of the case studies.

We noted that whilst the contextual factors were supported, they were not all required to achieve the outcome of each step. However, the mechanisms remained important to achieving the step outcomes. Study One and Two form a useful comparison as they both took place in a surgical context, using a similar approach, yet one was much more successful than the other. It was clear that the organisation was supportive in Study One, but indifferent in Study Two, which was less effective (Step One). Similarly, training in Study One was mandatory while it was not in Study Two (Step Two). Also the training itself was much more targeted in Study One, whereas there were competing interventions in Study Two (Step Three). Training was implemented more successful in Study one, with whole team training, thus staff were less resistant, as they had all received the same message and were committed to change, less so in Study Two.

Study Five illustrated all steps clearly, but also highlighted that Step Two could be reached during training, where the doctors learned about their need to change practice, thus motivating them to engage more with the training.

Study Four illustrated that individuals, rather than the organisation could identify a problem, but then still work through the steps, but returning to Step One to gain organisational support for roll-out.

The case studies also illustrate that whilst contextual factors have been assigned to a mechanism for the sake of clarity, they may often support other mechanisms, such as the use of reflective practice for personal development planning in Step Two, and as a means of understanding learning needs in Step Three.

The large amount of data collected from diverse interventions now enables the theory to be more generalizable across different contexts. Our sampling approach also enabled us to test the programme theory with positive and negative patient outcomes.

The case studies highlighted that, while the transfer of learning programme theory accounted for the mechanisms involved in education, which has been initiated and led by individuals (as opposed to education initiated and led by organisations or teams), the route through the steps in the model may vary.
3.4 Test Phase 2: Survey of HCPC registrants

Individual CPD that benefits patients

In our testing of the programme theory, we noted a lack of evidence about how individual-led learning, conducted as CPD, benefited patients. This was both missing from the literature and only evident in one case study, which indicated that individual learning could have an alternate route through the step structure in our programme theory. We therefore specifically sought to include this within the testing of the developing programme theory.

The purpose of the survey was to test the programme theory with a ‘bottom up’ approach from an individual, rather than organisational, perspective.

3.4.1 Aim

To explore how CPD activity could benefit patients through the description of further illustrations and confirm refinements to the programme theory.

3.4.2 Methodology

We have followed the RAMESES guidelines for realist approaches, (47) which states that the focus of realist evaluation is on testing the programme theory through additional and specific data collection. Therefore we planned to use this targeted approach to specifically test and where needed refine the programme theory. We therefore targeted data collection from Health and Care Professions Council (HCPC) registrants, who were ideal as the Health and Care Professions Council regulate both health and social care professionals. The HCPC regulates 16 professions, which includes over 320,000 registrants working across many different settings and locations. Therefore, to collect data about the impact of CPD we developed a survey to capture this information on a large scale.

Devising the survey

A subscription to ‘Survey Monkey’ an online questionnaire tool was purchased in preparation for collecting data. The survey was developed over various stages. The initial survey design was informed by interview data collection (136). We developed questions focused on collecting more information about CPD activities that lead to patient benefit. The survey questions were revised and edited following piloting with the various groups described below.
Piloting of survey

In total, the survey was piloted with over 20 people including Occupational Therapists, Physiotherapists, Radiographers, Paramedics and Art Therapists. The pilot sample included respondents who were employed by the NHS or independent practitioners, and included respondents who were recently registered (less than one year) as well as more experienced registrants (with more than 30 years of practice). There was representation from male and female registrants and some were members of HCPC council, CPD audit assessors, registrants who were audited and those who were not audited. Our Patient and Public Involvement (PPI) group, senior HCPC colleagues, also informed the survey questions and co-researchers involved in the project. The final feedback from registrants was that the questions were appropriate, clearly phrased and took no more than 15 minutes to complete. The survey went live on the 18/01/16 and closed on the 22/02/16. The HCPC sent out the survey via a bulk emailing system, and frequent reminders, to the randomly devised sample.

Sampling strategy

We devised a random sample of approximately 3.4% (11,300) of all HCPC registrants (stratified to include the range of professions) to explore the perceived strengths and weakness of the HCPC CPD system. The sampling framework was informed by complex survey design principles whereby professions with relatively few registrants were oversampled. This sampling strategy was intended to obtain responses from at least 50 registrants in each professional group (assuming a roughly 10% response rate - based on our previous research experience and a recent survey by another provider for HCPC), in the event that inter-professional comparisons were desired at any point in the data analysis. The proposed sampling strategy is shown in Table 10 below. As shown in table 10, the final number of respondents in each group (see shaded column) were generally close to those anticipated by the sampling plan. Social workers were the largest group of HCPC registrants and formed 19% of the total response rate to the survey.

Survey of registrants to identify potential benefits of CPD

We conducted an online survey inviting 11,314 registrants to take part in an online survey. The HCPC distributed the invitation and notified us that 8000 registrants opened the email, yielding a response rate of 1208 (15%). It is possible that the remaining 3000 did not receive the email due to incorrect email addresses, firewalls, or declined based on the email title only, this would yield a lower response rate of 11%. We identified that registrants were positive about the HCPC CPD Standards. All types of CPD activity was viewed as having benefits for patients. Registrants provided clear examples of CPD that had led to patient benefit.
### Table 10: The intended sampling strategy with oversampling of professions with relatively few members, along with the actual final sample obtained.

<table>
<thead>
<tr>
<th>Profession</th>
<th>Registrants</th>
<th>% to be randomly sampled (n)</th>
<th>Expected final sample</th>
<th>Actual final sample</th>
<th>Response rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arts therapists</td>
<td>3,672</td>
<td>13.6% (500)</td>
<td>50</td>
<td>50</td>
<td>10.0%</td>
</tr>
<tr>
<td>Biomedical scientists</td>
<td>22,798</td>
<td>2.5% (570)</td>
<td>57</td>
<td>58</td>
<td>10.2%</td>
</tr>
<tr>
<td>Chiropodists / podiatrists</td>
<td>13,042</td>
<td>3.8% (496)</td>
<td>50</td>
<td>46</td>
<td>9.3%</td>
</tr>
<tr>
<td>Clinical scientists</td>
<td>5,340</td>
<td>9.4% (502)</td>
<td>50</td>
<td>56</td>
<td>11.2%</td>
</tr>
<tr>
<td>Dietitians</td>
<td>8,763</td>
<td>5.7% (500)</td>
<td>50</td>
<td>76</td>
<td>15.2%</td>
</tr>
<tr>
<td>Hearing aid dispensers</td>
<td>2,212</td>
<td>22.6% (500)</td>
<td>50</td>
<td>54</td>
<td>10.8%</td>
</tr>
<tr>
<td>Occupational therapists</td>
<td>36,650</td>
<td>2.5% (917)</td>
<td>92</td>
<td>80</td>
<td>8.7%</td>
</tr>
<tr>
<td>Operating department practitioners</td>
<td>12,288</td>
<td>4.1% (504)</td>
<td>50</td>
<td>70</td>
<td>13.9%</td>
</tr>
<tr>
<td>Orthoptists</td>
<td>1,379</td>
<td>36.3% (501)</td>
<td>50</td>
<td>103</td>
<td>20.6%</td>
</tr>
<tr>
<td>Paramedics</td>
<td>21,473</td>
<td>2.5% (537)</td>
<td>54</td>
<td>59</td>
<td>11.0%</td>
</tr>
<tr>
<td>Physiotherapists</td>
<td>50,668</td>
<td>2.5% (1267)</td>
<td>127</td>
<td>116</td>
<td>9.2%</td>
</tr>
<tr>
<td>Practitioner psychologists</td>
<td>20,529</td>
<td>2.5% (514)</td>
<td>51</td>
<td>42</td>
<td>8.2%</td>
</tr>
<tr>
<td>Prosthetists / orthotists</td>
<td>1,040</td>
<td>48.1% (501)</td>
<td>50</td>
<td>56</td>
<td>11.2%</td>
</tr>
<tr>
<td>Radiographers</td>
<td>30,694</td>
<td>2.5% (768)</td>
<td>77</td>
<td>79</td>
<td>10.3%</td>
</tr>
<tr>
<td>Social workers in England</td>
<td>89,671</td>
<td>2.5% (2242)</td>
<td>224</td>
<td>224</td>
<td>10.0%</td>
</tr>
<tr>
<td>Speech and language therapists</td>
<td>15,191</td>
<td>3.3% (502)</td>
<td>50</td>
<td>39</td>
<td>7.8%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>335,410</strong></td>
<td><strong>10.3%(11321)</strong></td>
<td><strong>1132</strong></td>
<td><strong>1208</strong></td>
<td><strong>10.7%</strong></td>
</tr>
</tbody>
</table>

The survey was conducted as part of another study for the Department of Health. (136) As the survey was running parallel in time, we were able to add a question about how CPD benefitted patients for this study. Although 1208 registrants answered the survey, not all respondents answered the open text questions giving an example of how CPD benefited patients.

We received over 600 examples from registrants who said they had done CPD that had benefitted patients (additional results are provided in Appendix 17). We asked the following question to collect evidence of CPD that linked to patient outcomes:

“Please provide an example of one CPD activity you did, clearly describing how it led to service user/patient benefit? (including improved care, patient experience, safety activity).”
3.4.3 Analysis

We conducted framework analysis (see details described above in the case study methods) on the open text comments provided by the HCPC registrants in answer to the question set out above regarding CPD that had led to patient benefit. We used the Four-Step programme theory as a framework to explore the evidence for it in this dataset. We were interested to identify if the same Four-Steps were relevant and if so, did they apply in the same way. We were also interested in exploring evidence gaps, particularly regarding Step Two.

3.4.4 Results

Generally, we found evidence for the Four-Step Programme Theory. However, we noted that many registrants provided examples of CPD that they perceived to indirectly benefit patients but without direct evidence. Clearly the reported evidence is based on self-report, without any verifiable evidence. However, given this weakness, we were able to use some of the statements to explore our Four-Step Programme Theory. Although this is a departure from our previous measures of patient outcomes (that clinical effectiveness and patient safety are measured, and that patient experience is as reported by patients). However, this survey data serves to further support the programme theory with illustrative content where one, individual learner-level source (the health or social professional) has made the links in the transfer of education to patient benefit. Descriptions of this continuous, first hand, process are rare in the literature. Here we demonstrate that these first-hand accounts of CPD support the steps in the programme theory through their descriptions of contexts, mechanisms, and outcomes (perceived by staff or reported as observed and measured).

We have set out the evidence below and provided evidence using quotes to illustrate our findings. We have annotated evidence of steps in the programme theory, and highlighted examples of each of the patient outcomes: increased clinical effectiveness, improved patient safety, and improved patient experience.

3.4.4.1 Assumptions of benefits for patients

On analysing the open text accounts of CPD, we noted that many examples described assumptions that the CPD had benefitted patients, rather than reporting direct measurable benefit.

“I took part in Spinal training provided by Orthopaedic Physiotherapy Practitioners covering use of pain relief, assessment and treatment techniques and case studies. The outcome was that I felt more confident in advising patients on pain relief and felt more confident when discussing medication with GP’s. The refresher of assessment techniques also streamlined my own assessments making them more effective.” (Female NHS physiotherapist, Band 7)
“Every project for prostate cancer patients. Prostate cancer patients given a presentation on their radiotherapy treatment. In the presentation we included information on CT scan appointment, radiotherapy treatment, side effects of radiotherapy. This benefitted the service user as it prepared them, and they knew what to expect from their radiotherapy treatment. Nervous and anxious patients were put at ease. This meant improved patient experience”. (Female, NHS Radiographers, Band 6)

The registrant’s assumption of having achieved a patient benefit from their own learning, without any evidence of transfer to patients. This may reflect the nature of the question, and perhaps their understanding of the requirements of this CPD Standard for HCPC.

3.4.4.2 Examples of observable patient benefit

Registrants provided examples of observable increases in clinical effectiveness, reduction in error and improved patient experience. We have set out examples of this below, illustrating how individual CPD requires the team to participate and commit to the change thus reducing the barriers to transfer. We can see here that Step Four of our programme theory can present a major barrier to transfer. However, when an individual is working directly in a one to one capacity with a patient, that individual staff member can make a change that benefits patients. The examples below e.g. learning the sign language Makaton, working with coloured overlays with stroke patients and removing earwax illustrate effective transfer on a one to one level.

Examples of one on one transfer of learning:

“I undertook Makaton training as I work with disabled children who sometimes use alternative ways of communication, to enhance my ability to communicate with the children. I have been able to use this training with a young person who is hearing impaired and uses sign language to communicate.” (Female, social services social worker, Band 8a).

“Self-study an online course on management of visual defects after stroke, learnt additional management practices to offer the patients including coloured overlays for reading problems. Read relevant current journal articles to compare and confirm how effective management practices are for the patients. Work shadowed a colleague on use of coloured filters. Now offer colour overlays to stroke patients with reading problems which enhances their quality of life post stroke, patients report back that very helpful especially in early stages post stroke. Plan to audit which overlays patients find most helpful as have noticed tend to choose yellow or green. Will also contact stroke special interest group before starting audit to discuss.” (Female orthoptist, Band 6)

“I've done a wax removal course in Aston University. The course was very useful for me, but mainly for my patients because now I can do wax removal in the comfort of their homes, every time I find it is safe to do it. I'm having a very positive feedback from all the patients I've
applied this procedure, which gives me even more passion for my profession.” (Female hearing aid dispenser, private sector)

3.4.4.3 Evidence of transfer of learning from individual to team

Other CPD accounts reported change at a team level, for example see the quotes below regards reviewing the leaflets given to patients and improving out-patient services. These examples highlight that practice change and patient benefit can be achieved at both individual and team level: however, many of these educational activities could not have a wider impact due to the specific needs of the target population and a wider spread would be meaningless.

“A departmental review of information leaflets given to patients - looking at examples from other departments. As a result of this, our information was redesigned to allow it to be used in a number of formats, e.g. written information including large print leaflets, autism friendly information, and online access to documents. Patient feedback was obtained from this, and adaptations made to the information. Patient experience was enhanced as a result, and safety was increased as updates were made to contact details etc. so patients can contact us more easily for queries.” (Female NHS Orthoptist, Band 7)

“Review of current outpatient service within specialty, then further scoping exercise with both patient and other service users to help inform changes needed. From results met with service users and planned service redesign to help make outpatient service more patient centred to enable patients to have planned sessions and time to offer more holistic approach to patient care process. This also resulted in reduction in DNA (did not attend an appointment) rates and greater patient satisfaction with service provided on repeat scoping.” (Female NHS dietician, Band 6)

3.4.4.4 Evidence for the programme theory

Although many of the examples provided illustrations of all four steps in the programme theory (described below), this third testing phase was successful as it provided examples to further evidence for Step Two (motivation to learn). This step yielded the least evidence from the literature review, however Step Two come across more clearly in the individual accounts of CPD. Below is an example of becoming aware of a learning gap which supported motivation to learn (Step Two).

“While preparing a teaching/mentoring session for a student on patient assessment and in particular to respiratory assessments, I became aware that my skills and knowledge contained gaps [Step Two]. Using text reference (Macleods) and various online resources including ‘you tube’ patient assessment videos, I began to have a more in depth understanding of some aspects of these assessments. While some could be considered more primary care tools than emergency care, our role is changing, and I found these resources
very useful in increasing my level of knowledge [Step Three]. I have since studied more systems assessments in the same way [Step Three]. This has allowed me to do 3 things: Improve my patient assessment techniques, becoming more thorough. Pass this knowledge on to my students Communicate more effectively my findings to other Health Care Professionals when handing over care or referring patients on to other pathways.” (Male, NHS paramedic, band 6).

The following quote illustrates aspects of the programme theory such as the importance of checking knowledge to increase motivation to learn (Step Two) and targeting the learning at those in need (Step Three). We noted that individual CPD starts with knowledge of a patient related problem; this could originate from the organisation, the team or in some cases the individual. In the latter case, this could be addressed via individual CPD, rather than via commissioning of education or training at organisational level.

“Review of productivity and quality of care delivered in community team. Involved completion of ‘proving our worth tool’ as well as peer review tool reviewing care delivered to patients. Results outlined good practice, which was celebrated and shared; also, where staff were less effective and not discharging patients [Step Two]. Patient facing time was reviewed as well as percentages of clinical time spent on administration tasks. Staff comments were embraced, and opinions captured to review issues around effectiveness and safety. This work enabled the team to recognise training needs for junior staff [Step Two] and the need for further peer review and sharing best practice in the department. Action plan included new pathways to ensure discharge of patients [Step Three], outcome tool development and pilot, use of telehealth being piloted in care homes [Step Four] and increasing capacity of band 5 and band 3 staff in the teams. Additional admin functions were introduced to ensure that clinician’s time was put to best use. This was shared with senior staff and the executive team [potential to redirect to Step One].”(Female dietician, NHS, Band 8b)

The following quotations illustrates several aspects of our programme theory to support the benefits to patients, as defined by our three key patient outcomes.

Improved patient satisfaction

“Researched into the benefits of patient self-management of MSK conditions [Step Two] with relation to telephone triage and supporting the patient in ongoing management with follow up calls and information on advice and exercises verbally and by email [Step Three]. I then prepared a presentation based on my findings and presented a 1 hr CPD session on self-management to my team [Step Three]. This resulted in an increase in my own self-management treatment levels and those of my colleagues. Choosing appropriate patients for this process rather than face-to-face treatment was presented
and included the exclusion of patients with red flag symptoms or other complex problems to make the process safe for patients [Step One]. The presentation included appropriate follow up plans and information to be given to patients on what to do if their symptoms changed [Step Three]. This was also linked to scoring on measures such as mymop and StartBack to help with patient selection. Increasing supported self-management levels for appropriate patients led to increased patient satisfaction with receiving good information, a choice of treatment options, convenience (avoiding time off work for attendance face to face), good outcomes and support by telephone as needed. Offering this option to patients as a choice helped empower them and gave confidence to self-manage now and again in the future for recurring problems. Feedback as suggested good patient satisfaction levels [Step Four], as they know that they can have face to face treatment if they prefer or if their condition changes. Self-management is recommended in best practice guidelines for patient benefit when used appropriately. My research of current documents on the subject and my presentation have all helped my team improve the quality of decision making, selection and support for patients [Step Four].” (Female physiotherapist, private, band 6)

Improved patient experience

“Attended a Listening to Learn conference [Step Two], identified again the importance of starting as early as possible with good aids / cochlear implants and establishing good listening attitude and performance - using the deaf child's immediate family to support any interventions. Shared ideas with other SLTs and audiologists [Step Three] and TODs across the world and the consensus is for early intervention involving the family at every stage. Took this back to my departmental professional clinical lead and discussed within a small group of clinicians [Step Three]. Agreed to resume early interaction / preventative types of groups and 1:1 home based interventions [Step Four].” (Female, speech and language therapist, band 7)

Increased patient safety

“Attended over the last year regular monthly multidisciplinary planning meetings for high-risk children to reduce hospital admissions [Step One]. This enabled me to learn about health issues that impact Occupational performance [Step Three]. Identified ways to address them jointly and speedily to reduce the impact of health on wellbeing. This has reduced hospital admissions and enable much more efficient solutions, less waiting time and frustration for parents [Step Four]. Increased patient safety. Improved communication with parents and professionals who were working in isolation. Reduced the amount of follow up people have to do saves time. Increased school attendance” [Step Four].” (Female occupational therapist, NHS, band 6)
Increased clinical effectiveness

“I attended a CPD course that explained how to use a sleep system to avoid hip dislocation in children [Step One; problem identification]. So, for us it was the number of children who had dislocated hips [Step One; problem identification]. We bought 60 off the company and including a number of cot size sleep systems. I can say the whole team was committed to using them at the time [Step Three]. This is complicated by the severity of their condition so the more severe are at greater risk [Step One]. This was the first sleep system we were aware of, others are now out there possibly better now. Our aim was to introduce a sleep system to all children at risk of hip dislocation. It is very difficult to make changes in practice as one person, therefore send at least two on a course [Step Two]. Bring the training back to your colleagues [Step Three] and arrange IST from the people operating the new system if possible, especially where there is going to be a substantial funding requirement [Step Three]. All staff must be committed to making the changes if the funding outlay is to be justified [Step Four]. Monitor progress so that the any changes can be captured [Step Four] (Female NHS Physiotherapist, Band 7)

“I attended and contributed to workshops on dysphagia [Step Two]. These were attended by nurses, health care assistants and patients and delivered by the speech and language therapist and myself (dietitian). Within this workshop, we describe the signs of dysphagia, safer swallow strategies, show a video of video fluoroscopy, describe textures and allow the audience practice with thickening fluids” [Step Three]. (Female dietician, NHS, Band 6)

“The benefits to:

a) staff were that they could understand the rationale for thickened drinks and texture modified meals [Step Two].

b) patient requiring the texture modification, it keeps them safe and [Step Four]

c) other patients sharing the ward, it helps them understand the rationale for the modification and will prevent them from offering unsuitable textures to their peer and support him with his meal choices.

These workshops evaluated very well, and there has been a reduction in chest infections for the patient, keeping them safe [Step Four] and there is no embarrassment for the patient to make up thickened drinks in front of the other patients and the patient does not feel isolated/different when he receives 'different looking' meals, quality of life” [Step Four]. (Female, dietician, band 6).

Evidence of use of the Steps within our programme theory from self-learning to impact on practice as a social worker.

“As I had transferred from working with Children and families to now working with Adult Social Care (Safeguarding adults Team), I was aware that there would be gaps in my knowledge in terms of being able to make sound judgements and achieve best outcomes,
[Step Two]. I needed to research particular aspects of my new role. As an example, I needed to learn more about 'capacity', by assessing the maximum amount of information that someone can contain in order to make personal sound decisions [Step Two]. By ascertaining someone's capacity will determine, not only that they can make practical everyday decisions for them self but also making safe decisions about all aspects of their lives e.g. financial, health and personal safety. Therefore, by undertaking research in this area I was able to identify what I needed to do in terms of finding out what the law states about assessing mental capacity. I was able to undertake on-line research and found lots of sites with lots of information. The one that I found useful was a site that gave a ‘brief guide to carrying out capacity assessments and what the core principles were. I found this extremely helpful in enhancing my practice skills, in terms of having an understanding and insight of what capacity is and what to take into account when assessing capacity [Step Three]. I have utilised this research into practice and it has enhanced my confidence in this area in regards to helping individuals have a voice where others have suggested individuals were unable to do so.” (Female, social work, Band 6)

Summary of key messages from Testing Phase 2

The Four-Step programme theory was tested further using data collected from HCPC registrants using an online survey that provided over 600 examples of CPD that benefited patients in terms of patient safety, clinical effectiveness and patient experience. We noted that some of these accounts assumed patient benefit, rather than provided direct evidence of it. However, this data serves to further support the programme theory with illustrative content where individual learner-level perspectives (the health or social professional) make the links in the transfer of education to patient benefit. This phase of testing offers this narrative, which is largely provided only in summary form in the literature.

The data presented here offers clear accounts of evidence that transferred to patients both as an individual learner-led activity, and via the team. We identified support for our refined programme theory, and in the detailed exemplars, it was possible to see all of the Four-Step programme theory. Specifically, evidence of Step One (education or training is initiated and is designed to demonstrate patient benefit) was at times initiated by the individual rather than at the organisational level, as individual awareness of a problem was at an individual patient level, rather that the higher organisational level.

We also found more evidence of Step Two (the learner is motivated and ready to learn) within the individual accounts, where it was not always possible to identify learner motivation in the literature review or the case studies. This has allowed us to further substantiate Step Two, as well as provide further examples of the whole journey through the steps, demonstrating that CPD as an individual educational activity has the capacity to benefit patients, and can be described by the transfer of learning model.
3.5 Final Transfer of learning for patient benefit model

The Four-Step model presented below (Figure 5) illustrates the refinement to the programme theory following analysis of the case studies and survey data from Testing Phases 1 and 2. Much of the realist synthesis reported evidence that begins with organisational involvement in the initiation of training (Step One). Whilst this reflects an ideal process of reaching patient benefit, working through the Steps sequentially (yellow arrows), the case studies have highlighted that the process for individual learners can start at any step. This will then loop back to other steps, as summarised below.

Step One to Step Three (pink arrow):

Although the literature suggests mandatory training enables all learners to attend training, this may mean that some learners will begin training without having motivation to learn, therefore some individuals may progress without Step Two. However, this can lead to the scenario below.

Step Three to Step Two (blue arrow):

Gaining motivation to learn (Step Two) may not always be achieved prior to training (e.g. through problem identification, perceived relevance, incentives). However, motivation can be achieved during and as a product of the training session, and is represented by the blue arrow back to Step Two, prior to the desire to apply the learning (Step Three).

Step Three to Step One (green arrow):

As discussed in section 3.4, we have identified that individual CPD may begin at Step Three, but transfer to practice can be challenging (without organisational commitment or resources). The green arrow on the model illustrates how an individual or team may need to gain organisational commitment (Step One) before learning can transfer to practice.

Step Four to Step One (purple arrow):

The purple arrow illustrates a scenario where an intervention was piloted on a small scale prior to organisational rollout. However, the organisation needs to be aware, committed and apply the resources to further rollout (purple arrow back to Step One). The model also illustrates how culture change can occur at Step Four, meaning that other staff adopt the changes. For example, the literature evidenced how newcomers arrived and followed the new hand hygiene practices although they were not part of the educational intervention.
Transfer of Learning for Patient Outcomes Model

What was the outcome for patients?

Figure 5. Summary of the Four-Step model illustrating how education and training of health and social care staff transfers to practice and benefits patients
3.6 Test Phase 3: Linking of routinely collected Trust level data

3.6.1 Aim

To use routinely arising Trust-level data to evaluate to what extent workforce and educational factors were associated with patient outcomes and experience.

3.6.2 Methodology

Suitable data were not available from the Hospital Episode Statistics to populate and test elements of the model (as originally intended). However, national data, at Trust level, from England were available. At the time of the study data from 2015 was used as it was relatively complete by that stage. The data was managed and linked (often Trust names were not expressed identically between linked datasets). Initially it was intended that these data should be used to populate and test the overall model we developed of educational environment and patient outcomes (see below, Figure 6). Even though these analyses were not directly linked to known educational interventions they were considered important for two main reasons. Firstly, many of these routinely collected indicators relate to both a Trust’s educational environment as well as wider workforce issues. Secondly, considerable resources are devoted to obtaining these data- if such exercises are valuable then some relationships with patient outcomes should be observable at a proxy level.

On exploring the data, it was clear that many of the anticipated relationships were not statistically (or educationally) significant. Therefore, a data-driven approach was taken, whereby the potential relationships between the indicators and the available patient-relevant outcomes were evaluated. The three patient outcomes explored were:

- Trust Summary Hospital Mortality Index (SHMI) – a clinical effectiveness measure.
- Hospital infection rates (rates per bed days); Methicillin-resistant Staphylococcus aureus (MRSA) and Clostridium Difficile (‘C.Diff’) – patient safety measures.
- Patient’s Friends and Family Test results (FFT) – a patient satisfaction measure.

National data, at Trust level, from England were available. At the time of the study data from 2015 was used as it was relatively complete. The distribution and nature of outcomes were explored in order to optimise their use within the statistical modelling as follows.
3.6.3 Patient outcome measures

Clinical effectiveness - Trust Summary Hospital Mortality Index (SHMI)

The SHMI values tend to discriminate between Trusts at the lower end of performance. That is, SHMI is a marker where the information can be contained at the ‘lower end of ability’. The distribution of Trust SHMI values is shown below in Figure 7.
Figure 7. Distribution of Summary Hospital Mortality Indices (SHMI) from 2015 for the Trusts used in the modelling

This assumption was evaluated by exploring how the SHMI values behaved in relation to the mean Care Quality Commission (an independent regulator for health and social care services in England, who also monitor and inspect healthcare providers) ratings (for 2015)- a metric noted to be associated with SHMI in the initial exploratory analyses (see later). The SHMI values were divided into quartiles with 33-35 Trusts in each band. It was found that when the lower two quartiles (i.e. Trusts with SHMI values lower than the median) were collapsed the three levels behaved as ordinal indicators (that is, ordered categories). More specifically, when an ordinal logistic univariable regression was performed predicting SHMI category from the mean CQC rating, on formal statistical testing the ‘proportional odds’ assumption was not rejected in Brant testing ($\chi^2=0.91$, $p=0.63$). That is, the odds of being in category 2 vs category 3 should be roughly equivalent to category 1 vs 2 if the outcomes are to be treated as ordinal in nature. Thus, these categories of SHMI (1 or 2= ‘good’, 3=poor and 4=‘v. poor’) were treated as ordered categorical outcomes in a series of ordinal logistic regressions. As further evidence for this approach, the relationship with mean CQC rating and SHMI was more highly statistically significant when SHMI was categorised in this way, rather than treated as a continuous metric in a linear regression ($p=0.03$ vs $p=0.12$).

Patient safety - Healthcare Associated Infections (HCAIs)

The distribution of MRSA and C.Diff infection rates (rates per 100,000 bed days) were skewed, but approximately ‘log normal’. That is, when a log transformation was carried out the log rates were roughly normally distributed. These can be seen in Figures 8 and 9 below.
Figure 8. The distribution of (log) MRSA infection rates in the Trusts in the study

Figure 9. The distribution of (log) Clostridium Difficile infection rates in the Trusts in the study

Patient satisfaction - Patient Friends and Family Test (FFT)

In this case, as most responses were positive, the information was assumed to be mainly concentrated in the ‘negative results’. That is the proportion of respondents that would not recommend the Trust in question as a place to receive care. Again, these percentage responses were log transformed so that they approximated a normal distribution (see Figure 10 below).
3.6.4 Analysis and interpretation

We have used the terminology of the model in Figure 6 throughout this chapter, as this was created to reflect the data sources potentially available for use. The limitations of the data restrict significant meaningful interpretation: the univariate analysis does not control for the effects of other predictors or confounders. Only a few of the predictor measures directly measure any form of education, and some are completely independent of an educational intervention: we cannot know what educational influences have been at play.

The results of this analysis are presented in Appendix 18. They highlight that, while educational context and environmental factors (factors included in Step One of the programme theory) are relevant in the generation of patient outcomes, the dearth of available educational data limits the ability to consider the predictive validity of such factors. Because of the restricted use of this data in the development and utility of the programme theory, we summarise the evidence below and highlight the challenges faced in utilising national data for examining the effectiveness of education.

3.6.5 Discussion of our analysis exploring routinely collected Trust level data

We used national data, not directly linked to an educational intervention, to explore whether hints of our model could be identified using indicators of the educational environment and wider workforce issues and some focused patient outcomes. Clearly without evidence of an educational or training intervention, that was at organisational level, the analysis would be weakened, and evidence of our detailed programme theory linking education to patient outcomes was unlikely to emerge. Nonetheless, we conducted numerous analyses to determine if evidence to support our model could be identified in these proxy indicators. Overall, there was no evidence to support our model by making assumptions about an educational intervention on this scale and from using this
The main weakness was the assumption that the included data could be isolated and linked to patient outcomes. Even data from the NTS survey, following medical training, could not be linked to broad organisational data where care was delivered by a team rather than solely by medical trainees.

3.6.5.1 Indicators of clinical effectiveness

Our main findings regarding educational and workforce indicators in relation to SHMI, were that: CQC rating (responsiveness), the staff friends and family test (proportion not recommending the Trust as a place to work), the NHS staff survey regarding the levels of perceived discrimination, and the GMC NTS average rating for out of hours clinical supervision, were all statistically significant and independent predictors of the patient outcomes. However, the direction of association was inverse for the perceived discrimination, in that Trusts with a larger proportion of staff perceiving discrimination having, on average, lower (more desirable) SHMIs. This somewhat counterintuitive result could be explained as follows: large, central, ‘teaching’ hospitals that are highly specialised and are generally better resourced tend to have superior patient outcomes. However, staff working in these environments may perceive them as more discriminatory. It is well known, for example, that BME and overseas doctors have traditionally been concentrated in less desirable jobs and specialties (such as general practice and psychiatry), especially in areas of deprivation.

The staff FFT domain relating to a Trust as a place of work was more strongly and independently predictive of SHMI than one to receive caring (patients FFT). This is likely to be because staff have more insight, generally, and what environment is like to work in than how it is to experience care as a patient there. It is also worthy of note that the NTS item related to satisfaction with out of hours supervision for medical trainees was independently associated with SHMI. There has been much recent research, and indeed controversy, over the ‘death at the weekend’ effect and it is yet to be firmly established the extent to which the observed mortality for patients admitted outside of normal working hours is related to ‘case mix’ in contrast to staffing. Thus, it is quite plausible, that organisations that provide better support to medical trainees in dealing with patients admitted out of hours, who on average are sicker and less likely to have accessed primary care effectively, may experience better patient outcomes. This is worth further investigation.

In terms of the specialty specific GMC NTS survey results there was an interesting pattern noted in relation to SHMI as an outcome. That is, most of the strongest predictors of low SHMI were related to the specialty of medicine. This is of particular interest, as much of the mortality that occurs in hospital trusts will be related to the care of patients on medical wards, who are often elderly and have multiple morbidity.

3.6.5.2 Indicators of patient safety

Relatively few associations were found between these workforce predictors and hospital associated infection rates. Perhaps the only notable associations were the independent effects of both NIHR
research activity and workforce sick leave rates on the prevalence of Clostridium difficile infections. It may be that more research active organisations are open to changes and innovations in practice that reduce the spread of this bacterial infection. It is also possible that at least some of the sick leave amongst staff may be due to a gastrointestinal infections, including those with C.Diff.

3.6.5.3 Indicators of patient experience

There were a number of independent predictors for patient FFT results. However, these varied in the directionality of the association. All except one of the independent predictors were scores from the NHS staff survey. Increased perceived discrimination, better support from managers and staff feeling they could contribute improvements were all associated with higher proportions of patients not recommending the trust as a place to receive care. In contrast, staff reporting experiencing bullying from other staff, staff being satisfied with their responsibilities and those reporting effective processes reporting errors were associated with more positive patient FFT results. Some of these observations were obviously counterintuitive. It was also interesting to note that, again, the NTS survey item related to out of hours supervision for medical trainees was also associated with more positive patient FFT feedback.

3.6.6 Limitations

In this analysis, an adjustment for multiple testing (e.g. a Bonferroni correction) was not applied. This was for several reasons. Firstly the Bonferroni correction has been criticised as too stringent in many circumstances. Secondly, when considering building multivariable models to strict correction we have excluded almost all the initial variables from being entered into such models. Lastly, it is often the clinical (educational) significance of associations that have intuitive interpretation that is more important than the magnitude of the p value associated with the result. It should also be considered that many of the indicators, both as predictors and outcomes, would have been markers of ‘low quality’ of Trusts, rather than being able to discriminate accurately between well performing trusts. This is almost certainly due to a lack of variability at the other upper end of these metrics. Thus, many of these could be considered ‘amber’, or even ‘red’ warning lights, reflecting the underlying health of an organisation, indicative of Step One and the organisation’s readiness to support change through education.

3.6.7 Conclusion

The exercise of attempting to explore associations between educational indictors and patient outcome measures has been challenging and of questionable value. The metrics and data available no not provide adequate evidence of education, except perhaps the GMC trainee survey. What this has highlighted is the need for improved Trust level, or national level data, that can be linked. This would be of value to those aiming to demonstrate the value of education and training.
Summary of key messages from Testing Phase 3

Given the amount of resources devoted to collecting the metrics used in this analysis it is disappointing that so few demonstrated clear associations with patient outcomes. This calls into question the value of some of these data collection exercises. However, there were a number of key markers that indicated independent predictive abilities for SHMI. In particular, those Trusts that were reviewed by the CQC as responsive, those where the staff themselves would recommend the Trust as a place to work, and those where trainees felt themselves well supported out of hours were more likely to have low adjusted patient mortality rates. It was interesting that whilst Trusts that had a high degree of participation in NIHR supported research were associated with low adjusted mortality rates in the universal analysis this was not an independent effect. Therefore, it could be considered that participation in research could be a marker of a Trust’s ‘responsiveness’ through willingness to engage with innovation and change in practice (as in Step One), which could contribute to better patient outcomes.
4 Discussion

The primary aim of this study was to identify how education and training can transfer to practice and benefit patients (increased clinical effectiveness and patient experience or error reduction). This is of interest both nationally and internationally within health and social care service delivery. It is also of interest to the academic community, and adds to the knowledge base both theoretically and practically by providing an evidenced based model of how educational resources targeted at staff, can be facilitated to benefit patients.

The research presented in this report reflects four years of development work, refinement and testing of the final model. The realist approach we used in this research permitted us to develop and test a theory that has explanatory power in terms of what needs to be in place to facilitate the education and training of the health and social care team to reach and benefit patients. Realist methodology explains what works, but in addition how, when and why it works. It provided the detail required to unpack a complex intervention.

In the first phase, we conducted a systematic literature search, which returned over 24000 papers, of which we reviewed over 1100 full papers, and ultimately conducted a realist synthesis of all 368 papers of the included papers. The included studies identified both health and social care settings. However, the interventions in social care settings largely targeted health care outcomes. Following extensive analysis, discussion, and engagement with external partners (our expert panel, patient reference group and Think Tank); we iteratively developed a programme theory to explain how learning can be facilitated and transferred to patients. We closely examined 51 of our included papers, as they included rich and detailed process information for in-depth analysis. This process led to a refined, four step programme theory. We explored case studies, as examples of real life interventions to test the programme theory, and this highlighted that the programme theory is not linear but is more fluid in nature. For example, evidence from individuals and teams who engage with problem identification and good educational interventions then inform Step One and encourage the organisation to commit to the issue. We also identified that Step Two (motivation to learn) can be reached during Step Three (desire to apply the learning) particularly if the education or training is mandatory. Lastly, culture change occurs when individuals, not exposed to the intervention, join the organisation and adapt to the new practices. The Bhojani et al.(140) study illustrates this, and reported that the new Senior House Officers (SHOs), who joined the unit after the intervention (hand hygiene), had been running for some months, had a higher compliance rate (46%) than the previous SHOs who had a lower baseline (14%). We also explored quantitative indicators of educational metrics by linking them to patient outcome data. However, without clear evidence of an educational intervention, this exercise added no value.

In realist methodology, reference to a ‘black box’ is common and refers to the often-unseen mechanism,(122) which triggers the outcome. In health and social care education, the attribution of patient outcomes to education has taken on a mythical quality, because of the complexities in evidencing this link. However, the work presented in this report details in some granularity that
evidence does exist for this link, and that educational bodies and training organisations have been achieving health outcomes for patients because of staff education and training. Therefore, it is now possible to demonstrate these links, not with a single step, but with a complex chain of steps, which facilitate the process. The final programme theory offers a practical model for commissioners, managers, educators, and evaluators of health and social care education.

The model demonstrates that the context of an educational intervention is at least as important as the intervention itself. Evidence suggests that only when the complete learning sequence is followed, can the benefits be transferred to patients. Each step in the model facilitates achievement of the next outcome in order to get closer to transfer of training into practice for the benefit of patients. Our aim was to identify a model that could explain most of the data and account for most scenarios, but as with any research, we expect there will be rare exceptions not identified.

The model identified and put forward intends to facilitate decisions around the initiation of an intervention, funding, management, and evaluation. Below is a summary of the key messages in each step, the challenges faced in this research and how to use the model in practice with guidance firstly for commissioners, managers, and educators and secondly for academics and researchers.

### 4.1 Summary of the Four-Step model

**Step One: Education or training is initiated and is designed to demonstrate patient benefit**

The organisation needs to be open to new education and training that is aligned to strategic goals (this could be awareness of an existing problem or concern), best evidence, and quality improvement. Most initiation of education and training occurs as a result of developing partnerships with trainers and educational providers. In line with this, partnership working should be encouraged especially where teaching faculty and knowledge resources can be shared.

The implementation of education and training should be led and carefully project managed over the long term. This entails clarity on the service issue the intervention is intending to improve and a precise definition of educational or training objectives. It also requires consultation with all stakeholders to ensure the fit between the staff and patients with the intended objectives of the intervention, and to ensure that the resources to support the intervention are identified and procured. Monitoring and evaluation should be directly related to the aims and objectives of the intervention and have the capacity to detect a patient benefit. Senior management can play a key role in supporting the initiation and roll out of education and training by being influential change champions and overseeing project management. This step also involves ensuring the intervention is targeted at patients who are likely to benefit from the staff training/learning.

**Step Two: The learner is motivated and ready to learn**

Practical barriers, such as workload and staff shortage, or personal barriers such as cost or time to travel, must be overcome through planned participation, funding and to use venues that are easily
accessed. Staff participation in education or training can be increased if made mandatory (for those with little autonomy or inclination). Mandatory training also conveys the importance of the training, and will result in a greater (or critical) mass of trained staff, which should enhance transfer. Participation will likely increase further by motivating staff. Motivation can be promoted if staff recognise the relevance of the educational intervention and subsequent learning to their job role, the benefits in terms of personal development and its importance in terms of patient care. Recruitment strategies should ensure that the training is appropriate to the job role and grade.

Step Two includes the role of appraisal, personal development planning and consideration of how the training will be used to enhance individuals practice and service delivery (also supported by the PPI Think Tank). It could be possible that if Step Two is not achieved, trainees may still progress, i.e. have low motivation to learn initially, but following mandatory training become aware of their training need and have the desire to apply the learning (Step Three) but during the training become motivated to learn (Step Two).

**Step Three: The learner learns successfully and has the commitment and desire to apply the learning**

There are several considerations for trainers, to ensure that learning has the desired effect on learners. Ideally, trainers should ensure that an assessment of learning needs is made and fed back to learners to help them engage with the curriculum. Teaching and learning are optimal when focused on current and desired performance and are delivered using engaging and varied teaching methods.

Learners need to learn, but also have the desire to apply their learning in practice: the output of learning is the learner’s commitment to make specific changes on re-entry to the workplace. Time spent focused on action plans can engender this commitment and support transfer of learning. Mentoring and coaching learners can support them to bridge the gap between learning and new practice in the workplace and can help learners in their commitment to applying their learning.

Learners need to be prepared to challenge their current practice and learn what they need to do to improve their performance through feedback, reflective practice, and assessment. Successful learning will involve knowing what to change, but also how to make changes to practice and service delivery.

**Step Four: Learner has the capability and transfers learning into practice**

Learners need to have the ability, confidence, or sufficient prior experience to deliver complex new skills. If learners have a support structure (learner networks, peers, managers, influential change champions), it will help them develop their practice and maintain momentum for change when they return to the workplace, preventing relapse to pre-training practice. Ongoing monitoring of the needed change will also aid this momentum. Staff ownership of the intervention will increase learner desire to persist in the face of difficulty and is more likely to lead to long-term change.
Training whole teams increases cohesive working and communication, and reduces resistance to change. Sharing knowledge and experience back in practice increases team commitment to change.

Barriers to transfer include poor organisation around implementing new practice, time pressures and workload (which cause competing demands), and complexity of the intervention (leading to potential resistance). These can be addressed if the intervention is embedded in systemic change to reduce resistance and instil a new way of practice.

4.2 Operationalising the model and dealing with resistance

The focus on process flow, with clear links between the outcomes of each step from initiation through to patient benefit is important. For example, if elements in Step One are not present, then there is a reduced likelihood that the need for training will be recognised, and training may not be initiated (Step One outcome). Failing to observe the need for the training may not stop the process of initiation, but it may curtail the general effectiveness of the intervention, which may lack organisational support and commitment, as well reduce the spread.

If the staff are not motivated to attend and learn (Step Two outcome) then the training is not targeted at the right staff or they may not recognise its importance, relevance, and benefit for them, their practise, and for patients. A low level of motivation to learn will lead to staff responding with less interest, attention and energy and they will apply fewer resources to learning. Low pre-training motivation is associated with poorer learning outcomes, and the effects of training may not be achieved and may fall well short of reaching patient benefit. If training is not effective and does not facilitate action planning to prepare for transfer, then staff will not learn successfully and will not feel motivated to transfer any learning to the workplace (Step Three outcome). If learners emerge from training feeling motivated but transfer of the learning is not supported or embedded in systemic change, and there is no monitoring of performance, then transfer may fail (Step Four outcome).

It is also important to note that even if the outcome of Step Four is achieved (transfer of learning), this does not automatically result in a positive patient outcome. Positive patient outcomes are also dependent on well-targeted interventions. For example, we acknowledge that not all staff may adhere to strict training protocols in practice and patients may not comply with all the guidance from health professionals, leading to a lack of patient benefit. The study design and outcomes selected to demonstrate patient benefit may fall short, and may fail to show an effect of the intervention. However, the model does seek to overcome such barriers. For example, in Step One, if patient consultation does not take place and patient needs are not assessed, this could hinder the effect of the training, even if the learning was transferred. Patients can be resistant at the point of transfer, often not understanding or seeing a ‘hook’ for them to change behaviours.(70) Therefore, such issues need to be factored into development and planning to ensure effectiveness (Step One). Policy and the environment within healthcare are forever changing; therefore, we are not always prepared for such barriers to transfer and ultimately patient benefit. The importance of addressing logistical issues are discussed in Step Four.
It is important to note that although the steps in the programme theory are presented linearly, they will not always progress in this exact order. Instead, there may be feedback loops throughout, which negatively influence engagement with subsequent training. For example, staff may experience poor training, or feel it is not relevant for their current role. This may then affect perceptions of future training opportunities (e.g. as being ineffective and irrelevant), which would influence individual pre-training motivation (feeding into Step Two).

4.3 The role of individual continuing professional development in transfer of learning

We identified that the Four-Step model works most effectively by starting with the full support, commitment and resources of the organisation, and working through the Steps. However, following further testing using the online survey of Health and Care Professions Council (HCPC) registrants, we were able to identify that patient benefit could be achieved via an individual learner, who is committed to learn and improve his or her own practice. For example, in the case of a singlehanded practitioner who is providing care to a single patient in their own home, one can see that barriers to transfer from other staff are not relevant as there is no-one there to hinder or obstruct their transfer to practice. However, the model also highlights that most of the resistance to change following individual CPD will be at team level during Step Four. For example, if only one member of a team has the commitment to transfer new learning to practice and others have not had the same training and have no desire to change practice then change will not take place, or is less likely to.

In Case Study 4, which described the implementation of the Professional Practice Awards, the process started with individuals who tested out their ideas in practice and once evidenced, the organisation developed interest and became committed to implement it. The Laundry Manager illustrated this in her PPA project. She aimed to reduce infection rates by sourcing a fabric that reduced the retention of dust particles. After presenting her evidence to the Director of Nursing, the Trust made the decision to invest in new curtains throughout the hospital trust. This illustrates that an individual can transfer his or her own learning but this involved looping back to the organisational stage (Step One) to have impact on a larger scale in the organisation.

Another example of individual learning comes via the regulator the HCPC. The HCPC have set out CPD Standards and one of these states that CPD should benefit patients. In previous research commissioned by the Department of Health, the authors asked registrants (via an online survey) to provide details of CPD they had done which produced patient benefit.(136) The registrants provided over 600 examples of such CPD, but evidence of transfer was largely at team level, showing that the team were all committed to change. For example, a physiotherapist reported learning about a sleep system, which would stop children’s hips dislocating. This lead to the physiotherapist informing the team and to the Trust purchasing 60 sleep systems for use with children at risk of hip dislocation. In addition, at our Think Tank event one of the questions asked ‘How can we ensure that Continuing Professional Development (CPD) benefits patients?’ The discussion helped us identify that achieving patient benefit following individual CPD is challenging due to team resistance to change, but achievable if the individual can convince the team or organisation to change as illustrated above by the examples of the Laundry Manager and Physiotherapist above.
These examples illustrate how individuals who have reached Step Three (desire to apply learning) can loop back and trigger Step One at the organisational level and guide whole-team learning and spread to ensure staff education or training benefits patients. A department may pilot an intervention, and when successful, the organisation provides the resources to change practice on a larger scale. Thus, we were able to revise our model, still using the Four-Steps, but illustrate that patient benefit could be reached by starting at any of the Steps, sometimes looping back to another Step before progressing further. Thus, we were able to revise our model, still using the Four-Steps, but illustrate that patient benefit could be reached by starting at any of the Steps, sometimes looping back to another Step before progressing further.

4.4 Challenges in model development and testing

The challenges that we faced were in part due to the quantity of evidence identified, but also the result of the chosen methodology and combination of these factors. The papers included in the review covered a large range of topic areas, patient outcomes, training styles, specialties, professionals and patients. The complexity of the realist approach meant that the process of analysing this large data set was not always clear, particularly in the early stages of developing and testing our initial framework. Many discussions took place throughout and ongoing analysis fed into theory development and refinement. Keeping note of these discussions and memo writing helped to ensure transparency, and build, and test our programme theory. Memos were also important at the analysis stage for keeping CMO links clear and to record researcher’s thoughts and ideas about our developing theory. Meticulous recording of the decisions made was also crucial as there were several researchers involved in the analysis.

Initially, the realist approach required the research to make assessments-based on understanding of the relevant theory and on reviewers’ expertise and knowledge, before patterns became evident by immersion in the data. The realist approach is iterative; therefore, early papers needed reassessment and recoding to inform the final programme theory. At times progress was slow and uncomfortable, and the research later needed to return to earlier coding to review decisions made and ensure that coding reflected the most up-to-date iteration of the programme theory. However, this acted as a quality assurance stage as well.

It could also be argued that our use of key papers added a level of subjectivity. As we chose papers with more process information to enable us to illustrate and evidence the stages of the model with clear detailed examples. Including all 368 papers in a realist synthesis was neither feasible nor desirable, where the aim is to reach data saturation when sufficient evidence is identified to build the theory (discussed with a realist methodology expert; Geoff Wong). Theory building from the published literature was often hindered by traditional reporting conventions, where only the intervention and outcomes are described with no explanation of how one leads to the other. Choosing key papers meant that we were able to analyse each of these papers in fine detail and discuss them as a team. In addition, the process of analysing these 51 papers identified and informed gaps in the emerging model. Every included paper was originally analysed in the same way and fed into the development of the programme theory. The in-depth analysis of the key papers
initially shaped and then refined the model, as did the case studies, survey data, PPI group and Think Tank all of which facilitated further testing and refinement of the programme theory.

The realist approach of identifying a candidate theory, searching for patterns in the data and developing a programme theory to explain all of the data was at times challenging, particularly as this involved further evidencing and testing. Other challenges were seeing how CMOCs were linked; this link often having to be inferred from initial theory or additional data collection (realist approach requires this and can be viewed as a strength). Mechanisms were at times missing from the literature or not always clearly evidenced, but could generally be inferred from the data. However, previous experience using realist methods gave us understanding about the nature of the realist approach and its explanatory strength. There were also instances when it was difficult to decide whether the data should be termed a context or a mechanism and where data fitted into the steps, highlighting an initial level of subjectivity in the theory development process. However, having a framework supported the process and helped to overcome concerns about subjectivity. Regular and ongoing discussions also took place within the research team and with realist experts who supported the study during its development.

The PPI reference group supported and facilitated the development of this research throughout. Asking questions and challenging us to think about the development of our programme theory. However, the major contribution of the PPI reference group was to highlight the importance of revising our model from a Five-Step to a Four-Step theory which saw the final fifth step moved and incorporated into Step One. The argument focused on the importance of having a patient focus at the start and where possible patient involvement (further emphasised during the Think Tank). This change supported other developments, such as, the inclusion and measurement of patient outcomes right at the start of any intervention to ensure it is well targeted. Further testing of the Four-Step model followed from the literature, case studies, CPD survey and Think Tank.

4.5 Equality and Diversity

The review of literature was inclusive of health and social care professionals who have direct contact with patients as part of their role: we do not consider that our approach or methods directly discriminated against anyone who fits this criterion. However, given the size of the search, we did exclude from our list of specific search terms, job roles that we considered had minimal contact with patients. These may be members of the non-clinical team (e.g. porters, laboratory technicians, physicists), as we needed to maximise the impact of education on patient care. Although we acknowledge that everyone in the health service have important roles to play, our decisions were mainly an attempt to find the “best evidence” in realist terms, without oversampling. That said, many of the interventions on which we report are of whole teams, or even organisations. If this captures a wider team membership than our specific terms, we consider that to be additional value to the research and to patients.

However, on the substantive issue of education and training health and social care staff in equality and diversity, we sought to sample for it in our search terms, to identify any interventions in that
area. Our original search terms were based on Department of Health’s five Education Outcomes Framework domains, one of which was “widening participation”. Therefore, we included terms related to equality and diversity (“workforce diversity”, “workplace diversity”) to explore training and education that met organisations obligations as employers who value diversity. Therefore, papers that delivered education with an aim to address this will have been included in our review. However, comparison between different groups was not a feature of our objectives.

Nonetheless, varying personal patient characteristics were attended to from the results of the review. One paper(73) trained primary health care workers in AIDS prevention, and was selected as a key paper. Another key paper(81) reported an intervention for patients with delirium who were over 65. Many papers were targeted at interventions for staff who care for the elderly or those caring for residential patients. Eleven papers reported interventions to improve care in children, including two key papers.(56, 70)

The patient reference group (PPI) who supported this research had diversity across age, race, gender, and disability, so views from these perspectives were consulted. We especially made a call for members who had experienced different parts of the health service, and different healthcare professionals, to reflect varying patient needs. Also represented on the group were two men from an HIV charity. No individual was asked about his or her sexuality. There were 65 participants at our Think Tank who came together to discuss ‘How can education and training of the healthcare team involve, reach and benefit patients? The think tank contained patients, patient representatives, undergraduate and postgraduate students, doctors, nurses, physiotherapists, social work, undergraduate and postgraduate educators, members from the General Medical Council and Health Education England, academics and researchers from UK, Ireland, Malaysia, US, Canada, The Netherlands, Taiwan and Australia.

4.6 Limitations of the research

There was an assumption that there would be little research linking education and patient benefit. In fact, we reviewed over 1100 full papers, and included 368 that made this link. However, most of the evidence was not in the educational literature i.e. the journal Medical Education, it was in specialist and health service journals. The model we have evidenced in this report has focused on how education or training can reach and benefit patients and drawn from published research that worked. Due to publication bias against publishing research that has failed, we may have missed additional instances that explain why interventions fail. However, where research has failed or partly failed we have included this in our synthesis (e.g. Christie et al.(70)).

Studies that focused solely on undergraduate and pre-qualification training were mainly excluded, as they targeted the student as the outcomes rather than the patient. We know that students can have a positive impact on patients and research examining the impact of longitudinal community placements reported on two studies that reported this and highlights that there is a need for more research in this area.(142) The included papers focused on formal training, which included an evaluation component, and therefore neglected informal learning and individual CPD. Therefore, we explored individual CPD using a survey targeted at HCPC registrants(136), asking them to provide an
example of CPD that had benefited patients and have included this in our model (also tested at the
Think Tank). However, although the Four-Step model was supported by the CPD data, we did not
explore whether the same mechanisms within the model were operational at an individual level.
Also, the CPD survey relied on self-report rather than external objective measures.

In many published studies, the training interventions were not fully described. In papers describing
experimental or controlled study designs, the ‘usual’, or ‘control’ condition (where an educational
intervention did not take place) was sometimes not clearly described, making interpretation of the
intervention arm challenging. In addition, there was at times a lack of alignment between the
variables the intervention intended to change and the actual measured outcome.(58) This relates to
the quality of the studies and is an important consideration when evaluating educational
interventions. With regard to both of these issues, we have suggested below (see section 4.10
that research should clearly evidence the link from education to patient benefit using agreed publication
standards.

The case studies were all conducted in acute hospital NHS Trusts, which may restrict the
generisability to other types of health or social care providers. However, case study four did
include social care staff. The case studies selected were diverse, including education embedded in a
Trust-wide ‘top down’ service improvement project, two workforce development initiatives, one
involving small scale ‘bottom up’ improvement projects, and one designed to support doctors
coming to work in the UK. There was also an opportunity to compare an identical course delivered in
theatres in two hospital Trusts located at opposite ends of the country. The strength of the
programme theory was that it was applicable to all settings and types of training studied and was
sensitive enough to identify similarities, differences and their consequences, even in the two
identical courses delivered by the same external trainer.

There were studies in the review that illustrated that the implementation of new training methods
(e.g. senior surgeons training juniors) which created no change for patients and did not report any
patient benefit, yet the outcome was positive (i.e. no negative outcomes for patients). Although the
realist review included a large number of surgical papers, none of which were included in the 51 key
paper analyses as they were lacking in the rich process information needed for in-depth analysis.
Training juniors to provide equivalent care and treatment for patients can also be a cost saving.
However no studies reported on this outcome, which was a limitation in the research reviewed.

The quantitative study explored whether hints of our model could be identified using indicators of
the educational environment and wider workforce issues and some focused patient outcomes.
Clearly, without evidence of an educational or training intervention that was at organisational level,
the analysis was weak, and evidence of our detailed programme theory did not emerge.
Nevertheless, this raises the possibility of introducing educational markers most likely to be
associated with patient outcomes. Another key limitation was due to the sheer number of indicators
and outcomes, and thus paired comparisons involved. It is therefore possible that some of the
observed associations and universal analysis, when taken as significant at the conventional level (p<
0.05), were due to chance.
4.7 Theoretical Contribution

This research makes several theoretical advancements. Firstly, it is the first literature review, which brings together the evidence on the impact of education and training on patients in health and social care. Our realist approach means that we have explored the data in detail, looking for both process and outcome data and provided a comprehensive and robust analysis of the evidence.

Secondly, our programme theory provides a process-focused approach (through the prioritisation of mechanisms) about how staff training can benefit patients. By achieving this, we believe we have contributed to the theory of learning transfer. Starting with Kirwan’s model of learning transfer, we have provided insight on the interactions between agents and processes, thus moving beyond Kirwan’s identification of associations.

The resultant programme theory offers greater detail about the features of transfer of learning, and extends the coverage of transfer of learning to encompass the conditions of initiation, as well as the impact beyond the learners practice. Oxman et al. (28) conducted a large systematic review of educational interventions and their impact on performance and health outcomes, thus being less discriminatory than our review on Kirkpatrick’s model of outcomes, which benefit patients.

Kirkpatrick (35) included some of these stages including programme initiation phase, by highlighting the importance of determining needs through enquiry with participants, the managers of participants, through to analysis of performance and outcomes. However, we build on this progression of events. Our work goes further than listing the activities involved, by explaining how the steps build up and how the mechanisms are activated. To articulate educational interventions in this way is to appreciate the complexity of interventions (34) from instigation to implementation and evaluation, acknowledging the highly heterogeneous and intricate nature of health and social care.

4.8 Policy and Practical Contributions

The model presented here offers several opportunities for the development of policy in the field of health and social care education. Firstly, it provides clear guidance about how to ensure resources spent on educational interventions do reach and benefit patients. Commissioners of education and training need to consider what patient outcomes should be targeted, and set up monitoring activities to check that goals are reached including awareness of the important steps needed to achieve the desired outcome. Secondly, our model also informs educators about how to design and deliver these interventions, and the important contextual factors that need to be in place to support a successful outcome. We also propose a set of messages below to guide educational and training implementation and separately we have proposed the development of publication standards to ensure future research provides evidence of transfer to practice. The benefits for patients, evident from our work, of a shared perspective and broad but flexible adoption of the model, applies across all healthcare systems.
In the UK, Health Education England has devised a Quality Framework, which contains six domains that reflect key components for quality in work-based placements for all staff groups: (1) Learning Environment and Culture; (2) Educational Governance and Leadership; (3) Supporting and Empowering Learners; (4) Supporting and Empowering Educators; (5) Delivering Curricula and Assessments; (6) Developing a Sustainable Workforce. The Quality Framework has identified important factors that clearly overlap with our model. For example, *Educational Governance and Leadership* (2) is reflected in our Step One (organisational awareness of a problem and commissioning education) but *Developing a Sustainable Workforce* (6) also includes the organisational awareness of the future educational issues as well as numbers. *The Learning Environment and Culture* (1) is important for Step Two, which is focused on motivation to learn, and *Delivering Curricula and Assessments* is reflective of Step Three, learners having the desire to apply their learning. Lastly, *Supporting and Empowering Learners* (3) and *Supporting and Empowering Educators* (4) overlaps with Step Four, which is focused on supporting learners to overcome barriers and to transfer their learning into practice. However, the HEE framework does not include patients as an outcome.

Our work also has considerable overlap with the work of the NHS Education, Training and Development (ETD) community and the Training Quality Team (TQT), who have jointly developed a set of standards and guidance for trainers and training managers in the design, delivery, and evaluation of their training. These comprise of: (1) strategy and service improvement (Step One); (2) planning and learning needs analysis (Step One and Step Two); (3) design and delivery (Step Three); (4) administration, facilities and equipment (Step Three); (5) team management and development (Step Three and Step Four); (6) evaluation and assessment (Step Four). Again, these standards have not incorporated patients.

The drive to organise training and education conceptually and practically as a complex intervention is active in the UK, with multiple bodies contributing their models and framework. However, like the existing theories of learning transfer, these domains are static, offering a categorisation of influencers, but not providing explanatory power regarding how the standards work to produce patient outcomes. The evidence-based model that we offer will be of greatest value as an explanatory model to maximise the benefits of training staff for patient benefit. Organisations focused on workforce improvement in training and reducing workforce pressures in health and social care can use the developed model to better target budgetary spending on staff training and ensure increased benefit.

Lastly, we noted in our synthesis and evaluation of research evidence, that patients were rarely involved in the development, design or delivery of the interventions. This is particularly important in future if initiatives targeted at benefitting patients are to be successful.

Next we have set out our key messages, based on our Four-Step model, for those with a remit of commissioning, quality assuring, and evaluating education targeted at staff, but intend to reach and benefit patients.
4.9 10 Key messages are set below to support transfer of learning into practice

It was crucial that this research led to an outcome that had the potential for practical application for commissioning, quality assurance, and evaluation of education or training. Therefore, we aimed to move beyond the literature and test the programme theory to ensure we could develop a practical and applicable model. We have now derived a model that is broadly applicable to educational interventions designed to improve patient outcomes. This is currently missing from the literature. To aid utility, we have converted the model into ten messages for practical application.

Step 1: Need to change
1. The key to this step is the organisational awareness of the need for a change. This can be because of a national policy, awareness of new evidence or, a driver for quality improvement. This step ends with the initiation or commissioning of the needed educational/training intervention
2. This stage also needs to ensure that the training is targeted at patients (ideally following patient input) and a plan is in place to deliver, monitor and evaluate.
3. Another important aspect is the engagement and commitment of personnel who will provide support and ensure the needed resources are available to take the issue forward.

Step 2: Motivate to learn
4. This stage involves removing any barriers to enable access to attend the training. Sometimes it may be necessary to make the training mandatory or provide incentives to attend.
5. Staff need to recognise they need the training (this can be enhanced by prior assessment of their knowledge or skills) and recognise it as both important and relevant to their role.

Step 3: Desire to apply
6. This stage focuses on the learner knowing what they need to learn. The learner will then engage with the learning (ideally using an interesting and varied format, with the needed resources) and have the commitment and desire to apply the learning into practice (if at an individual level, this may loop back to Step 1, leading to whole-team training and organisational spread).
7. The training should consider ending with a period of planning about how to introduce the new knowledge and skills when back in practice.

Step 4: Spread and embed
8. To facilitate transfer of learning, learners need to overcome barriers to ensure the learning can be transferred into practice.
9. The organisation needs to demonstrate commitment to the initiative by providing ongoing support, and opportunities for networking.
10. To achieve a culture change, where the new practice becomes the regular practice, the learning needs to be spread and embedded. To achieve this, the organisation needs to set up ongoing monitoring of the expected change and report back regularly on progress.
4.10 The development of publication guidelines to improve the quality of reported evidence: A guide for academics and reporters of educational interventions

Following the synthesis of literature, we identified variable reporting standards and often scant details about the education or training intervention. As a result, we identified a need to address this gap in reporting standards. This section therefore presents additional and ongoing work in the development of publication guidelines, in which we aim to share lessons learned from our analysis of the evidence. We intend the resultant guidelines to act as a resource for authors aiming to demonstrate patient outcomes from their reporting of educational interventions, as well as a framework for editors and reviewers.

There have been several calls to improve the description of educational interventions, and for these descriptions to be more detailed. Of the 200 reporting guidelines listed on the EQUATOR network, only five relate to educational interventions. All of these guidelines focus on the delivery of specific interventions, or to specific outcomes, and do not include the surrounding contextual complexity of interventions.

Cotterill et al. (2018) have emphasised the importance of context and complexity of intervention reporting generally, calling on the Template for Intervention Description and Replication (TIDieR) checklist, which was developed to enhance the detailed reporting of trials, to be adapted such that it can be used more flexibly outside of trials. In educational intervention reporting, the nearest resource to achieving this is the Guideline for Reporting Evidence-based practice Educational interventions and Teaching (GREET) proposed by Philips et al. However, as with the other educational intervention guidelines mentioned above, this is limited in its applicability – it is intended for describing the educational intervention for evidence-based practice.

Schaalma & Kok highlighted that educational interventions are complex interventions and acknowledge the engagement process and priority setting involved the development of education. They also underscore the importance of translation from ‘ideal world’ techniques and ‘intervention contexts’ and argue that a focus on the teaching and learning techniques employed in interventions do not reflect the complexity of learning.

There are several guidelines for the conduct and reporting of process evaluations and complex interventions, and education and training interventions may be considered complex processes. These existing guidelines are likely to apply to studies reporting educational interventions for patient benefit. However, process evaluation is about understanding causal mechanisms that produce change on an intended outcome, and adopt evaluation methodologies to conduct that investigation. Therefore, guidance about process evaluation of complex interventions (like education) could stop at behavioural outcomes, or even service-level outcomes, and may not provide sufficient evidence to show the impact on patients. Thus, process evaluation may not help to show patient outcomes if the outcomes are more proximal (educational, behavioural, service).

We also acknowledge that evaluators or investigators may have conducted process and/or outcome evaluations with high fidelity, dose, and reach. These investigations may lead to patient outcomes. However, without clear guidance on how to demonstrate this (e.g. measure appropriate outcomes, identify causal mechanisms, understand the interplay between factors), and then express
the links and mechanism in publication, others will not learn what works and have confidence in the links. Therefore, a replicability issue arises. Complex interventions are highly varied so considerations about their conduct (and associated guidelines) are necessarily general. (34)

The guidelines presented here are specifically for demonstrating the links between educational interventions and patient outcomes in different health and social care contexts. The programme theory specified in this report was generated from our realist synthesis and evaluation, and include contextual and process factors that can influence outcomes. Therefore, our guidance moves beyond the stated requisites for causal pathways as complex intervention and process evaluation guidance proposes, but instead specifies characteristics that should be reported on.

The proposed guidance can be applied to any methodology, including process evaluation methodologies, but are informed by process evaluation of complex interventions, with the emphasis and focus on the patient outcome. Furthermore, in valuing the need for complexity in detailing context, mechanisms, and the intervention, the guidance proposed here is to demonstrate transfer of learning, thus distinguishing it from preceding educational intervention reporting.

4.10.1 Methodology

The development of these guidelines evolved over several steps. Firstly, this involved familiarisation with the current evidence of educational and training interventions, which report patient outcomes. The realist review process provided this initial step. The second step was to consult the current literature on good practice for reporting evaluations. Therefore, we interrogated the existing guidelines on educational interventions and complex interventions and assessed their ability to properly evaluate the evidence found in our review. Both of these processes included robust discussions within the research team to ensure quality assurance. This was particularly to ensure that the items reflected our experience of the evidence, and our aim to emphasise the transfer of learning by placing importance on contextual and mechanistic factors (beyond the realist evaluation sense of these terms).

These two processes produced a preliminary set of items (see section 4.10.2 below). These were then subject to a Delphi method, which involved using an interdisciplinary panel of journal editors, academics, and healthcare professionals who report on educational interventions. A Delphi exercise aims to draw on the experience of these groups to develop consensus about the items to be included in the guidance.

The items are presented as statements with accompanying questions to be addressed when reporting, prompting specifically for factors we know to be important in understanding staff education and its impact on patients.

A Delphi study will be conducted via the internet using an online survey tool, Bristol Online Survey. Following our draft of the items, we circulated them around members of the reference group to pilot them. The final candidate items were then submitted to a panel of 35 experts, selected for their expertise in health and social care education research, methodology, education, research, editorial
experience, designing interventions, publishing, or reviewing articles. In the first round they were asked to use an email link to the survey to anonymously:

1. Indicate their views on whether each item is acceptable or not acceptable, using the tick boxes in the link
2. Record any suggestions for improvement for each item (please specifically consider how each item can be used for different study designs and methodologies)
3. Record any general comments or suggestions

Individual participant’s response will be collated for each question with the aim of establishing the strength of support for items. All comments will be used to refine the relevant items, using the terms of the participants as much as possible. It is intended that three rounds will be conducted.

Round one has already been completed and we have obtained feedback from 18 international experts across the globe (including Australia, Canada, Netherlands, Taiwan, UK, USA). The second round will be to gain feedback on the changes made resulting from round one. The third round will be to confirm the final items for publication.
TITLE AND KEYWORDS

1. Title should include the intervention and patient outcome in broad terms
(Examples of interventions could be an accredited education programme, a training course, skills development, work-based learning, or continuous professional development. The patient outcome could be clinical effectiveness, patient safety, patient-reported satisfaction, or financial outcomes. Key words or terms should include: “educational intervention”, “training intervention”, “patient outcomes”, and a term to describe the professional group targeted.)

INTRODUCTION

2. Describe the context, reported need, or problem which led to the intervention
(For example, what are the policy drivers, evidence base, or service improvements that informed the decision to implement training or education?)

3. Present a coherent theoretical basis for the intervention
(How has theory and knowledge of previous interventions (evaluations, for example) been used to develop the intervention and any hypotheses about why and how the intervention is expected to work, e.g. what is the theory of change or logic model? Why and how would you expect your chosen outcomes to be responsive to education?)

4. State the aims and objectives of the intervention
(What is the intervention trying to achieve? Are the aims and objectives clearly linked to the need for the intervention?)

METHODS

5. Describe the educational or training intervention in full
(Have you included details of the delivery, implementation, the educators/trainers and their skills, the learners background knowledge, the content of the education/training, duration, and knowledge and skills targeted?)

6. Describe the context in which the intervention is delivered
(What are the key organisational, leadership, and team factors, and what are their roles in, and influences on, the intervention? Was the intervention piloted?)

7. Describe and justify the study design
(What design have you used and why? What are the details of any comparator/control groups? If you have chosen an evaluation design, describe the role and degree of separation of the evaluators. Justify selection of participants, sampling strategies, and data collection and analysis)
techniques. Have you considered any practical constraints on design as well as limitations e.g. contamination of a control, organisational change?)

8. **Identify the relevant patient outcomes and their measures to be evaluated in the study**
   (Have you explained why the chosen patient outcome measures are the appropriate measures to evidence the change following the intervention? Are the outcomes directly aligned to the aims and objectives of the training?)

9. **Report factors which may limit the impact on targeted patient outcomes**
   (For example, what factors or behaviours may affect the transfer of education, or restrict the effects of the intervention? Are there any resourcing or support limitations? Has intervention adherence been evaluated?)

10. **Describe any patient and/or public involvement, its relevance (or not), and any contributions to the study**
    (How has public and/or patient involvement influenced the intervention, methods, measures, and outcomes? If not, what measures have been taken to ensure that the intervention is right for the target patient group or outcome? This may include prior evidence suggesting the interventions effectiveness with a particular patient outcome.)

**FINDINGS AND DISCUSSION**

11. **State the direction of change**
    (Is the change specified: patient improvement, patient deterioration, or no change?)

12. **Discuss the underlying processes believed to have produced the patient outcome, or not, and detail the learning transfer conditions**
    (How can the effect of education or training be explained with the proposed theory of change or logic model? Has a process evaluation been conducted? What evidence or insights can be offered to help explain any discrepancies between expected and observed outcomes? What limitations or biases to the intervention or study design have been identified that might have affected overly large or weak effect sizes?)

13. **Describe any other factors that could have influenced the outcome**
    (To what extent can outcomes be attributed to the education or training, compared to other influences or changes? How can the strength of this attribution support the conclusions?)

14. **Implications for wider scale implementation**
    (How generalisable is the intervention? Are there any updates to the evidence that set the context for the findings?)

15. **Where appropriate, ensure sufficient data are included to assess and report the cost effectiveness of the educational/training intervention.**
5 Conclusions

The Four-Step model presented provides a multi-layered, dynamic illustration of how and why education/training interventions can facilitate patient benefit, extending the focus of education from the learner to include the patient. This is the central tenet of this research and it moves the ambition of health and social care education forward. This model transcends structure, process, and policy, and can act as a shared approach to commissioning, managing, evaluating, and reporting staff education in any health and social care system internationally.

The model identified is heavily evidenced from a top-down perspective, illustrating how an organisation can commission education or training that transfers and benefits patients. The model identifies the processes and resources that are needed to gain a positive outcome, but also highlights where the chain can be broken and no transfer or benefit occurs, leading to a waste of resources. The model provides an explanatory framework of how the environment, the learner, and the intervention interact positively and negatively to produce or hinder patient outcomes.

Organisations play a major role in creating large-scale change, which ultimately can lead to culture change. Individuals and teams can also play an important role in identifying and implementing good practice that is specific to a patient group (not at organisational level) and also by doing the pilot work prior to uptake by the organisation. However, we are concerned that much CPD activity is assumed to benefit patients. Our research highlights that more could be achieved by better targeting and collecting evidence of patient benefit, and by teams working more effectively together, to reduce the barriers of learning transfer that was emphasised in Step Four of our model.

This research has identified a gap in the availability of national data focused on education/training and patient outcomes. Collecting patient outcome data following an education/training intervention would provide an important metric which is currently missing. National organisations such as Health Education England are well placed to consider their role with regard to education and training of the healthcare team and how patient outcome data could be collected following an educational intervention. Our literature search highlighted a lack of evidence at undergraduate level, where the outcome is focused on the student. However, data from patients who have received care from students and trainees could be collected and could provide a valuable resource about educational impact and inform future directions.

In addition, there was little evidence of cost-benefit analysis in the identified interventions. Like the myth exploded in this research, falsely maintaining the chain from education to patient benefit could not be evidenced, we believe that educational interventions can and should add health economics to their evaluations.

We have proposed ten key messages for commissioners, managers and educators, enabling those implementing educational interventions to make more informed, evidence-based decisions.
6 Next steps

This work has generated several avenues for future work:

1. There is a clear need to improve the national educational metrics in the UK, to provide educational data linked to patient outcomes.
2. We are currently in the process of developing publication guidelines, through the Delphi process, and we aim to complete and publish this separately.
3. The research team have begun discussions with Health Education England, who are the main recipients of this research in the UK. Health Education England aim to support the delivery of excellent healthcare and health improvements to the patients and public of England. Discussion has focussed on the articulation of the model for future use. The plan is:
   - To develop tools to support the use of the model*
   - To develop workshops to understand and implement the model*
   - To evaluate the implementation of the model
     *To refine if needed

4. In addition to working with Health Education England, we aim to disseminate this research internationally for the benefit of other organisations involved in commissioning and implementing education, quality assurance, and evaluation.
7 Dissemination

2016

- A realist synthesis of the evidence linking education and training to patient benefit (Poster, Ottawa Medical Education Conference, Perth)
- How can we enhance the transfer of learning into practice? (Oral presentation, Association For Medical Education In Europe (AMEE) conference, Barcelona)
- How does learning transfer to practice to improve patient safety, clinical effectiveness and the patient’s experience? (Oral presentation, The Association for the Study of Medical Education (ASME) conference, Belfast)

2018 – ASME Conference (Gateshead)

- How does the education of health and social care staff lead to patient benefit: a realist synthesis? (Poster)
- Using case studies to test a model of education for health and social care staff that leads to patient benefit: a realist evaluation (Poster)
- Evaluating the effectiveness of educational interventions for patient benefit: The development of reporting guidelines (Oral presentation)
- Designing and delivering training interventions for health and social care staff that lead to patient benefit (Oral presentation)

2018 - International Think Tank

Transfer of learning for patient benefit: Think tank. This is an event that attracted key international contributors in the field of medical education and was attended by 65 delegates who came together to discuss ‘How can education and training of the healthcare team involve, reach and benefit patients? Present were: patients, patient representatives, undergraduate and postgraduate students, doctors, nurses, physiotherapists, social work, undergraduate and postgraduate educators, members from the General Medical Council and Health Education England, The day was facilitated by academics and researchers from UK, Ireland, US, Canada, The Netherlands, Taiwan, Malaysia and Australia. A collaborative paper resulting from the Think Tank is planned.

2018 - AMEE

Evaluating the effectiveness of educational interventions for patient benefit: The development of reporting guidelines (Oral presentation).

Using case studies to test a model of education for health and social care staff that leads to patient benefit: a realist evaluation (Poster)

How does the education of health and social care staff lead to patient benefit: a realist synthesis (Poster)
2018 – Health Education England and NHS engagement

To optimise the likely impact of the research on policy, we have shared a draft of the report with Health Education England and have held a provisional meeting with them (June 2018). This was followed up with a meeting in November 2018 with their Executive Group. Health Education England intend to use the model to inform future work. In particular, they plan to use the model for:

- Effective education commissioning
- Design of education interventions
- Quality assurance of continuing professional development
- Evaluation strategies (as a theory of change)

In addition, the model has been shared and positively received by a Postgraduate Medical Dean (Health Education England), NHS Leadership Academy, NHS Medical Directors and NHS directors of Medical Education.

Planned peer reviewed publications

How does the education and training of health and social care staff transfer to practice and benefit patients? A summary of an evidence-based model

How does the education of health and social care staff lead to patient benefit: a realist synthesis?

Evaluating the effectiveness of educational interventions for patient benefit: The development of reporting guidelines.

Using case studies to test a model of education for health and social care staff that leads to patient benefit: a realist evaluation.

Guidance on the implementation of educational interventions for health and social care staff that benefit patients.
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10 Appendices (attached separately)