

The relational workplace and the role of senior nurses in neonatal care delivery in Kenya

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Abstract

Introduction

Relational aspects of the hospital workplace impact on quality of care, but are under-theorised. In efforts to improve the quality of neonatal care in resource-constrained Kenyan hospitals, there is need to better understand how relational systems and structures operate, including the role of senior nurses.

The aim of this DPhil is to examine social ties between healthcare staff, and how these influence the workplace and delivery of neonatal care in Kenya.

Methods

The core research is a realist evaluation, conducted in two urban hospitals in Kenya. Mixed methods data were collected using non-participant observations, in-depth interviews and social network analysis. Programme theory was abstracted from explanatory context-mechanism-outcome configurations (CMOCs), and sense-checked with stakeholders. An initial programme theory (IPT) from realist synthesis, informed the realist evaluation, and a scoping review identified candidate relational interventions.

Results

The abstracted GELLE Framework is a middle-range programme theory explaining how, why, for whom and in what context, the social ties of staff influence quality of care, using five domains: 1) Grouping: who individuals consider to be their peers and trusted colleagues, 2) Empowering: aspects of formality and structure which influence the ability of specific individuals to act, 3) Leading: how leadership influences relational culture, 4) Learning: how learners can be supported to become competent professionals, and 5) Equipping: how physical order influences relational processes.

Discussion

This thesis contributes theoretical clarity to the relational workplace. It explains how duality of relational systems and structure operates, and thus how reproduction and transformation can occur, and the influence of senior nurses. The utility of the GELLE Framework is proposed as: a reflective tool, a guide for interventions, and a catalyst for further research and public engagement.

The findings illuminate possibilities for influencing deep-rooted, “visible, invisible”, social phenomena in healthcare, such as norms, values, power and culture.

The relational workplace



LS Lowry Coming from the Mill 1930 © The Lowry Collection, Salford (reproduced with permission)

Foreword

“In other words, intervening in CAS [complex adaptive systems] is about fostering productive emergence rather than simple, mechanistic, cause and effect type solutions.” (Barasa et al., 2017, p.112)

“Understanding how and why programmes work – not simply whether they work – is crucial. Good theory is indispensable to advancing the science of improvement” (Dixon-Woods et al., 2011, p.167)

I have witnessed first-hand the importance of appreciating the whole system in healthcare, both in times of ‘business as usual’ and also in times of humanitarian crisis. Contrary to frequent portrayal, healthcare is much more than interaction between clinician and patient. Indeed, the clinician-patient interaction is a glimpse into, and often the product of, a huge configuration of continuously moving and interacting parts that comprise the health system. The functioning and quality of these interacting parts – i.e., the details - are themselves both shaped by, and formers of, the system at large. The whole is made up of the details – each detail both a product of and a producer of the whole (see discussions of complexity and structuration in the following chapters).

Barasa and colleagues encourage “fostering productive emergence” (Barasa et al., 2017) for sustained health systems change. My DPhil contributes to such efforts, through illuminating and operationalising the often blurry and tacit ways in which social interactions occur in the workplace by means of middle-range theory, and thereby hypothesising how true and sustained change might occur.

Communication, or social ties, between healthcare workers and the relational structures that form, are difficult to grasp in both measurement and description - known yet unknown, visible yet invisible. As an analogy, I include here the poem, "A Jelly Fish", by Marianne Moore:

A Jelly-Fish, by Marianne Moore

Visible, invisible,
A fluctuating charm,
An amber-colored amethyst
Inhabits it; your arm
Approaches, and
It opens and
It closes;
You have meant
To catch it,
And it shrivels;
You abandon
Your intent –
It opens, and it
Closes and you
Reach for it –
The blue
Surrounding it
Grows cloudy, and
It floats away
From you.

Personal reflection

I completed the work presented in this DPhil as a part-time student. After travelling to Nairobi twice before the Coronavirus pandemic, during which I undertook familiarisation visits to two exemplar neonatal units with KEMRI-WELLCOME colleagues, attended neonatal nurse training events, and had sensemaking discussions with several experienced colleagues at KEMRI-WELLCOME about the initial programme theory I was developing from the literature, I then remained in the UK.

To ensure methodological rigour and the highest quality of research while conducting my thesis research at a distance, I undertook the following steps throughout the remainder of my DPhil:

- *I worked very closely with two exceptional Kenyan colleagues throughout the DPhil: Conrad Wanyama and Juliet Jepkosgei.*

My supervisor, Mike English, introduced me to Conrad Wanyama after I had completed the inceptive realist synthesis and developed the initial programme theory, which would form the starting point of the realist evaluation component of the Pathways Study. The Pathways Study was the name given to an overarching research project undertaken in Kenya, combining the realist evaluation part of my DPhil thesis work and additional in-depth qualitative research exploring clinical learning environments in nurse education. Conrad has a particular interest in nursing education and how nurses implement their learning (including non-technical skills) in the workplace. Conrad and I immediately found that our research interests, whilst different, were highly complementary, and we worked very well together. We worked together to design the Pathways Study protocol, as co-Principal Investigators, which integrated both the realist evaluation part of my DPhil work,

to refine and develop the initial programme theory on social ties of healthcare workers from the literature, as well as focused qualitative work specific to nursing education and clinical learning environments. The initial programme theory from the realist synthesis was used to inform the protocol and study design, as well as study tools for the realist evaluation component of the Pathways Study. To our knowledge this was the first time that Social Network Analysis had been used in a Kenyan hospital, and we were excited to include this method of data collection in the study. Likewise, realist methods had not been widely used in KEMRI-WELLCOME, so it was an opportunity to further develop these approaches. Conrad and I assembled an expert group of co-investigators and collaborators early on in the project, which we amended over the course of the study as the needs of the project developed (e.g. addition of an expert in social network analysis, based in Oxford), with the approval of ethical review committees in Kenya and Oxford. We successfully gained ethical approval and the associated permissions in Kenya and ethical approval in Oxford.

Conrad and I advertised for an Assistant Research Officer (ARO), and after shortlisting and interviewing, we appointed Juliet Jepkosgei. Juliet proved herself to be an exceptional ARO, showing great attention to detail and high levels of commitment and organisation. When Juliet joined our core team of now three, we invested in her training and a structured induction, including three online induction sessions with me on: 1) The Pathways Study, 2) Social Network Analysis, and 3) Realism.

As the core team, Conrad, Juliet and I met weekly online to discuss administrative issues, data collection, emerging findings, analysis, interpretation of findings, and relevant literature and theory. As such, we were able to address data collection challenges or decisions in real time, adapt study tools as appropriate, and consider insights from literature in data collection, analysis and interpretation. In addition, we discussed any arising ethical issues, and were reflexive in our discussions with one another. We

communicated frequently by email, and worked using a shared OneDrive folder, to further aid collaboration, alongside ethical data management practices.

- *Sensemaking with expert stakeholders*

From the realist synthesis phase of my DPhil, where I engaged with expert stakeholders to inform my analysis and interpretation of the data from the literature, I continued to engage with stakeholders as part of the Pathways Study, throughout the DPhil. Two major stakeholder engagement exercises occurred in Pathways: the first during the analysis of the realist evaluation, where a full set of draft CMOCs were shared with expert co-investigators for sensemaking feedback, and the second at the end of the Pathways Study, when practitioners in Kenya were invited to give sensemaking feedback on the GELLE Framework and their own ideas and recommendations for action (see Chapter 4.2). These stakeholder feedback exercises enabled further triangulation of findings, and helped to refine and confirm findings, increasing the rigour and validity of the research.

- *Development of methodological skills during my DPhil*

To improve the methodological rigour of my DPhil work, I undertook training and participated in the following groups, before the Coronavirus pandemic:

- Social Network Analysis (SNA) course, Said Business School (8-week course)
- Realist group for DPhil students, facilitated by Geoff Wong (monthly meetings)

After the Coronavirus pandemic, I continued my personal development in these two specific methodologies through student supervision by Geoff Wong (informal DPhil supervisor) and Prof Bernie Hogan.

In addition to skills in SNA and realist research methods, I have also developed my collaborative skills during this DPhil. I have learned so much about what makes a productive research partnership, and I have experienced how immersive a true research partnership can be. I have learned the immeasurable value of frequent and open

communication, and how online platforms used appropriately can help to achieve this. I have learned the value of sharing in-progress findings for stakeholder feedback, and have experienced the utter joy of hearing from those who know, that the findings are true and useful!

I have developed my skills at giving feedback and comments on drafts of papers and presentations to colleagues and have I have also developed skills to invite and manage feedback on my own work in a timely manner.

- *Pursuit of depth and breadth of sociological understanding*

I have sought to improve the depth and breadth of my understanding of sociology throughout my DPhil. I spent time in the first phase of my DPhil reading, particularly around social movement theory, social network theory, and related theories, and then continued to expand my reading, based on direction from my supervisors and self-directed snowballing. I come from a background in clinical medicine, so I was keen to expand my knowledge and skills in the social sciences.

- *Drawing on my previous personal experience*

Remaining reflexive throughout my DPhil, I have also drawn on my relevant personal experience when undertaking the research, which I have found useful. For example, in thinking about the context of neonatal care, and relational ties in the healthcare workplace I have drawn on my own clinical experience. I am a qualified General Practitioner, and though I have not worked in a clinical role for the past 10 years, I spent the previous 10 years working as a doctor in UK hospitals and general practice, and in a provincial referral hospital in Sierra Leone. During my time working as a doctor in Sierra Leone, I mostly worked on the female medical ward, and provided medical cover to all wards, including paediatrics and maternity. There was no neonatal unit in the hospital at the time, so neonatal care was provided within the maternity and paediatric wards. I learned Krio

(most widely spoken national language) during my time in Sierra Leone, and used this as my principle language of communication with healthcare colleagues and patients. In my UK hospital jobs, I rotated through paediatrics (including a rotation in neonatology) and maternity, as well as many other specialities. Sometime after working in the hospital in Sierra Leone, I also worked at an Ebola Treatment Centre, and for a short time for a child health charity in the country. I also spent 3 months as a medical student in Internal Medicine and Therapeutics at a teaching hospital in Ghana. As a trustee of a medical libraries' charity, I have also visited several other government hospitals in Sierra Leone. Prior to starting my DPhil, I worked as a Lecturer in International Public Health for just over a year, during which time I visited hospital and community healthcare settings in Pakistan, whilst contributing to an Early Child Development project. I drew on these experiences and familiarity with different clinical settings, during my two initial visits to Kenya. During these visits, I accompanied KEMRI-WELLCOME colleagues to the neonatal units of two public hospitals within the Nairobi area – one small and one larger. The visits were extremely helpful in allowing me to try to situate the Kenyan neonatal facilities, in the context of my own clinical familiarities.

As outlined above, though my colleagues Conrad Wanyama and Juliet Jepkosgei collected the empirical data that were used in this DPhil (and are both fluent in Swahili), I have had a core role at all stages and have made substantial personal contributions to the work presented in this thesis, outlined in the table below.

Table i. Personal contributions to work presented in thesis

	Realist synthesis	Realist evaluation	Scoping review
Conceptualisation	X	X	X
Methodological design, including study tools	X	X	X
Data collection/ extraction	X	I did not collect data (non-participant observations (NPOs), in-depth interviews (IDIs), social network analysis (SNA)), but colleagues collecting data and I met online weekly to discuss data collection procedures, adaptation of tools, sampling, emerging findings, and any arising issues. Though I did not directly collect data from participants (sense-checking and ideas for interventions), I participated online in the final stakeholder event, and presented the GELLE framework and feedback sheets to stakeholders.	X
Data Analysis	X	X	X
Interpretation	X	X	X
Research team collaboration activities	X	X	X

Contributions statement reproduced from Pathways Study protocol paper:

“Contributors This protocol was codeveloped by CB and CW as joint authors/ coprincipal investigators. ME, PMM, MB, GW and LH contributed to the development of the protocol, and JJ, SM and JJM contributed to the refining of the protocol and study tools for implementation.” (Wanyama et al., 2023)

Glossary of terms

Appraisal support: Assists self-evaluation or affirmation (Langford et al., 1997)

Clustering coefficient: The degree of inter-connectedness amongst nodes with whom an individual node has edges. “How connected are my friends?” (Hansen et al., 2011)

Coarse status: Overall cadre, for example “doctor”, “nurse”, regardless of seniority or level of qualification (e.g. MO, resident, consultant = “doctor”)

Context: A specific aspect of the setting/environment of study, which when present triggers the activation of a mechanism(s) (Wanyama et al., 2023)

Context-mechanism-outcome configuration: A unit/statement/diagram which links and orders a context, mechanism and outcome, to provide causal explanation. It is often abbreviated to CMO or CMOC (Wanyama et al., 2023)

Demi-regularity: An observable pattern in the data, which occurs in certain circumstances (Wanyama et al., 2023)

Directed edge: The connection travels from one node the other (e.g. one node seeks the other for support/advice) (Scott, 2000; Wasserman & Faust, 1994)

Edge: A connection between two nodes (Scott, 2000; Wasserman & Faust, 1994)

Emotional support: Provides care, empathy, love and trust (Langford et al., 1997)

Flattened sociogram: All edge types (i.e. nominations in response to questions around different types of social support) are combined in the network visualisation

Informational support: Assists problem-solving (Langford et al., 1997)

In-degree centrality: The number of edges that are directed to a specific node (i.e. the number of people who nominate the same individual) (Scott, 2000; Wasserman & Faust, 1994)

Initial programme theory: A rough outline of a theory of causation pertaining to the question under study, to guide the process of investigation (Wanyama et al., 2023)

Instrumental support: Provides tangible goods, services, or aid (Langford et al., 1997)

Mechanism: A latent (often invisible) property/entity, sensitive to variations in context, which when activated causes an outcome to occur (Wanyama et al., 2023)

Middle-range programme theory: The product of realist enquiry – an abstracted theory derived from relevant and robust data, which is both testable, and transferable to other settings by application of abstracted learning (Wanyama et al., 2023)

Node: Representation of an individual within the network (Scott, 2000; Wasserman & Faust, 1994)

Nomination: The naming of a colleague by a participant, in response to a question

Outcome: A desirable (or undesirable) event/occurrence, which is of interest by its presence or absence (or strength/degree of) (Wanyama et al., 2023)

Retroduction: Intentional consideration, exploration and identification of the hidden elements of causation that lie beneath observable data and logic (Wanyama et al., 2023)

Sociogram: A visual representation of a network, using graph theory (Scott, 2000; Wasserman & Faust, 1994)

Unweighted: An edge between two nodes is deemed present (i.e. 1) if any type of edge is present (i.e. at least one nomination in response to any question around social support), and absent (i.e. 0) if no edge is present between two nodes (i.e. no nominations in response to any question around social support)

Overview of thesis

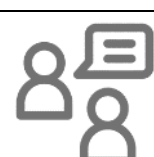
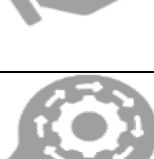
The work in this thesis contributes explanatory detail and precision to the theorising around relational ties within the healthcare workforce in Kenya, and points to the practical application of this enhanced knowledge. The findings focus on the detailed and the specific, both of which are essential for meaningful change in the healthcare workplace.

At the core of the thesis, I present explanatory theory that has been developed and abstracted at different levels for practical use, in the form of the novel GELLE Framework. Through reflexive analysis and interpretation of rich multi-method data and stakeholder engagement, methodological rigour and robust findings have been achieved, as well as insight into the practical value of the research for healthcare workers.

The thesis is divided into four main chapters: Introduction, Methods, Results and Discussion (Table ii).

Table ii: Overview of thesis

1.0 Introduction		1.1 Improving quality in a complex system: Neonatal care delivery in Kenya and the senior nurse	Justification of the need for better understanding of the relational context, as a prerequisite to improving quality of neonatal care in Kenya, and the potential influence of senior nurses
		1.2 The influence of social ties and relational structures in the healthcare workplace	Demonstration of the importance of relational ties and structures on individual and collective behaviours, from the literature, focusing on Rogers' theory of diffusion, social network theory, and Giddens' theory of structuration
		1.3 Realism and the contribution of theory	Provision of the rationale for using a realist approach of scientific inquiry throughout the DPhil
		1.4 DPhil aim and objectives	Description of the research questions, aim and objectives of the DPhil
2.0 Methods		2.1 Initial Programme Theory (IPT) development using realist synthesis	Description of the steps taken to develop an initial programme theory from realist synthesis of the literature
		2.2 Programme theory development and refinement using realist evaluation	Development of the protocol and multi-methods study tools (non-participant observation, in-depth interviews, social network analysis) of the realist evaluation component of the Pathways Study
		2.3 The use of multiple methods, and multiple perspectives	Account of the approaches taken to integrate multi-method data, as well as engagement with multiple perspectives during the research process
		2.4 Identifying candidate interventions from the literature, that target relational aspects of healthcare delivery	Description of a focused review of the literature, aiming to identify relevant candidate interventions targeting relational aspects of healthcare delivery

3.0 Results		3.1 Initial programme theory	The findings from realist synthesis of the literature, from which the design of the realist evaluation was informed
		3.2 Programme theory: GELLE Framework, from detailed to abstracted 3.2a: summary of data collected 3.2b: detailed CMOCs and SNA findings 3.2c: GELLE Framework programme theory	The main section of the results chapter, and the core of the thesis, in which the programme theory (GELLE Framework) is presented, from its finest detail to its most abstracted
		3.3 Candidate interventions targeting aspects of relational context	A summary of relevant candidate interventions identified from the literature
4.0 Discussion and Conclusion		4.1 Summary of main findings	A summary of the main findings of the research undertaken
		4.2 The GELLE Framework and complexity theory	How the GELLE Framework operationalises the theories of complexity and structuration in healthcare, and contributes novel understanding.
		4.3 The GELLE Framework and senior nurses	Learning drawn from the GELLE Framework, specific to senior nurses in neonatal care, with reference to complexity theory and Merton's Role-Set.
		4.4 Utility of the GELLE Framework	How the GELLE Framework can be used: as a reflective tool, to develop interventions, and in future research, and a discussion around communication and engagement
		4.5 Strengths and limitations of the research, reflexivity and ethics	Discussion around the strengths and limitations of the DPhil and ethics in practice
		4.6 DPhil conclusions	The conclusions of the study

1.0 Introduction

The contents of this introduction chapter are summarised in Table 1.0.

Table 1.0: Outline of introduction chapter

1.0 Introduction		1.1 Improving quality in a complex system: Neonatal care delivery in Kenya and the senior nurse	Justification of the need for better understanding of the relational context, as a prerequisite to improving quality of neonatal care in Kenya, and the potential influence of senior nurses
		1.2 The influence of social ties and relational structures in the healthcare workplace	Demonstration of the importance of relational ties and structures on individual and collective behaviours, from the literature, focusing on Rogers' theory of diffusion, social network theory, and Giddens' theory of structuration
		1.3 Realism and the contribution of theory	Provision of the rationale for using a realist approach of scientific inquiry throughout the DPhil
		1.4 DPhil aim and objectives	Description of the research questions, aim and objectives of the DPhil

In this chapter I set out the rationale behind the aims and objectives of the DPhil.

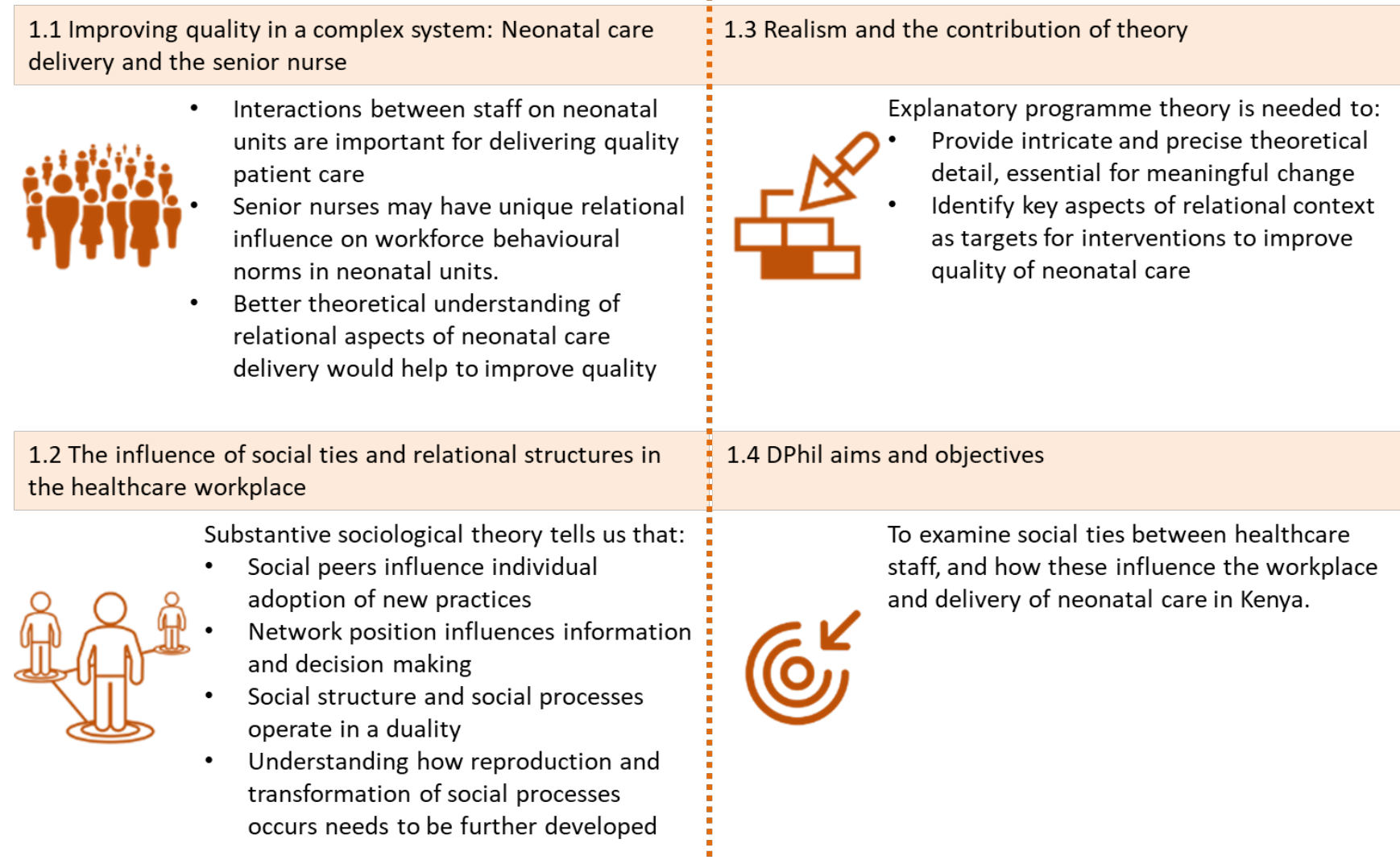
Specifically, in section 1.1, I justify the need for better understanding of relational interactions between staff delivering neonatal care, as part of quality improvement efforts. Next, I use section 1.2 to outline aspects from three substantive sociological theories that have been helpful in framing the conceptual thinking of the DPhil, and which demonstrate the significance of relational interactions to the adoption of change, access to information and capital, and reproduction of systems and structure. Following this, in section 1.3, I justify the use of realism, as put forward by Pawson and Tilley (1997), as my approach to science throughout the DPhil. Finally, I set out the research questions, aim and objectives of the DPhil in section 1.4. Figure 1.0 below, shows a schema of how the different sections in Chapter 1 fit together.

Conceptual focus of thesis

The focus of my thesis is on the *social ties* of hospital staff – i.e. the inter-personal details that constitute the relational workplace. I have sought to explain the nature and contribution of these social ties in this thesis, by answering three core research questions presented later in this chapter. It is my view that an ability to explain how, why, for whom and in what circumstances relational outcomes occur in hospitals is essential to designing interventions and implementing meaningful and sustained improvements in patient care processes and quality. Explanation moves beyond description and identifies causation, revealing potential targets for interventions and paths to change.

For this reason, I have engaged with substantive theories to frame my research that provide focused theoretical lenses and transparency of theoretical assumptions relevant to social ties of staff and the relational workplace. Specifically, complexity theory (Sturmberg & Martin, 2013) and social network theory (Scott, 2000) have fundamentally influenced my choice of scientific approach and methods in this thesis. Influenced by complexity theory, I chose to use realist synthesis and realist evaluation to pursue explanatory enquiry. An ability to view theoretical details of social ties within the broader conceptual whole is essential to appreciate the interaction of components, and fundamental to understanding complex adaptive systems (Sturmberg & Martin, 2013). Drawing on social network theory has facilitated my exploration of the core relationships that contribute to this complexity (Scott, 2000).

Figure 1.0: Schematic overview of Chapter 1: Introduction





1.1 Improving quality in a complex system: Neonatal care delivery in Kenya and the senior nurse

In this section (1.1) I justify the need for better understanding of relational interactions between staff delivering neonatal care, as part of quality improvement efforts.

Neonatal care delivery as a complex system

The provision of care to neonates involves a diverse and multi-professional workforce, fulfilling a range of different care needs for patients who often present with complex clinical problems. For example, neonatal patients must be fed and cleaned, in addition to provision for their individual additional medical needs such as oxygen, respiratory support, intravenous therapies, phototherapy, and medication (World Health Organisation, 2017, 2020). Healthcare workers on the neonatal unit must also provide support (both practical and emotional) to mothers and caregivers who are involved in care. Like many units in the hospital, the neonatal unit also functions as a clinical learning environment for healthcare students and professions in training (McKnight et al., 2020). As such, the neonatal unit is a complex system involving many human actors, and the way in which the healthcare team functions within the neonatal unit is critical to the quality of patient care provided. Box 1.1.1 describes the key characteristics of complex adaptive systems (CAS) (Cilliers, 1998; Sturmborg & Martin, 2013), which can be observed within neonatal care delivery.

Box 1.1.1: Key Characteristics of Complex Adaptive Systems (CAS).

Adapted from Sturmberg and Martin (2013), which was drawn from Cilliers' (1998) 11-point list.

- Complex systems consist of many different components that interact in nonlinear ways
- They are open to their environment
- Interactions occur at many different levels and influence each other through recursive feedback loops—they are self-organising
- Pattern and organisation develop iteratively through interactions among the system's components in the absence of any external supervisory influence
- Some simple rules for self-organisation in human systems include shared values and principles, connectivity and feedback, dialogue, memory and interdependency
- A complex system is defined by its relationships or patterns of interaction, not its constituent components
- The behaviour of a CAS cannot be reduced to the behaviour of specific components, it is emergent
- CAS are dynamical. They change over time as a function of the flow of energy and information
- CAS adapt to environmental pressures, agents co-evolve to new states

Like many other settings in sub-Saharan Africa, the healthcare system in Kenya faces additional challenges which exacerbate complexity experienced within neonatal units and impact on delivery of effective patient care (World Health Organisation, 2020). Neonatal units in Kenyan public hospitals are often overcrowded and understaffed, despite public facilities providing care to the majority of sick newborns (Murphy et al., 2018). Units experience shortages of equipment, medication, space and staff. Staff shortages reflect wider shortages in the national skilled healthcare workforce (at 16.5 per 10,000 population, with inequitable distribution across the country). Furthermore, complex human resource management issues associated with devolution, a legacy of strike action, and

unemployment within the sector have affected services (Irimu et al., 2018; Republic of Kenya, 2018).

Working conditions are known to be exceptionally challenging for staff in Kenyan neonatal units, with low nurse to baby ratios (up to 1 nurse: 25 babies in one study), overcrowding, cot-sharing, sick and clinically complex babies, and scarcity of resources, including staffing (McKnight et al., 2020). Indeed, authors of an ethnographic study of neonatal units in Nairobi reflected:

“In the course of our study, it became clear that nurses were simply unable to meet national or international guidelines of best practice and that asking nurses to translate such high aims is unreasonable” (McKnight et al., 2020, p.1)

The authors described collective norms used by nurses to deal with the realities of neonatal nursing work in Kenya (McKnight et al., 2020). Nurses are recognised to provide a substantial proportion of newborn care, and there have been calls for healthcare staff to be better supported to improve quality (World Health Organisation, 2020).

Wide variation in the quality of care provided across neonatal units within Kenya has been observed. An audit in 2012 looking at the availability of resources, quality of documentation, and patient care indicators in 22 teaching hospitals in the country, revealed wide variation in clinical documentation and indicators of neonatal care quality across sites, with significant errors in the prescribing of medications such as gentamicin, which is potentially toxic (Aluvaala et al., 2015). Likewise, a cross-sectional observational study conducted in Nairobi, found essential nursing care for sick newborns was frequently missed (Gathara et al., 2020). A multisite retrospective cohort study using data from 2018-2020, found a 3-fold variation in the mortality of newborns within specific birth weight categories across the 16 neonatal units studied in Kenya (Irimu et al., 2021).

As in other countries with high neonatal mortality rates (Hug et al., 2019), improvements in quality of neonatal care delivered in health facilities in Kenya must be prioritised, as

part of multisector efforts. Indeed, whilst there have been improvements in under-5 mortality, improvements in neonatal mortality in Kenya have lagged behind, and neonatal deaths account for 56% of under-5 mortality. Birth asphyxia and birth trauma are the 6th leading cause of all-age inpatient mortality (Republic of Kenya, 2018). Likewise, a multisite retrospective cohort study found that neonatal deaths comprised two thirds of total mortality in the 0-13y age group across 14 hospitals (Irimu et al., 2021).

Improving quality

The call for improved quality of patient care in health facilities has been echoed throughout global healthcare literature. Indeed, Kruk and colleagues emphasised the need for improvements in quality to accompany extended healthcare coverage, stating:

“The human right to health is meaningless without good quality care, because health systems cannot improve health without it” (Kruk et al., 2018, p.e1196)

In response to the multiple challenges to delivering high quality neonatal care in Kenya, complex interventions such as the NEST360 programme have been introduced in units to support neonatal care. The NEST360 programme is an international alliance of 23 institutions and organisations, working to provide technologies and equipment, education and support for the implementation of evidence-based care. The NEST360 programme operates in Kenya, Malawi, Nigeria and Tanzania (NEST 360, n.d.).

In addition to addressing the material constraints, relational aspects of the healthcare setting are also an important factor in quality improvement. In one study in Kenyan hospitals, factors such as poor teamwork, communication and inadequacies of leadership were found to influence poor uptake of healthcare guidelines (Nzinga et al., 2009). In another study, which interviewed 57 hospital staff in two government referral hospitals in two East African countries, relational context was identified amongst three core themes reported as obstacles to delivering safe patient care in the hospital, alongside material

resources and staffing factors. Examples of how relational context obstructed safe patient care included poor inter-professional and inter-unit communication, conflict, poor teamwork due to hierarchical factors, feelings of being disrespected by colleagues, misuse of power and poor accountability (Aveling et al., 2015). In their conclusions the authors commented on the ubiquitous nature of relational factors as determinants of quality patient care:

“Though the impact of resource constraints and weak governance structures are particularly marked in low-income countries, the congruence between accounts of health workers in diverse settings suggest that the origins and solutions to patient safety problems are likely to be similar everywhere and are rooted in human factors, resources, culture and behaviour. While additional resources are essential to patient safety improvement in low-income settings, such resources on their own will not be sufficient to secure the changes needed.” (Aveling et al., 2015, p.1)

The role of senior nurses

Within the relational context of staff providing care to patients are those with management and leadership roles. In neonatal care units, senior nurses may be appointed ‘in-charge’ on the unit, or take on other delegated aspects of leadership. Mid-level managers such as these often take on multiple different roles within the unit, requiring good relational skills, and therefore have the potential to be highly influential within the social context (Nzinga et al., 2013). An in-depth case study of two district hospitals in Kenya, found that hybrid clinical managers (i.e. physician or nurse departmental heads) exercised their role on a backdrop of formal and informal expectations, and were highly influenced by embedded behavioural norms (Nzinga et al., 2019). Despite limited formal training in management, these staff navigated their way through the substantial additional work their role required, often with little personal recognition. The study found that the attitude by managers towards their role varied, and was shaped by associated factors such as level of authority, and access to support and mentorship. The study highlighted the unique opportunity for such managers to influence quality of clinical care, partly due to familiarity with embedded

norms (Nzinga et al., 2019). Indeed, how discretion is exercised by such managers influences how official policy is implemented in the unit (Gilson, 2015).

Nurses often make up the largest professional group delivering neonatal care, and senior nurses are often in a hybrid or mid-level management role. As such, senior nurses may be in a key social position within units to drive quality improvement. Senior nurses or 'in-charge nurses' have been of particular interest as potential change agents in Kenya, as long-standing participants in the Clinical Information Network (CIN)¹, facilitated by KEMRI-WELLCOME (English et al., 2017). As part of the CIN, aggregate patient outcome data collected by KEMRI-WELLCOME at hospital sites are shared with CIN members as part of audit and feedback, and refresher training is conducted on workplace skills. The network also provides a platform through which colleagues from different units meet, to share experiences and best practice. The CIN members from facilities across the country are connected online, through social media platforms, and in person at tailored training and collaboration workshops in Nairobi (English et al., 2017). The members of the CIN hold positions of formal authority within their units, therefore training and sharing of best practices are intended to be cascaded to colleagues and implemented in units.

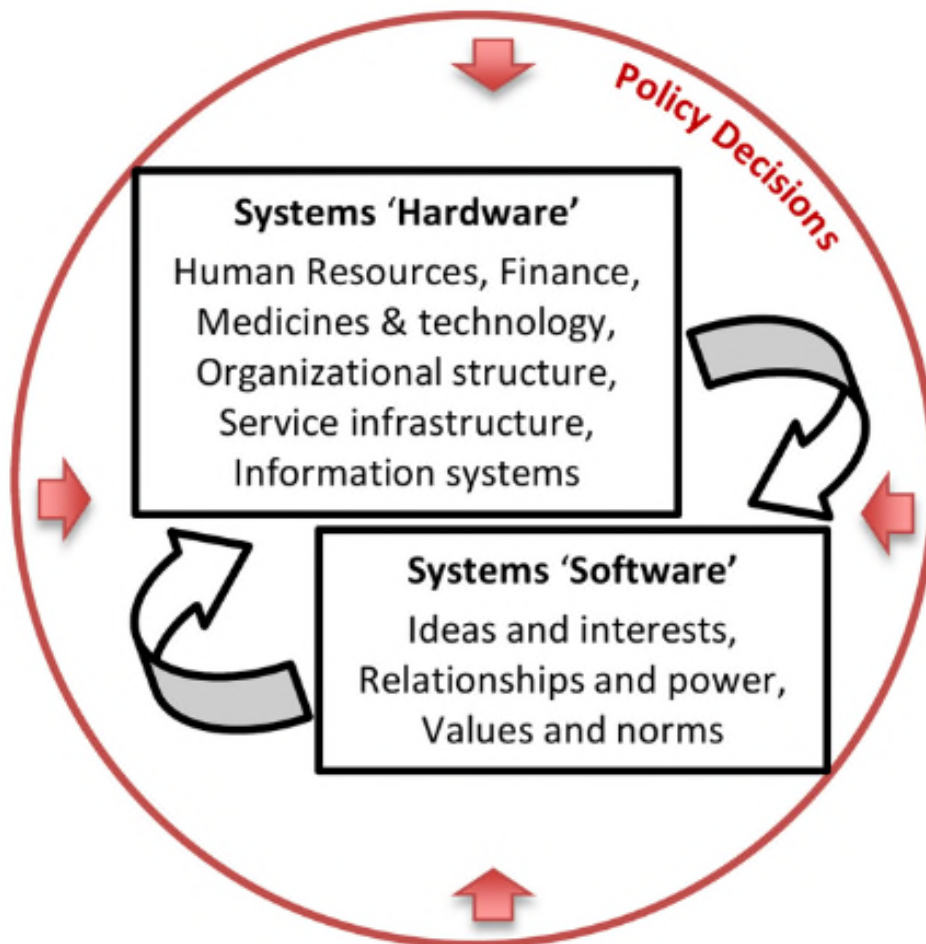
Conceptualising relational interactions

However, the social dynamics which comprise the essential fabric of hospitals and neonatal units require greater exploration, understanding and theoretical development. One way in which such relational aspects of the health system have been conceptualised, is as part of health systems 'software' (Figure 1.1.2) (Sheikh et al., 2011).

¹ The Clinical Information Network (CIN) was established in Kenya in September 2013, initially connecting paediatricians, and training data clerks to work with hospital health record information officers. Data on quality of care were collected and feedback provided to hospitals, with group work around guidelines (English et al., 2017).

Figure 1.1.2: Health workforce relational structures as part of complex health systems 'software'

Reproduced and adapted from: Figure 1. Health policy and systems: alternative perspectives (Sheikh et al., 2011).



Compared to the 'hardware' of health systems, the 'software' is notoriously elusive to capture, and difficult to measure. Despite the importance of 'software' to the functioning of health systems, gathering and using 'soft intelligence' (i.e. word of mouth and what is unspoken) is difficult. Partly due to 'soft data' not easily aligning with more familiar methods of analysis and interpretation, but also because 'soft data' are most richly, and sometimes exclusively, communicated through informal personal interactions, so

authenticity outside of such networks is prone to filtering, censoring or manipulation (Martin et al., 2018).

“Across our sample, participants emphasised the difficulties for senior managers and leaders of forming an accurate picture of the quality of care delivered at the sharp end of care. Conventional approaches to trying to making the realities of the sharp end known to the blunt end of organizations (executives and board members) were sometimes slow and cumbersome, and prone to distort or diminish potential hazards. “What’s actually happening day-to-day at ward level tends to be very invisible traditionally, remarkably so.”(Chief Executive)” (Martin et al., 2015, p.21)

Furthermore, often the ‘back stage’ (i.e. away from patients or carers) ad-hoc opportunistic exchanges, such as those occurring in the hospital corridors, influence decision making (Goffman, 1959; Lewin & Reeves, 2011). These are the very data which somehow must be explored.

The target of many quality improvement efforts, behavioural norms of the healthcare workforce sit within ‘software’. Indeed, better understanding of the relational structures that influence the individual and collective behavioural norms of the healthcare workforce is needed, to enable change through targeted and theory-informed intervention. For example, in Michigan, complex relational interventions were essential in changing norms and culture within healthcare units to bring about improvements in catheter-related blood stream infections. These interventions included influencing leadership practices, communication, and empowering specific members of staff. As a result of this theory-driven initiative, the new practices became embedded as social norms within the units (Bosk et al., 2009).

The relational issue of norms

Behavioural norms of the workforce have also been conceptualised as falling within the ‘software’ of health systems (Sheikh et al., 2011) and are essential to quality healthcare delivery. Indeed, quality improvement is, at its core, concerned with the transition from

current norms of practice to new norms which will afford better patient outcomes and experience. However, entrenched existing patterns of behaviour, or 'practical norms', within healthcare facilities are notoriously difficult to change (De Herdt & de Sardan, 2015). Practical norms refer to the behaviours of healthcare workers that *"diverge considerably and habitually from the official norms"* (De Herdt & de Sardan, 2015, p.24) and cannot be explained by social norms, but do however follow a socially-regulated pattern:

"The gap between official rules and actual behaviour is, per hypothesis, not a space where norms are forgotten or missing, but a space where alternative norms are in use" (De Herdt & de Sardan, 2015, p.21)

'Practical norms' have been described in different professional settings, including healthcare, where health care workers are seen to follow a pattern of behaviour which is distinctly different from both 'official norms' and 'social norms' (De Herdt & de Sardan, 2015). These practical norms represent powerful and widespread tacit unwritten codes of conduct, and have evolved in response to practical realities and challenges of the workplace. They are passed on to newcomers, and operate as an essential part of everyday practice (De Herdt & de Sardan, 2015). Indeed, the 'practical norms' that health workers adopt in executing their roles, can deviate substantially from official 'best practice'. They evolve and are communicated socially, and as such are difficult to capture, measure and change, and are often widespread and deeply entrenched (De Herdt & de Sardan, 2015).

Practical norms do however perform an essential purpose (De Herdt & de Sardan, 2015), enabling staff to navigate the day-to-day challenges and often the uncomfortable, even impossible, realities of work, and use of discretion as 'street level bureaucrats' (Gilson, 2015; Piore, 2010). Discretion, defined as the by-product of the gap between ideology and reality (Piore, 2010), itself creates both a necessity for the development of local practical

norms, and opportunity for advantage. In many settings practical norms have adapted to cope with a legacy of chronic under-resource in terms of human resources, drugs and equipment. Practical norms are therefore an essential requirement to undertaking one's day-to-day work (McKnight et al., 2020). Indeed, resilience of long-negotiated structures of power and practice has emerged, alongside chronic external constraints and inadequacies (Barasa et al., 2017). Such long-standing and complex power arrangements, with integration of the formal and informal, can become uniquely and often exclusively known to those working in the particular setting (Barasa et al., 2017; De Herdt & de Sardan, 2015; Gilson, 2015).

Intervening to improve quality

“Context is a ‘slippery thing’ that can be difficult to apprehend due to its dynamism, multiple interacting levels and blurred boundaries.” (Szymczak, 2018, p.763)

The complexity of neonatal care in Kenya, and indeed health systems more broadly, renders linear cause and effect assumptions that are solely located in interventions as entities, essentially void. Indeed, the implementation context in healthcare, is identified as an important factor in complex interventions (Blacklock et al., 2016), and the importance of interaction of intervention with context is widely recognised when evaluating complex interventions (Greenhalgh et al., 2017; Skivington et al., 2021). Indeed, eight key contextual factors influencing quality improvement efforts were identified from a realist synthesis of 35 articles: leadership, organisational culture, individual skills and capabilities, organisational capacity and capability, data and technical infrastructure, readiness for change, championship and relationships (Coles et al., 2020).

In chapter 1 of their book, *Realistic Evaluation*, Pawson and Tilley (1997) put forward their own opinion in regards to the logic of linear experimental evaluations of interventions in complex systems:

“The underlying logic ... seems meticulous, clear-headed and militarily precise, and yet findings seem to emerge in a typically non-cumulative, low-impact, prone-to-equivocation sort of way.” (Pawson & Tilley, 1997, p.8)

They give the example of reviews conducted in the 1980s of offender rehabilitation programmes, from which they summarise the findings as:

“....most things have been found sometimes to work.” (Pawson & Tilley, 1997, p.10)

Indeed, in the healthcare improvement literature, theory-based approaches have been deemed more promising than randomised controlled trials for transferable learning around healthcare quality improvement initiatives, starting from the realities of social and practical norms within the specific setting (De Herdt & de Sardan, 2015; Dixon-Woods et al., 2011; Shepperd et al., 2009). Indeed, the potential utility of robust transferable theory to guide intervention targets and approaches, far outweighs that of an effect size and confidence intervals with insufficient detail or relevance to be operationalised. As Dixon-Woods (2011) writes:

“Understanding how and why programmes work – not simply whether they work – is crucial. Good theory is indispensable to advancing the science of improvement” (Dixon-Woods et al., 2011, p.167)

Well-developed theory is hence essential for understanding and targeting healthcare worker performance - ultimately human behaviour. Theory can also aid synthesis of findings from across multiple complex intervention studies by explaining and hence predicting what might occur in different settings (Shepperd et al., 2009). As such, theory can help to identify appropriate targets for interventions, as well as hypotheses for

delivering desired changes (Dixon-Woods, 2019). Theory can help to expand relational thinking around intervention typologies (Effective Practice and Organisation of Care, 2015; Waltz et al., 2015).

I therefore posit that quality improvement efforts will be greatly supported by an expanded and deeper understanding of the relational environment of healthcare delivery, and that developing explanatory theory to better understand relational 'software' within neonatal care in Kenya is essential.



1.2 The influence of social ties and relational structures in the healthcare workplace

In the previous section (1.1) I introduced complexity theory and justified the need for better understanding of relational interactions between staff delivering neonatal care, as part of quality improvement efforts. In this section (1.2) I outline aspects from three further substantive sociological theories that have been helpful in informing the framing conceptual thinking of the DPhil, and which demonstrate the significance of relational interactions to the adoption of change, access to information and capital, and reproduction of systems and structure. Though my thinking has been influenced by many sociological theories, as demonstrated in the results chapter (in particular sections 4.1 and 4.2), I have chosen to introduce the following aspects of sociological theory in this chapter, as framing theories for the thesis overall. I justify the choice of each in the proceeding section.

The social workplace

The people that we spend time with during the course of our lives influence our own behaviours. We know that to be true through our own experiences of life and the lives of others, and that influence extends into the workplace. As such, the social ties (i.e. connections) we have with others, influence what we do and why.

In healthcare, social ties between the healthcare staff working in a particular facility are thus of critical importance to information sharing, decision making (Cross et al., 2002), and the implementation of quality patient care. Indeed, multiple studies of patient-sharing

physician peer networks using claims-based data from the US demonstrate the influence of physician peer group on both clinical practice and also patient health outcomes (see Appendix 1.1). Hence, behavioural norms of healthcare workers (including 'practical norms' introduced in section 1.1) are inherently socially mediated.

In order to illustrate the principle of social mediation, and thus the angle from which my DPhil has examined and explored the healthcare workforce, I now introduce three specific aspects of substantive sociological theory from among the many theories that have influenced my work (for reference of these, please see chapter 4 (sections 4.1 and 4.2), as well as the discussion of complexity theory in section 1.1 above). These three aspects of sociological theory in particular have been chosen for special attention here, as they have informed my overall conceptual thinking around social mediation in healthcare.

Namely, they are:

- 1) Rogers' (2003) Diffusion of Innovations, which I have found to be helpful in explaining the importance of peer influence when adopting new practices.
- 2) Social Network Theory (Scott, 2000), which is actually itself a conglomerate of multiple theories, and which I have found to be helpful in explaining the significance of an individual's network position relative to others, in addition to concepts such as strong and weak ties, and homophily (see section below).
- 3) Giddens' Theory of Structuration (Giddens, 1984, 1991), which I have found helpful as a foundational conceptualisation of relational structure and systems existing as a duality.

In the paragraphs below, I will summarise each of these aspects of substantive sociological theory, as the introductory conceptual framing of my DPhil research.

Theory of Diffusion

Firstly, the influence of social mediation on individual behaviour is demonstrated by Rogers' (2003) Diffusion of Innovations theory, and work by Coleman (1957) and others.

Rogers (2003) observed that innovations diffuse through channels of communication, whether this be formal channels such as mass media, or informal social interactions. Indeed, even where messages were relayed to a specific audience through mass media, social interaction influenced how the information was interpreted, and thus ultimately how change occurred (Rogers, 2003).

The key to diffusion of innovations in Rogers' (2003) model is the importance of the adoption behaviours of close peers. Indeed, it has been found that an individual is more likely to adopt an innovation if their close peers have already adopted, even if other individuals in the target population have not. Whilst this may provide some encouragement for those seeking change, the theory recognises the phenomenon of homophily, which permeates social network theory (Scott, 2000) – i.e. that individuals who are similar to one another will preferentially communicate with one another. This can mean that knowledge about innovations may be difficult to spread to individuals who are different from those who already have that knowledge. Indeed, Rogers (2003) describes how adoption of innovations can commonly lead to the widening of inequalities, as late adopters and laggards (who are typically less advantaged than earlier adopting counterparts) reap less benefit from the innovation and their relative disadvantage is further amplified. Furthermore, this can lead to a diversity of consequences, categorised by Rogers (2003) as 1) desirable vs undesirable, 2) direct vs indirect, and 3) anticipated vs unanticipated. In addition, the innovation itself is often re-invented, to better suit the perceived local needs, a phenomenon which has been associated with improved sustainability (Rogers, 2003).

Successful innovations have been shown to follow a similar pattern of adoption over time, with individuals who adopt at the same time displaying similar typologies. As such,

adopters can be categorised as: 1) innovators, 2) early adopters, 3) early majority, 4) late majority, and 5) laggards (Rogers, 2003). This well-observed pattern for the adoption of successful innovations highlights relative differences in thresholds for adoption within the overall population, with Rogers (2003) also adding that the rate of adoption will be different in different social systems. Indeed, whether or not the overall social system favours change will influence (and likely vice versa) the innovativeness of the opinion leaders therein (Rogers, 2003). In addition, the innovation itself may or may not be suitably positioned for the audience, and may or may not be compatible with existing realities (Rogers, 2003):

“Compatibility is the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters. An idea that is more compatible is less uncertain to the potential adopter and fits more closely with the individual's situation. Such compatibility helps the individual give meaning to the new idea so that it is regarded as more familiar. An innovation can be compatible or incompatible with 1) sociocultural values and beliefs, 2) previously introduced ideas, and/or 3) client needs for the innovation.” (Rogers, 2003, p.240)

An example demonstrating the influence of the overall social system on adoption is a realist review into antibiotic stewardship of junior doctors, in which adhering to the prescribing behaviour of consultants was found to trump juniors' own knowledge of antibiotic guidelines in prescribing decisions, even when contradictory (Papoutsi et al., 2018).

Within the process of diffusion, Rogers (2003) describes some specific roles, such as 'change-agent', 'opinion leader' and 'champion'. 'Change-agent' refers to a person who is trying to promote adoption of the innovation amongst others, however as such they are usually markedly different from many of those they are trying to influence, except perhaps from those who are relatively more innovative. As such, Rogers (2003) warns of bias in communication of change-agents towards those who are more alike themselves, thereby further widening inequalities within the population through preferentially targeting those

who are likely to be least in need of the innovation. However, the change agent will hopefully also seek to recruit 'opinion leaders', who are better socially placed to influence others. Indeed, adoption of an innovation by opinion leaders helps to drive the overall adoption curve towards 'critical mass', whereby widespread adoption within the target population becomes increasingly likely. However, depending on the wider social setting, such opinion leaders may be more or less innovative and hence more or less likely to adopt the innovation themselves in the first place. 'Champions' on the other hand are not in the same social position as opinion leaders, but may instead use their accomplished communication and negotiation skills to encourage adoption by others (Rogers, 2003).

In addition, the way in which peers are themselves connected to one another has also been observed to influence adoption (Centola & Macy, 2007). A sufficient degree of social reinforcement through the presence of "*wide bridges*" (Centola & Macy, 2007, p.710) is required for the diffusion of "*complex contagions*" (Centola & Macy, 2007, p.706) which are "costly, risky, or controversial" (Centola & Macy, 2007, p.703). In other words, merely hearing about an innovation, particularly if that innovation is associated in some way with risk, even if that information is coming from a peer, is less likely to result in adoption compared to the influence exerted by multiple connected peers who have all adopted the innovation (i.e. reinforcement) (Centola & Macy, 2007).

Furthermore, in addition to creating opportunities for individuals to more readily adopt an innovation or change through peer networks, these same networks can exert constraint on individuals (Tindall et al., 2014). When considering participation in social movements, Tindall (2014) describes:

"In addition to their role in facilitating mobilization, social network ties can also serve to constrain action in some circumstances. For example, a potential movement participant who has strong ties to individuals who oppose the values and goals of a movement may be constrained in their actions." (Tindall et al., 2014, p.232)

Indeed, Gans (1974) also describes cultural norms and expectations that he proposes constrained protest activity among Boston West Enders in the 1950s against slum clearance, in addition to historical and political influences:

“Fourth, West Enders were reluctant to engage in political activities, partly because they felt it was useless to fight City Hall, but partly also for cultural reasons; they felt they would have looked foolish to kin and peer-group members if they had indulged in such “abnormal” behavior as marching and demonstrating.”
(Gans, 1974,p.525)

“Pro-innovation bias”, has been a criticism of diffusion theory, with little description of what an unsuccessful innovation looks like in terms of adoption behaviours (Rogers, 2003). In addition, more research on rejection, discontinuation and re-invention of innovations has been identified as needed (Rogers, 2003).

Notwithstanding, Rogers’ (2003) theory hence underpins an assumption in my DPhil that adoption of new behaviour (or not) is socially mediated.

Social network theory

Now, I will introduce some pertinent aspects from social network theory which provide a conceptual basis for the importance of network structure (i.e. where individuals are socially positioned in relation to others within the network).

Strength of social ties

Healthcare workers, indeed like all human beings, are social and exist in a network of social exchange, with both 'strong' and 'weak' ties to others (Scott, 2000). 'Strong' social ties refer to close relationships of communication which an individual has with specific others. These strong ties are characterised by frequent reciprocal communication and trust, and as such are suitable for sharing more complex information and may lead to the formation of sub-groups or even cliques (see below). 'Weak' social ties on the other hand, refer to the looser connections one has with specific others, typically with an individual from outside one's immediate social group. Such weak ties are characterised by less frequent communication, and although they can be an important source of novel information and innovation (Granovetter, 1973), more complex information is not easily shared, due to insufficient 'bandwidth' for communicating this type of content (Aral & Van Alstyne, 2011). Weak ties may however make greater resources available to an individual, and ties to a well-connected person can be additionally lucrative. Though strong ties commonly connect those who are similar to one another in some way, weak ties often connect those who are different. Thus, in addition, weak bridging ties have been credited with holding wider communities together which might otherwise fragment into smaller cliques, as Granovetter (1973) describes:

"...weak ties, often denounced as generative of alienation are seen here as indispensable to individuals' opportunities and to their integration into

communities; strong ties, breeding local cohesion, lead to overall fragmentation.”
(Granovetter, 1973, p.1378)

Ties between two individuals may or may not be reciprocated, and different individuals may share ties to common specific others. Where there is a density of close ties between the contacts of an individual, that individual may hear the same information multiple times from different others, thus reinforcing the message being communicated. However, this can also contribute to redundancy of information (Scott, 2000).

Sub-groups, clusters, cliques

Social networks, or the patterns of social ties, within the hospital workforce are built by communication and exchange between individuals. Individuals often share values, meanings, ways of interpreting the world, and aspects of identity with a group of close peers (Kawachi et al., 2008; Morris & McClurg Mueller, 1992; Scott, 2000). Such collective frames or understandings are reinforced by observing the behaviours of other group members and are evolved and strengthened through ongoing conversations, discussion and debate (De Herdt & de Sardan, 2015; Garud et al., 2007; Morris & McClurg Mueller, 1992). The maintenance or evolution of group norms (Garud et al., 2007) is often led by specific influential individuals within the group (Bene, 2017).

Social groups and the social capital possessed by them, are linked to trust and provide the groundwork for change (Gloede et al., 2013; Jenkins, 1983; Millar, 2013; Morris & McClurg Mueller, 1992). Innovation can disseminate quickly and effectively if such groups identify with, and participate in, collective social action frames (Millar, 2013; Morris & McClurg Mueller, 1992).

Whilst certain social capital is desirable and often necessary, there may be ‘dark sides’ (Portes, 2017; Villalonga-Olives & Kawachi, 2017) such as excessive demands on individuals who may be sought by multiple others, or for multiple purposes, or who are in

a position of brokerage (see below). Social sub-groups and cliques may be associated with excessive informal control and exclusion of non-members. 'Down-levelling' norms (i.e. collective system disadvantage associated with belonging to a specific social group) can also occur, acting to limit opportunities for members of specific social groups (Marchal et al., 2013). Social contagion of poor behaviours can also occur, for example, and cross-level interactions between individual-level and group-level characteristics (e.g. a high-trust individual living in a low-trust community), may act to dilute or oppose innovations (Villalonga-Olives & Kawachi, 2017).

Bridges, holes, and brokers

Social networks are often clustered into sub-groups or cliques of similar individuals, displaying 'homophily' (also see text above) (Scott, 2000), thus illustrating the 16th Century proverb, 'birds of a feather flock together'. Where there are boundaries between such groups within a larger network, information typically cannot easily travel between groups due to lack of social ties. Such gaps in information flow in the overall network are termed 'structural holes' (Burt, 1992, 2005; Scott, 2000). These can be problematic for either or both disconnected parties, therefore structural holes also create opportunity for the gap to be bridged by a 'broker' (Burt, 1992, 2005; Scott, 2000).

Brokerage is the act of receiving and communicating information between otherwise unconnected groups of individuals. The position of broker is inherently powerful, as both groups are dependent on the broker to access novel information, without which they would be disadvantaged. Brokers must be accepted (or at least accessible) to both disconnected groups, and must be able to communicate effectively with both. However, brokerage of information is intrinsically reliant on mediation by the broker, with associated risks of incomplete or selective transmission, and the workload of brokerage may put brokers themselves under excessive strain (Burt, 1992, 2005; Scott, 2000). The importance of not only the ties of an individual to others, but also the ties held by those

specific others to whom an individual is tied, are well described (Scott, 2000). Bridging ties for example, enable access to additional social capital (Scott, 2000).

Peer comparison, particularly with structurally equivalent individuals (i.e. those in equivalent social positions within the social network), may also influence professional behaviour (Zheng et al., 2010).

Power

Importantly in social network theory, those in formal leadership or management roles may not automatically occupy a corresponding social status or position in the hospital (Cross et al., 2002; Scott, 2000). For example, failure to appropriately execute duties in an official leadership role may result in unofficial filling of a perceived 'leadership vacuum' by others (Barasa et al., 2017). Or a nominated 'opinion leader' with little social capital may not be very effective (Zheng et al., 2010). Clinical 'hybrid-managers' must also manage competing priorities of management and clinical work, the balance of which will depend on clinical pressures, and the individual's personal preferences (English et al., 2017; Nzinga et al., 2013, 2018). In addition, competing pressures on those in formal leadership or management roles must be managed, including external social influences (De Herdt & de Sardan, 2015). Such competing pressures may make decision-making exceedingly difficult, for example when specific others also hold power over an individual's promotions or postings (De Herdt & de Sardan, 2015). The individual must therefore skilfully negotiate a web of relational influences, particularly when their decisions might be unpopular with some (De Herdt & de Sardan, 2015; Gilson, 2015; Omaswa & Crisp, 2014; Scott, 2000).

Another example of where power and influence might be enacted within social networks is around hospital resources (Barasa et al., 2016). Indeed, the purpose of many social interactions is to access resources (e.g. informational, social or material) that are not otherwise possessed (Morris & McClurg Mueller, 1992; Scott, 2000). Lack of essential medication, consumables and equipment needed to deliver basic patient care is common

in many hospitals in sub-Saharan Africa, due to delays, challenges at various points in the supply chain, and insufficient supply or inequitable distribution (Barasa et al., 2016, 2017; Nzinga et al., 2009). This inevitably leads to bricolage, through a process of consciously or unconsciously adapting to change through using the available (De Herdt & de Sardan, 2015).

In the hierarchical and 'tribal' system of professions, it must also be noted that parallel structures of leadership and management can exist in the same hospitals and on the same wards (Nzinga et al., 2018; Omaswa & Crisp, 2014). As such, there may be little interaction between professions due to these organisational hierarchies, even among those working on the same ward, and junior staff of different cadres may experience the authoritative behaviour of their seniors in different ways (e.g. intimidation) (Nzinga et al., 2018).

Social network analysis

Social networks analysis, which I will describe more fully in the methods chapter, allows visualisation and measurement of ego-centric and whole network metrics, from collecting data on social ties. Social Network Analysis represents a meeting of sociology, mathematics and statistics (Wasserman & Faust, 1994), assigning metrics to human exchange, quantifying activity of workforce communication through measures such as density and centrality, and using various mathematical and statistical techniques including matrices (Scott, 2000). Through careful study of social networks using this methodology, obscurities of tacit power and influence can be illuminated. Indeed, metrics can be visualised using sociograms, first developed by Moreno in the 1930s (Wasserman & Faust, 1994). The sociogram is a graphic representation of individual actors and the ties between them, and has transformed how relationships can be visualised (Wasserman & Faust, 1994).

Social Network Analysis (SNA) hence measures and maps the relational ties between individuals - a major determinant of change in behaviour and hence quality improvement. Indeed, understanding of sub-cultures, social networks and bricolage (see quotation below) is likely necessary (De Herdt & de Sardan, 2015; Gilson, 2015; Piore, 2010).

“In the processes of bricolage, people (consciously and non-consciously) draw on existing social formulae (rules, traditions, norms, roles and relationships) to assemble and adapt arrangements in response to changing situations.” (De Herdt & de Sardan, 2015, p.209)

Since we know that norms are socially mediated, SNA offers a focused lens through which to view human factors and to understand the relative social position and influence of staff in a healthcare facility.

As such, social network theory has contributed substantial conceptual underpinning to my DPhil work, and has justified assumptions made in my work about the significance of social ties in the healthcare workplace, the importance of relative individual social positions, and the use of social network analysis as a methodology within multi-methods data collection.

Giddens' theory of structuration

I will now introduce a final aspect of sociological theory, which contributes a helpful underpinning conceptualisation to how interactions occur and are sustained within the healthcare workforce - Giddens' theory of structuration (Giddens, 1984, 1991) (Figure 1.2.2). Giddens' theory of structuration has been criticised by those advocating dualism over duality (Archer, 2010), however I have found it to be very helpful in providing some underpinning assumptions in my DPhil.

The concept of duality in structuration (see below) differs from the Donabedian (2005) assertions of linearity (albeit uncertain) between structure, process, and outcome.

"The assumption is made that given the proper settings and instrumentalities, good medical care will follow. This approach offers the advantage of dealing, at least in part, with fairly concrete and accessible information. It has the major limitation that the relationship between structure and process or structure and outcome, is often not well established." (Donabedian, 2005,p.695)

Giddens describes this theory as an "ontology of social life", stating:

"Specifically, it [structuration theory] is the label I attach to my concern to develop an ontological framework for the study of human social activities. By 'ontology' here, I mean the conceptual investigation of the nature of human action, social institutions and the interrelations between action and institutions." (Giddens, 1991, p.201)

And, further:

"In seeking to come to grips with problems of action and structure, structuration theory offers a conceptual scheme that allows one to understand both how actors are at the same time the creators of social systems yet created by them." (Giddens, 1991, p.204)

Moreover, he states:

"In structuration theory the core concern of the social sciences is with recurrent social practices and their transformation" (Giddens, 1991, p.203)

Figure 1.2.1: Giddens' theory of structuration

Figure reproduced with permission from Giddens (1984, p.25)

The Duality of Structure		
<i>Structure(s)</i>	<i>System(s)</i>	<i>Structuration</i>
Rules and resources, or sets of transformation relations, organized as properties of social systems	Reproduced relations between actors or collectivities, organized as regular social practices	Conditions governing the continuity or transmutation of structures, and therefore the reproduction of social systems

Structuration is indeed a useful schema for allowing oneself to dispense with grappling between relational structure and the relational activities that occur as both cause and product of these. It allows the duality of these entities to be named (structuration) (Bryant & Jary, 1991; Giddens, 1984) (Figure 1.2.2) and for the focus of scientific questioning to move away from the 'what', towards the 'how'. By providing meaningful and simple conceptual language to frame the *"...core concern of the social sciences [which] is with recurrent social practices and their transformation"* (Bryant & Jary, 1991,p.203), the theory of structuration both supports and encourages further, and more detailed, scientific inquiry as to the specifics of how duality of structure occurs in healthcare settings.

At this point, I would like to illustrate how I visualise Giddens' theory of structuration and its relevance to my work with two analogies from nature: 1) a murmuration of birds, and 2) a school of fish.

A murmuration is the term given to the fantastic sight of many hundreds (or even thousands) of birds (usually starlings), creating large moving shapes like dancing and billowing clouds in the sky, by their synchronised flying. This analogy is akin to structuration - the flying of birds causes a collective visible form in the sky, which in turn produces the direction of flight. It is thought that how this occurs is by individual birds

watching several other birds (Natural History Museum, n.d.; Wildfowl and Wetlands Trust, n.d.):

“Starlings and shorebirds like dunlin and plover sometimes reach speeds of 40mph in dense groups where the space between them may be little more than their body length. Yet they can exhibit lightning reactions and make seemingly synchronised turns, appearing to move as one. How do they do it? Research has shown that in fact a turn ‘ripples’ through a flock, much as a cheerleading wave passes through sports fans at a stadium. Rather than waiting for a cue from their immediate neighbour, a bird watches a number of birds around it. As a result, the ‘ripple’ through a flock is three times faster than could be explained if the birds were just watching the bird next to them.” (Wildfowl and Wetlands Trust, n.d.)

Again, a school of fish refers to the coordinated movements of a group, unlike a shoal, where movements are uncoordinated (Dimensions, n.d.). How this happens is through sensing the activity of those around them (Dimensions, n.d.; MacDonald, n.d.):

“Each fish coordinates with its neighbors through a combination of visual contact and their lateral line, an organ along each side of the body that can sense extremely subtle pressure changes in the water around the fish. If a neighbor turns or speeds up, for example, it will be felt in the lateral line and the fish can respond accordingly. In this system, the number of neighbors to which each fish pays attention helps determine the size of the group and the degree of coordination.” (MacDonald, n.d.)

Identifying how structuration of the relational environment (i.e. the duality of workforce social ties and social structures) occurs in healthcare, indeed forms the crux of understanding the ways in which the actions (or norms) of healthcare workers are reproduced and transformed, and is an area of great scientific need for quality improvement.



1.3: Realism and the contribution of theory

In the preceding sections of chapter 1, I justified the need for better understanding of relational interactions between staff delivering neonatal care, as part of quality improvement efforts (1.1). I then demonstrated the significance of relational interactions to the adoption of change, access to information and capital, and reproduction of systems and structure, drawing on substantive sociological theory (1.2). In this section (1.3) I justify the use of realism, as put forward by Pawson and Tilley (1997), as my approach to science throughout the DPhil.

“From its youthful first steps as a philosophy of science, through all the assorted disciplinary applications, and despite the bouts of infighting, realism stands foursquare behind the generative model of causation.” Pawson (Pawson, 2006, Ch.2, p.6)

As already outlined in this chapter, neonatal units in Kenya are complex systems with quality of patient care relying on both material resources and human behaviour. Within neonatal units, relational structures and practices influence the behavioural norms of staff, and hence patient care. Senior nurses hold unique roles within such units, and have the potential to be highly influential. To better and more precisely understand the details of relational processes and structures that are so influential in the delivery of neonatal care, explanatory theory with clear routes for practical implementation, is needed.

Realism, as put forward by Pawson and Tilley (1997), with its focus on building testable abstracted explanatory programme theory from robust and relevant data through the

process of constructing context-mechanism-outcome configurations, offers a unique way to draw transferable learning from diversity. Since healthcare delivered in unique facility settings paradoxically exhibits both difference and sameness, realism offers an approach for building theory that will allow deeper and more useful understanding of health systems 'software' (Sheikh et al., 2011). A departure thus takes place, away from the mean effect size and confidence intervals of randomised controlled trials, to using theory to understanding how, why, for whom and in what circumstances, outcomes occur.

Realism seeks to scrutinise relevant and rigorous data from the realm of the 'actual' (i.e. what we can perceive with our human senses), to come as close as possible to understanding the 'real' (i.e. how things really work, without the imperfect filter of our senses). From observing 'demi-regularities', or patterns in the data that occur some of the time, explanatory theory can be built which in turn can be tested (confirmed, refuted or refined) through empirical data collection (Greenhalgh et al., 2017; Wong et al., 2013) (Table 1.3.1). Indeed, realism offers an empirically-based approach to building robust theory within the healthcare sciences, with a transparency of methodology amenable to critical review and an approach to quality appraisal.

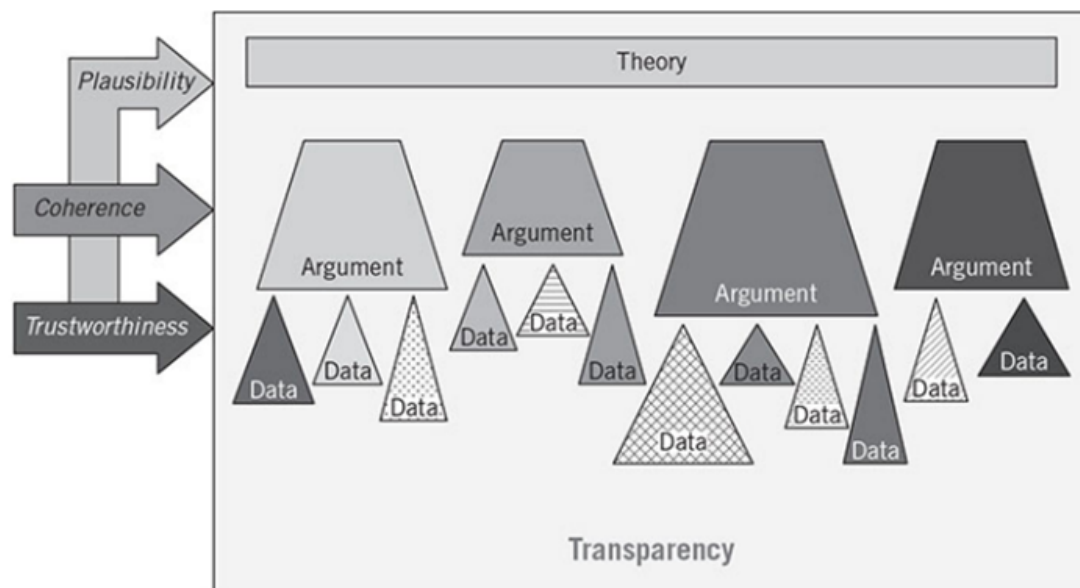
The central focus of realist enquiry is eliciting the causative mechanism within a Context-Mechanism-Outcome configuration (CMOC). The CMOC, representing a theoretical argument derived from demi-regularities in the data (see Glossary of Terms), seeks to explain why a specific outcome (e.g. getting out of bed quickly) occurs in a specific context (e.g. alarm going off on the day of an important presentation). It does this by identifying the mechanism (e.g. prioritising giving an important presentation over staying in bed). Hence, CMOCs provide causal explanations for an outcome in a particular context, through the identified mechanism. The CMOC is formulated from relevant and rigorous data, and represents the unit of realist programme theory building. From the explanatory arguments articulated as CMOCs, abstracted programme theory can be

developed (Emmel et al., 2018; Wong et al., 2013) (Figure 1.3.1). Cumulation can also further refine theory over time as understanding is improved by learning from “similar programmes” (Pawson, 2006).

Figure 1.3.1: Realist theory building

Reproduced with permission Wong G. (2018) Chapter 8: Data Gathering in Realist Reviews: Looking for needles in haystacks. In: Emmel et al. (Eds). Doing Realist Research. SAGE. (Emmel et al., 2018, Ch.8, p.9, e-version)

Figure 8.1 The relationships between theory, arguments, data, trustworthiness, coherence, plausibility and transparency



NB: Within this figure the size of the shapes has been used to illustrate the degree of trustworthiness and coherence of data and arguments respectively. The colours simply illustrate that data or arguments are different and varied.

Realism rejects a linear model of causation when it comes to complex interventions.

Furthermore, realism rejects the notion that causation is located in the intervention itself.

Whether an intervention ‘works’ or not will depend on the context(s) in which it has been implemented (Pawson, 2006, 2014). Pawson (2006) states:

“Programme subjects are always faced with a choice, but it is both a limited and a loaded one. They enjoy different pre-existing relationships that leave some well placed and some ill placed to take up the opportunities provided by the

intervention. They come to programmes with power, or lack of it, which enables some to resist and some to embrace the ideas of the programme.” (Pawson, 2006, Ch.23, p.11, e-version)

Instead, the realist approach uses the concept of mechanisms, as well as the aspect of context which triggered each mechanism, to explain causation. Mechanisms are considered to be a:

“latent (often invisible) property/entity, sensitive to variations in context, which when activated causes an outcome to occur.” (Wanyama et al., 2023, p.2)

By identifying the triggering aspect of context, this can be considered as a potential target for intervention. In other words, alternative desired outcomes can be made to happen, by manipulating context using interventions. The site of intervention in realism is at the context level, manipulation of which thereby triggering alternative mechanisms and more desirable outcomes. This fundamental standpoint aligns with the principles of interventions in complex adaptive systems, proposed by Barasa (2017):

“In other words, intervening in CAS [complex adaptive systems] is about fostering productive emergence rather than simple, mechanistic, cause and effect type solutions.” (Barasa et al., 2017, p.112)

Furthermore, the realist approach enables rich explanatory theory to be developed, beyond the identification of ‘barriers and facilitators’ (Szymczak, 2018):

“By thinking about context in terms of ‘barriers and facilitators’, we run the risk of generating accounts that are static, predetermined, and driven by theoretical frameworks that are not grounded in the reality of life in complex healthcare organisations.” (Szymczak, 2018, p.764)

As such, I have chosen to use a realist approach to science throughout my DPhil for the following reasons:

- Realism is well suited to the study of complex healthcare systems
- Realism uses a structured and integrated approach to the analysis of mixed methods data, by developing explanatory arguments from demi-regularities in the dataset, using the context-mechanism-outcome format
- The realist approach allows transparency to be demonstrated throughout the analysis process, by the use of illustrative data to support explanatory arguments, and clear linkage between arguments and the formation of abstracted theory
- Realist programme theory is in the middle-range, and as such should be testable and potentially transferable
- Realist programme theory moves beyond mere description (Dixon-Woods, 2019) to explanation, and in so doing demonstrates causality and identifies targets for intervention



1.4 DPhil Aim and Objectives

In chapter 1, I justified the need for better understanding of relational interactions between staff delivering neonatal care, as part of quality improvement efforts (1.1). I demonstrated the significance of relational interactions to the adoption of change, access to information and capital, and reproduction of systems and structure, drawing on substantive sociological theory (1.2). I then justified the use of realism, as put forward by Pawson and Tilley (1997), as my approach to science throughout the DPhil (1.3). Finally, I set out the research questions, aim and objectives of the DPhil (1.4), which the remainder of this thesis seeks to fulfil.

To return to the title of my thesis, I have considered this broader focus of questioning and scientific study to be essential in furthering understanding of the relational environment specific to senior nurses. In other words, I considered that understanding specific to the relational influence of senior nurses would only be possible when drawn from a more holistic theoretical understanding of the relational environment of the neonatal care workforce at large. Indeed, the inter-dependency of CAS and the value of studying the whole system is argued by the theoretical physicist Gell-Mann:

“Today the network of relationships linking the human race to itself and to the rest of the biosphere is so complex that all aspects affect all others to an extraordinary degree. Someone should be studying the whole system, however crudely that has to be done, because no gluing together of partial studies of a complex nonlinear system can give a good idea of the behavior of the whole.” Murray Gell-Mann (Sturmberg & Martin, 2013, p.vii)

Therefore, the aim of my DPhil is seemingly broad, in order to understand the specific.

DPhil aim:

To examine social ties between healthcare staff and how these influence the workplace and delivery of neonatal care in Kenya, and to develop explanatory programme theory.

DPhil research questions:

1. What can we learn from research on staff social ties that informs our thinking on strategies that support collective behaviour change in hospitals?
2. How, why, for whom, to what extent and in what context do the social ties of staff (particularly senior nurses) in a neonatal unit in Kenya influence quality of care being targeted by improvement efforts?
3. What lessons can be drawn from examining staff social ties, to guide the design of interventions to improve neonatal care in Kenyan hospitals that require collective behaviour change?

DPhil objectives:

1. Develop a programme theory from the literature using realist synthesis to understand how staff social ties influence behaviour and quality of care in hospitals (addressing research question 1).
2. Conduct open and inductive empirical work to explore how social ties influence the implementation of improvement projects in Kenyan neonatal wards, combined with more directed efforts to explore social networks. Draw on these findings to explore the

transferability of the programme theory and the changes required to use the theory in the specific setting of neonatal units in Kenya (addressing research question 2).

Bring together the empirical findings to refine the programme theory for the specific setting of neonatal care in Kenya, and develop a practical theory that indicates how intervention designs can take account of social ties so that collective change efforts are more likely to be successful (addressing research question 3).

2.0 Methods

Table 2.0 Outline of Methods Chapter

2.0 Methods		2.1 Initial Programme Theory (IPT) development using realist synthesis	Description of the steps taken to develop an initial programme theory from realist synthesis of the literature
		2.2 Programme theory development and refinement using realist evaluation	Development of the protocol and multi-methods study tools (non-participant observation, in-depth interviews, social network analysis) of the realist evaluation component of the Pathways Study
		2.3 The use of multiple methods, and multiple perspectives	Account of the approaches taken to integrate multi-method data, as well as engagement with multiple perspectives during the research process
		2.4 Identifying candidate interventions from the literature, that target relational aspects of healthcare delivery	Description of a focused review of the literature, aiming to identify relevant candidate interventions targeting relational aspects of healthcare delivery

In chapter 2, I describe the methods used to fulfil the aim and address the research questions and objectives presented in chapter 1. The chapter is divided into four sections, illustrated in Figure 2.0. In the first section (2.1), I set out the methods used to develop an initial programme theory from the literature. Then, in section 2.2, I show how this initial programme theory was further refined and developed using realist evaluation of empirical data (non-participant observation, in-depth interviews, social network analysis), and how sense-checking with stakeholders was undertaken. In section 2.3 I describe the ways in which multiple methods and multiple perspectives were integrated during the course of

the DPhil. Finally, in section 2.4, I report the methods used to search the literature for relevant candidate interventions.

Analytic process and choices made in my DPhil

Before I set out the main three methods used in my DPhil (realist synthesis, realist evaluation, scoping review), I briefly summarise my overall analytic approach, to justify and expand on my choices.

As presented in the previous chapter, my research questions were:

1. What can we learn from research on staff social ties that informs our thinking on strategies that support collective behaviour change in hospitals?
1. How, why, for whom, to what extent and in what context do the social ties of staff (particularly senior nurses) in a neonatal unit in Kenya influence quality of care being targeted by improvement efforts?
2. What lessons can be drawn from examining staff social ties, to guide the design of interventions to improve neonatal care in Kenyan hospitals that require collective behaviour change?

My approach to analysis connects the three main methodologies presented in this chapter (i.e. realist synthesis, realist evaluation, scoping review) to address the research questions. Firstly, the realist synthesis was designed to produce an initial programme theory from the literature (addressing research question #1) which could be tested and refined for the specific setting of neonatal care in Kenya, using realist evaluation of primary data (collected through non-participant observations, in-depth interviews and social network analysis). The resulting programme theory (the novel GELLE Framework, presented in Chapter 3 – addressing research question #2) provides a way to identify specific aspects of context amenable to manipulation, and as such was used in the

analysis stage to map candidate interventions identified from a scoping review of the literature by conceptual relational target (addressing research question #3, alongside stakeholder feedback collected as part of the realist evaluation activities).

I intentionally chose a realist approach to answer the first two of my research questions. Alternative approaches to answering these questions might have included ethnography, for example, to develop thick descriptions (Ponterotto, 2015). Alternatively, I could have undertaken qualitative work to construct narratives around the experiences of staff and associated 'barriers and facilitators'. However, if I had chosen from among these alternative approaches, my DPhil would have served a different purpose, due to substantial epistemological contrasts. As it stands, the approaches and methods that I chose and present in this Methods Chapter are designed to produce pragmatic realist programme theory.

It is the explanatory power of the realist approach that I believe is essential to enable this DPhil to illuminate clear paths to improvement and implementation for healthcare workers. Understanding how, why, for whom *and in what circumstances* things happen, is necessary for achieving meaningful change. Indeed, the realist approach does not neglect context (when compared, for example, to ethnographic thick descriptions (Ponterotto, 2015)), but engages deeply with context in a markedly different way (Wong et al., 2013), through systematically identifying detailed aspects of context relevant to causation and the mechanisms triggered (in the form of context-mechanism-outcome configurations). Moreover, the realist approach theorises how manipulation of context will lead to alternative mechanisms and different outcomes, thereby informing intervention design and implementation.

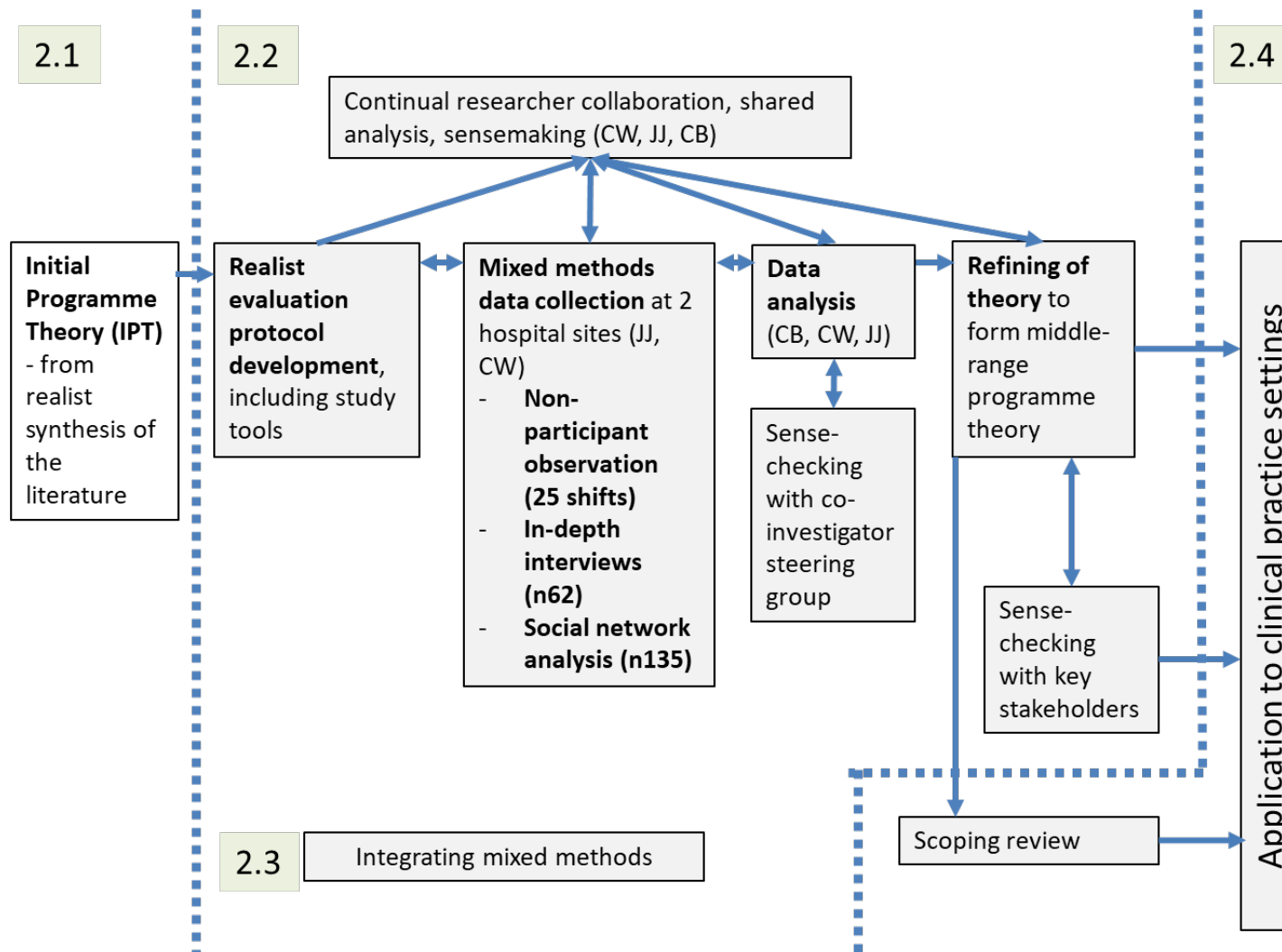
For the purpose of understanding *healthcare workplaces*, a realist approach to theory development offers particular benefits. Firstly, healthcare settings are home to continual quality improvement ambitions and efforts, so understanding context in terms of causation

will help to guide such efforts. Secondly, the realist expression of context-mechanism-outcome (CMO) summarises social pattern in an explanatory statement. As such, the statement is a step away from the rich, messy and sometimes emotive contributing data, to enable understanding of causation to inform interventions. Further, the abstraction of realist programme theory permits appreciation of the interaction and inter-dependence of different co-existing causative pathways, ideal for understanding complex adaptive systems of which the healthcare relational workplace is exemplar. As such, CMOCs and abstraction of programme theory permit identification and relative positioning of theoretical details within a broad and inter-dependent relational whole, for the purpose of informing improvement interventions.

Within the overarching focus on staff social ties, a specific focus of my DPhil has been to better understand the role of senior nurses within the relational workplace of neonatal care in Kenya, reflected in both my DPhil title and second research question: *How, why, for whom, to what extent and in what context do the social ties of staff (particularly senior nurses) in a neonatal unit in Kenya influence quality of care being targeted by improvement efforts?* To answer this question, I chose to collect and analyse data relating to senior nurses alongside data relating to other staff within the neonatal unit and present the theoretical findings as integrated (see Results Chapter). I made this choice in line with the conceptual assumptions underpinning complexity theory and social network theories around inter-dependence that have fundamentally influenced my scientific approach and methods. Specifically, by collecting, analysing and presenting findings relating to senior nurses in the 'relational whole', my intention has been to consistently reflect that senior nurses and their relational influence cannot be isolated from the rest of the relational workplace. In addition, differences in contextual circumstances are accommodated by the realist approach. For example, the relational influence of a senior nurse working in one particular set of contextual circumstances may differ from another. The realist approach allows these differences to be both captured and explained.

The third research question of my DPhil was: What lessons can be drawn from examining staff social ties, to guide the design of interventions to improve neonatal care in Kenyan hospitals that require collective behaviour change? As presented in the last section of this methods chapter, I chose to answer this question by drawing on the findings of a scoping review, in addition to stakeholder feedback and recommendations received in Kenya. I chose to undertake a scoping review to explore a broad and diverse literature, in order to identify and map candidate interventions that targeted the relational workplace.

Figure 2.0: Schema to show how reporting of the research methodology is divided into sections, within chapter 2





2.1 Initial Programme Theory (IPT) development using realist synthesis

In this section (2.1), I set out the methods used to develop an initial programme theory from realist synthesis of the literature. The findings from the realist synthesis can be found in chapter 3.1.

I registered the protocol for the realist synthesis with PROSPERO (Blacklock et al., 2019) (see Appendix 2.1.1):

Claire Blacklock, Amy Darwin, Lisa Hinton, Jacob McKnight, Mike English, Geoff Wong. The social networks of hospital staff: a realist synthesis. PROSPERO 2019 CRD42019122049 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42019122049

The realist synthesis that is described in this section has been published as a peer reviewed paper (Blacklock et al., 2022) (see Appendix 2.1.2):

Blacklock C, Darwin A, English M, et al. The social networks of hospital staff: A realist synthesis. Journal of Health Services Research & Policy. 2022;27(3):242-252. doi:10.1177/13558196221076699

This text has been adapted from published work (Blacklock et al., 2022) – the content has been adapted, the formatting of references has been changed, as have the titles and numbering of tables and figures, to align with the rest of the thesis.

As described in chapter 1, I chose to use a realist approach to science, as put forward by Pawson and Tilley, throughout the course of this DPhil.

The initial programme theory, which was used to guide the design of the following realist evaluation, was developed using realist synthesis. As already introduced in chapter 1, the product of the realist approach is explanatory programme theory. Data that are relevant and rigorous are examined for demi-regularities to explain causation. Arguments in the form of context-mechanism-outcome configurations are developed from identification of demi-regularities, and abstracted theory is developed in the middle range (i.e. it is both testable and transferable). Through the development of theory and the identification of specific aspects of context that trigger particular causative mechanisms, potential targets for interventions are singled out. As defined in Box 1.3.1, context refers to a specific aspect of a setting which triggers a specific mechanism, which in turn refers to a latent, often invisible property of a person, object, or institution, which is triggered or activated by exposure to a specific context and causes a specific outcome to occur.

The purpose of this realist synthesis was to fulfil the first objective of the DPhil, set out in chapter 1: Develop a programme theory from the literature using realist synthesis to understand how staff social ties influence behaviour and quality of care in hospitals.

This understanding from the literature would form the foundation for the design and conduct of realist evaluation in Kenya.

In the conceptualisation and design phase of the realist synthesis, a basic 'best guess' initial programme theory was formed (Figure 2.1.1), using relevant sociological theory, literature from neonatal units in Kenya, and the professional experiences of healthcare settings of both myself and multiple colleagues. This was used to design the search strategy, with assistance from a specialist health librarian, Elinor Harriss (EH). Search terms used are shown in Table 2.1.1. The following databases were searched by EH from inception to 17-18 December 2018 without language or date restrictions:

Table 2.1.1 Search terms

Participants/population	Intervention(s)/exposure(s)	Main outcome(s)
"Personnel, Hospital"[MeSH Terms]) OR ("Health personnel"[MeSH Terms] AND "Hospitals"[MeSH Terms]) OR staff[Title/Abstract]) OR surgeon*[Title/Abstract]) OR midwi*[Title/Abstract]) OR nurs*[Title/Abstract]) OR keeper*[Title/Abstract]) OR porter*[Title/Abstract]) OR supervisor*[Title/Abstract]) OR pharmacist*[Title/Abstract]) OR doctor*[Title/Abstract]) OR physician*[Title/Abstract]) OR manager*[Title/Abstract]) OR leader*[Title/Abstract]) OR technician*[Title/Abstract]) OR therapist*[Title/Abstract]) OR physiotherapist*[Title/Abstract]) OR aide*[Title/Abstract]) OR assistant*[Title/Abstract]) OR officer*[Title/Abstract])) OR administrator*[Title/Abstract])	SNA[Title/Abstract] OR "social network"[Title/Abstract] OR "social networks"[Title/Abstract]	<i>No search terms included for outcome</i>

I screened all citations retrieved by the database search against the inclusion and exclusion criteria (Table 2.1.2), with 10% also screened independently by Amy Darwin (AD – a UK-based junior medical doctor, with MSc and International Health) to check for systematic error in the inclusion / exclusion decisions. I had decided to only include those studies using social network analysis in the methods, in order to narrow the studies included in the synthesis, and make screening decisions more feasible within the potentially broad focus of the review. Titles and abstracts were screened, followed by full texts of relevant documents. If two or more documents related to the same study, all additional reports were included only if novel data from the study were reported. I imported full texts of all included documents into NVivo v12.0 for data extraction. I then

extracted and coded data of relevance to the research question from each included document. Inductive codes were assigned to sections of text within any included document, and 10% of refined iterative coding (stage 3 below) was checked for consistency by AD, who gave me her feedback. The further stages of analyses were discussed with AD and the rest of the co-authors on the published manuscript. The co-authors had substantial relevant expertise and experience, including realism, health systems research, global health, sociology, ethnography, health information, and clinical practice.

Table 2.1.2. Inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
• Empirical study (i.e. both observation and intervention designs) • Must use a form of social networks analysis in methodology • Hospital setting • Primary focus on social networks of hospital staff (i.e. clinical and non-clinical staff)	• No empirical data collection • No use of social networks analysis (SNA) in methodology • Community, primary care, public health, or health policy setting • Primary focus on social networks of patients, carers, relatives, lay health workers or students • Focus on online social networking • Studies using insurance claims-based data

I undertook data extraction and analysis concurrently, using an immersive, iterative, and refining approach (Pawson, 2006; Wong et al., 2014). Iterative cycles were undertaken to help visualise, make sense of, and configure the data, seeking to further refine context-mechanism-outcome-configurations using repeated cycles of analysis (Figure 2.1.2a and Figure 2.1.2b). I looked for semi regular outcome patterns in the data (Wong et al., 2013) and developed CMOCs from the data contained within and across the included documents in several stages (Table 2.1.3):

Table 2.1.3: Stages of iterative data analysis

1	I conducted iterative coding for 25 documents, coding relevant data using descriptive terms deemed to reflect the emerging major themes from the data. I created novel codes whenever relevant data did not fit with an existing code. I did not set a limit for the number of new codes.
2	I reviewed and refined nodes by re-reading coded data and by using manual visualisation/mind-mapping and summarising of data under each node on flip-chart paper. Throughout this process, duplicated or equivalent meanings of codes were combined or collapsed, and similar codes were organised into groups along major themes identified from data extracted from the included documents, thus creating new refined nodes.
3	I used a combination of deductive coding using the refined nodes, and continued iterative coding, to code 34 further reports.
4	Nodes were exported into Microsoft Word, and sorted manually in Word documents into more detailed sub-nodes to expand the emerging thematic granularity within the data.
5	I then repeated a process of visualisation and summarising of the coded data, using a series of large whiteboards for each higher-level node, to identify explanatory pathways from data within each code. This step sought to begin to move away from thematic coding towards constructing theoretical explanatory units from the data, which would be used as new codes.
6	I then sought to convert the identified explanatory pathways within each higher-level node into more abstracted explanatory statements by transcribing from the whiteboards into Word. These explanatory statements were written in prose, allowing greater clarity in identification and absorption of all relevant supporting data.
7	I then integrated all explanatory statements from the higher-level nodes by manually cutting and sticking printed colour-coded text from transcribed statements onto a large piece of flip chart paper. This allowed any duplication and iteration of a common pathway to be identified, and combined. Identified statements could be visually sorted and ordered into domains in relation to one another, thus further contributing to programme theory development.
8	From the processes described in steps 5-7, higher-level nodes were then created and further refined, and these refined nodes were used to subsequently code the data from the remaining documents.
9	Newly coded data from the remaining documents were then used to refine, expand and enrich existing explanatory statements.
10	I constructed CMOCs as written sentences with clear identification of the context, mechanism and outcome in each, to articulate the granularity and detail of explanatory statements and define these as distinct explanatory units of middle-range theory.
11	CMOCs were further refined by discussion between authors, and by open discussion of methodology and emerging findings as part of a realist tutorial group, which I attended with Geoff Wong (GW).
12	I finally re-read all data extracted from all included documents and assigned those data to each refined CMOC, providing a further check that the refined CMOCs were indeed representative of and supported by the data. From the refined CMOCs, I developed the realist programme theory, which took the form of a short narrative text.

Data interpretation and analysis were also informed by feedback from six stakeholders from sub-Saharan Africa with relevant content expertise and experience to sense-check emerging explanations of phenomena within the programme theory (1, Sierra Leone, 5, Kenya), over a period of two years. Of these, I engaged in formal discussions with four stakeholders (1, Sierra Leone, 3, Kenya) who provided feedback at different stages of the review.

Figure 2.1.2a: Realist synthesis data analysis (1 of 2)

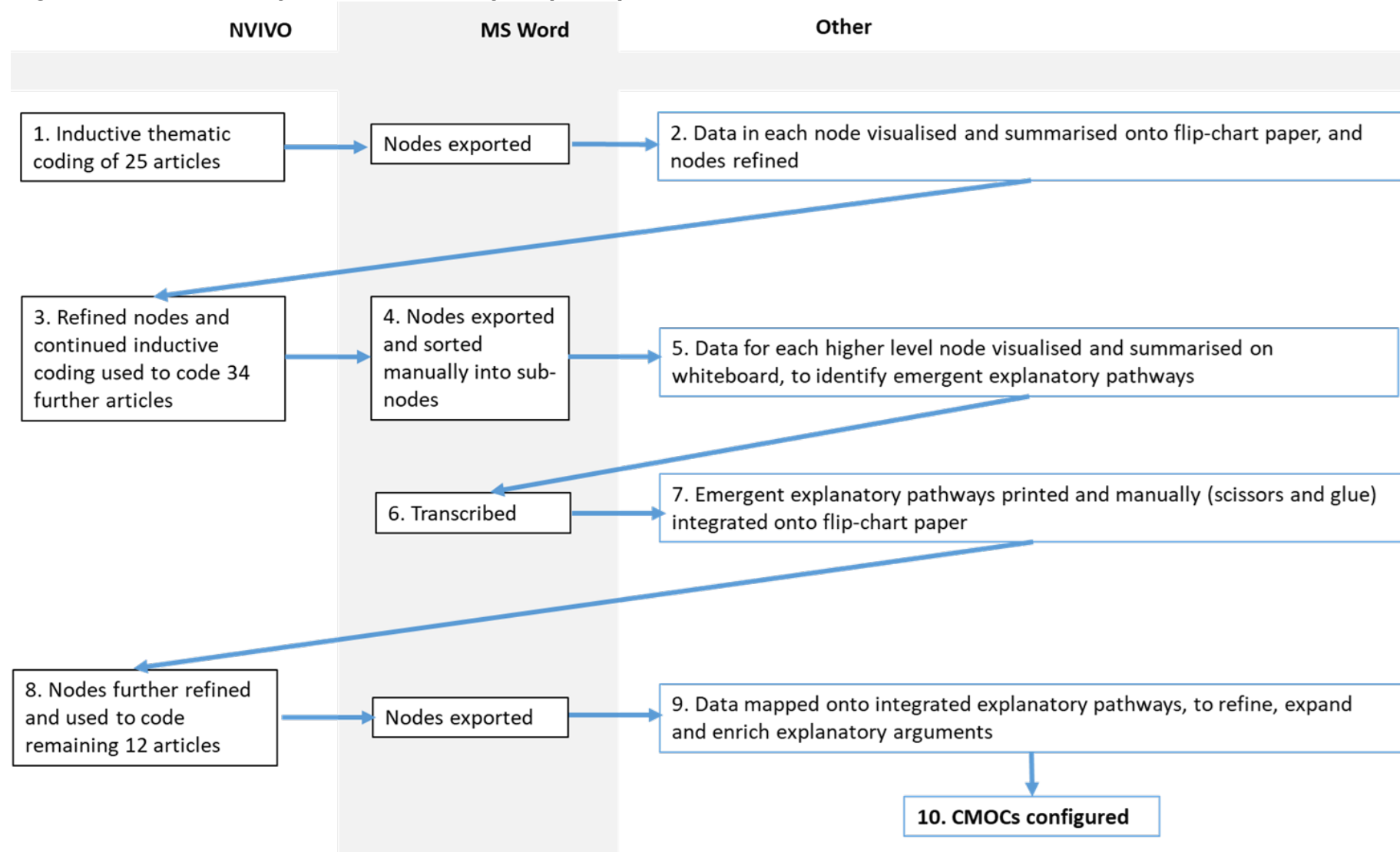
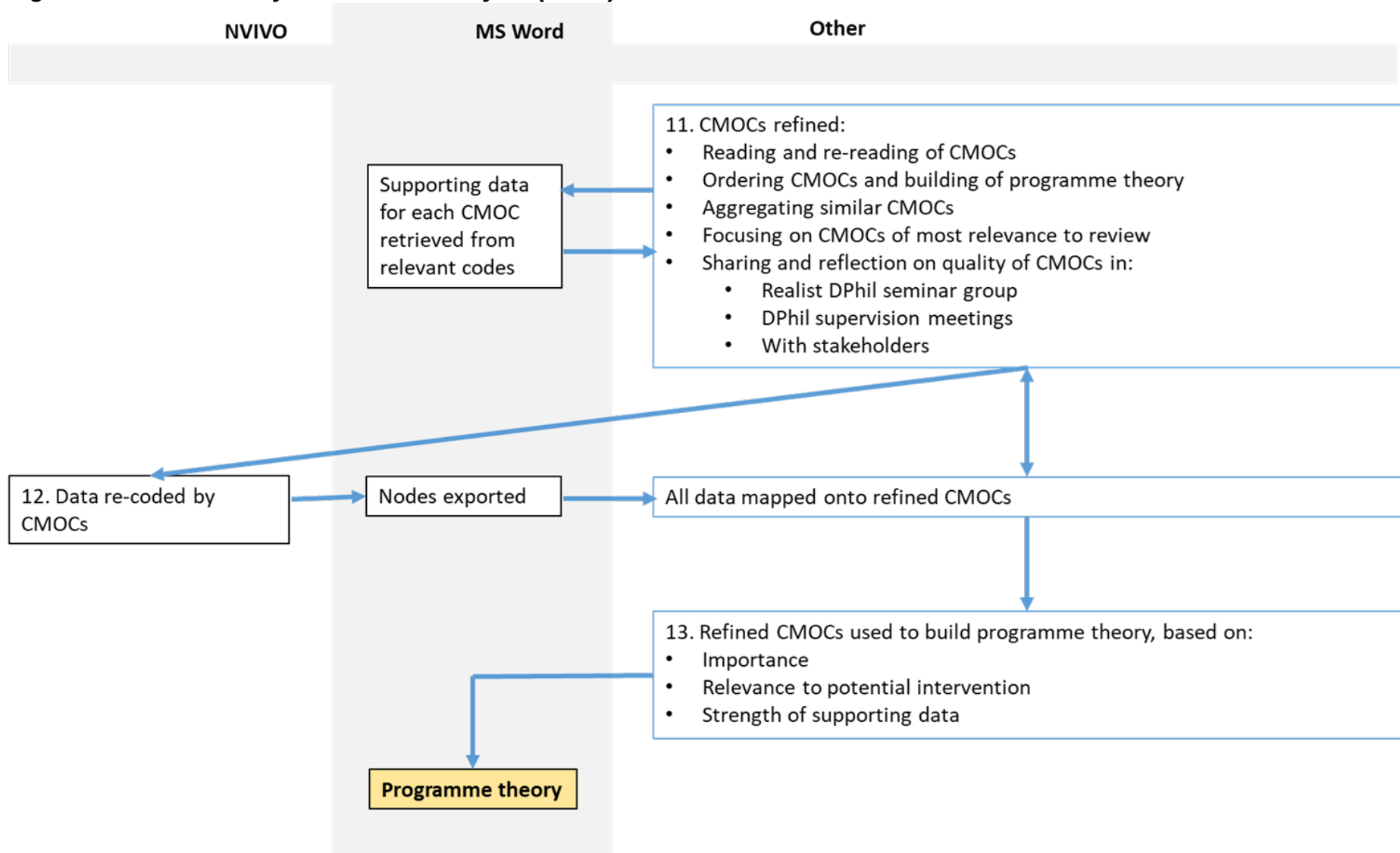


Figure 2.1.2b: Realist synthesis data analysis (2 of 2)





2.2 Programme theory development and refinement using realist evaluation

In the previous section (2.1), I set out the methods used to develop an initial programme theory from the literature. In this section (2.2), I show how the initial programme theory (presented in Chapter 3.1) was used to inform the design of a realist evaluation, and then further refined and developed using the empirical data collected, and how further sense-checking with stakeholders was undertaken.

The protocol for the realist evaluation described in this section has been published as a peer reviewed paper (Wanyama et al., 2023) (see Appendix 2.2.1):

Wanyama C, Blacklock C, Jepkosgei J, et al. Protocol for the Pathways Study: a realist evaluation of staff social ties and communication in the delivery of neonatal care in Kenya. BMJ Open 2023;13:e066150. doi: 10.1136/bmjopen-2022-066150

Ethical approval letters, submission to ethical review boards and details of study tools etc. can be found in Appendices 2.2.2 to 2.2.5.

This text has been adapted from published work (Wanyama et al., 2023) – the content has been adapted, the formatting of references has been changed, as have the titles and numbering of tables and figures, to align with the rest of the thesis. In particular, the content relevant to the DPhil (i.e. the realist evaluation) is presented here. Note – the Pathways Study also included key informant interviews and focus group discussions with nurses, which were focused on nurse education and clinical learning environments, and these elements were not part of my DPhil.

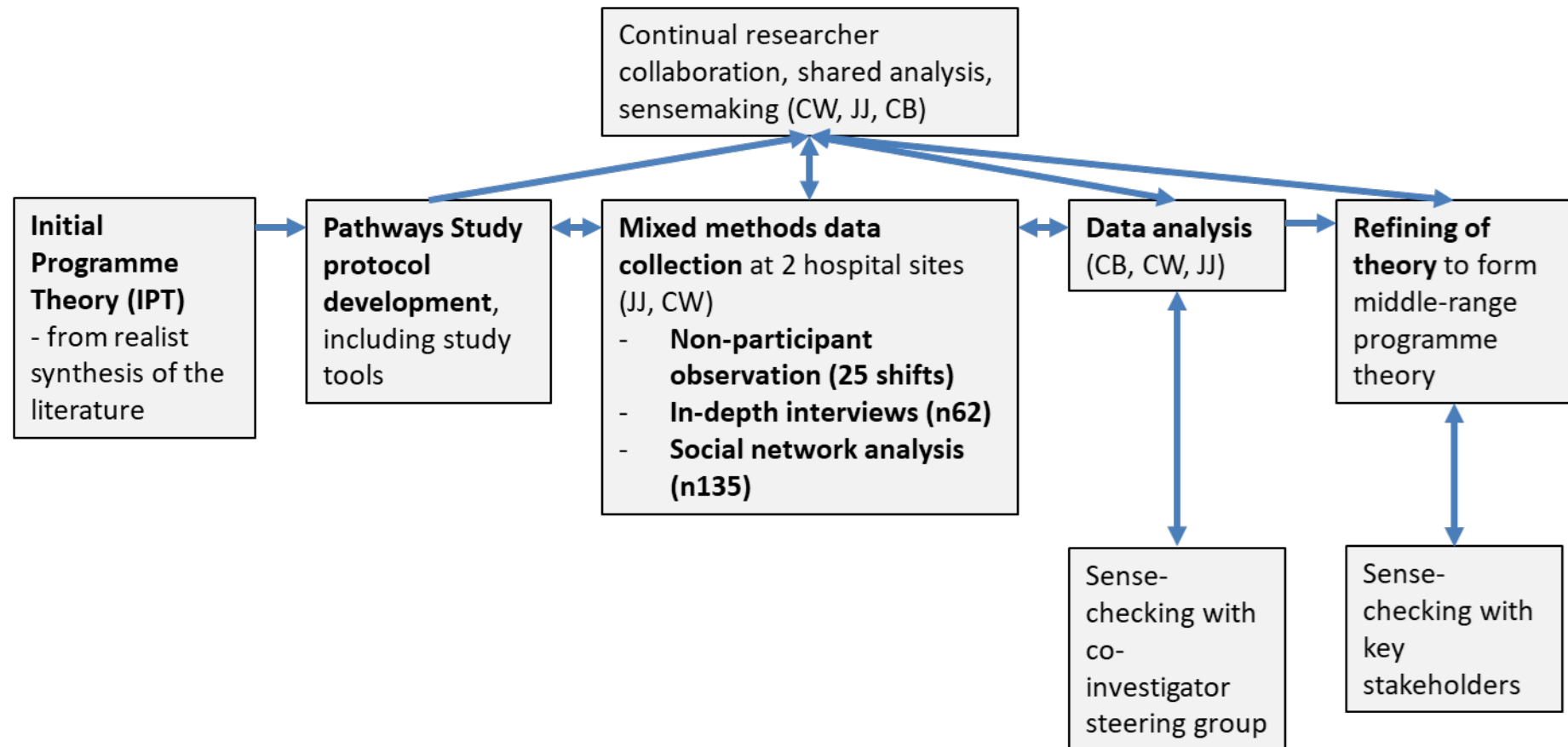
A realist evaluation was undertaken to fulfil the second objective of the DPhil, as set out in chapter 1:

Conduct open and inductive empirical work to explore how social ties influence the implementation of improvement projects in Kenyan neonatal wards, combined with more directed efforts to explore social networks. Draw on these findings to explore the transferability of the programme theory and the changes required to use the theory in the specific setting of neonatal units in Kenya.

The purpose of a realist evaluation is essentially to confirm, refute and refine the initial programme theory, and as such to further develop a middle-range programme theory that is testable and transferable. In the case of this DPhil, data collection was designed to be exploratory in nature, in recognition that the initial programme theory was likely limited, as it was derived from literature from mostly high-income settings. Indeed, the value of an exploratory approach to the realist evaluation was also important to mitigate the potential bias that the initial programme theory was derived from data exclusively from studies that used social network analysis.

The process of theory development is shown in Figure 2.2.1

Figure 2.2.1: Development of programme theory during the Pathways Study



Selection of methods

The realist evaluation that formed the core of the Pathways Study, used a mixed methods approach to collect relevant data, drawing on diverse methods. This approach was taken in order to improve the quality and strength of findings through triangulation. It was hypothesised that specific aspects of the programme theory would be best tested using different methods of data collection (Figure 2.2.2), namely:

- Non-participant observation
- In-depth interviews
- Social network analysis

Stakeholder sensemaking feedback was also included in the design of the realist evaluation, so as to improve the validity, quality and strength of findings.

Development of data collection tools

The initial programme theory was used as a basis from which to design the approaches and tools for data collection (see Appendices 2.2.3 to 2.2.5 for all study tools). In addition, the conceptualisation of social support put forward by Langford (1997) and colleagues was used to expand the idea of 'social tie'. This was required because the initial programme theory had used data from studies focusing on different types of social ties, and we wanted to expand the programme theory to try to disaggregate explanations for different types of social tie. As such, after Langford (1997), the following four types of social support informed the study tools, particularly the social network questionnaire, which included specific scenarios for each type:

- **Instrumental support:** provides tangible goods, services, or aid
- **Informational support:** assists problem-solving
- **Emotional support:** provides care, empathy, love and trust
- **Appraisal support:** assists self-evaluation or affirmation

Data collection tools were piloted and adapted to setting-specific requirements (for example the SNA in hospital 1 was shortened to 4 questions, to adapt to the short time available for participation in research by staff), and to emerging findings.

Hospital Study Sites

Data were collected from healthcare workers involved in providing neonatal care, who were working in two large urban public hospitals in Kenya. The study sites were chosen in part due to ease of access, owing to the existing COVID-19 restrictions to movements at the start of the study period. They were also facilities of contrasts with regards to setting.

At the time of data collection, both hospitals were implementing sites for ongoing initiatives to improve care of neonatal service through the 'NEST360 (2022 online) Delivering and Sustaining Newborn Technologies' (NEST360, n.d.), a program that was seeking to integrate technological solutions within clinical care. In addition, both were members of the 'Clinical Information Network' (CIN) (English et al., 2017; Tuti et al., 2016), which was seeking to improve clinical care of children by targeting better use of routine clinical data to inform policy and practice through providing audit and feedback mechanisms and supporting the work of clinical champions in participating network hospitals.

Hospital 1 (H1) was a large teaching and referral hospital, with a large neonatal unit with a Newborn Intensive Care Unit. The hospital was also a training centre for Basic Diploma Nursing and Clinical Medicine students, Bachelor of Science in Nursing and Bachelor of Medicine and Surgery undergraduate students, Post-Graduate Diploma, Higher Diploma and Master's level training for Paediatric Nursing, Neonatal Nursing, Paediatrics and Child Health and a Fellowship in Neonatology. Hospital 2 (H2) was a large county hospital, with a smaller neonatal unit.

Table 2.2.1: Study inclusion and exclusion criteria

Note: common inclusion/ exclusion criteria were used for recruitment of participants for all three methods of data collection that were conducted in H1 and H2 – i.e. non-participant observation, in-depth interviews, social network questionnaire

Methods of data collection	Inclusion criteria	Exclusion criteria
• Non-participant observation • In-depth interviews • Social network questionnaire	• Must work in the delivery room, post-natal ward, neonatal unit, or paediatric ward, or support the function of these units as part of their work within the wider hospital. • Relevant staff of all cadres and grades will be included, for example nurse, doctor, midwife, nutritionist, clinical officer, patient care attendant, housekeeping, physiotherapist, orthopaedic technician, mortician, kitchen staff, laboratory staff, pharmacy staff, hospital administration. • Nursing and midwifery students and final year medical and clinical officer students will also be included, to reflect their role in service provision. • Must be aged 18 years or over • Must be able to provide informed consent • Must be available to participate in the study, without their participation adversely affecting to the functioning of the neonatal/maternity unit (e.g. before/after shift or during break)	• Does not work in, or provide any support to neonatal care delivery in the hospital • Aged under 18 years • Unable to give informed consent • Unable to participate in study, without participation adversely affecting the delivery of neonatal care
• Stakeholder workshop	• Must have relevant experience in healthcare (particularly paediatric/neonatal care) delivery, research or healthcare policy/education/decision making, e.g. healthcare worker, health systems researcher, policy maker, health service leader, educator, professional representative, or employee of national or county ministry of health or international health agency (as assessed by KEMRI-WELLCOME Trust Research Programme (KWTRP) colleagues) • Must be familiar with key aspects of intervention design or implementation (as assessed by colleagues in extended research team in Kenya)	• Insufficient relevant experience or familiarity with key aspects of healthcare service delivery, research or policy/decision making (as assessed by KWTRP colleagues)

Data collection procedures

As explained earlier in this section, the purpose of data collection was to confirm, refute and refine the initial programme theory, whilst at the same time being exploratory in nature in recognition of limitations of the realist synthesis, and as such to further develop a middle-range programme theory that would be testable and transferable (Figure 2.2.1).

The inclusion and exclusion criteria for study participants are set out in Table 2.2.1 – the same criteria applied for participants of the non-participant observations (NPOs), in-depth interviews (IDIs) and social network analysis (SNA). A summary of data collection methods and how these related to theory development is presented in Table 2.1.2.

Data were collected by an assistant research officer (JJ - female, Kenyan) with a scientific background, and a researcher (CW - male, Kenyan) with a nursing background.

Prior to the start of data collection, JJ, who had been recruited to work on the Pathways Study and collected the majority of data used in the realist evaluation (along with CW), received induction and training, including how to collect the data using the study data collection tools and an overview of relevant theory to sensitise awareness prior to the conduct of non-participant observations, in particular.

During data collection and analysis procedures, the core team of three researchers (CW, JJ and I) adopted a highly reflexive approach. We met every week for the duration of the Pathways Study design, gaining necessary ethical approvals and research permits, data collection, analysis, interpretation and sense-checking phases, as well as continuing our regular meetings beyond into the phases of writing papers and sharing of findings.

Non-participant observations

In the two hospital study sites, health workers were observed in the units/departments in which they were working. Familiarisation visits were undertaken in each hospital by CW

and JJ to introduce the study to staff (including during a ward meeting) and for staff to know who they were. Relevant observations made during familiarisation contributed to data in the form of field notes. Sampling of shifts was discussed with the unit manager during the familiarisation visits and shifts were purposively chosen to select a range of different shifts, and to capture variation. A sample of relevant hospital meetings were also observed at each hospital site. Consent was sought from staff present on the unit at the start of the shift (see appendix for information sheets and consent forms), and observations by the researcher continued throughout the shift to try to mitigate any possible changes in staff behaviour due to being observed. Multiple shifts were observed per hospital, to also try to mitigate any potential changes in staff behaviour due to being observed. Though not the focus of observations, caregivers also had the presence of the researcher explained to them and were given the option to opt out of them/their baby being present in observations of staff.

Notes from non-participant observations were typed by JJ and CW and then shared amongst the three core researchers (CW, JJ and I). I carefully read each set of notes and then added questions about the details of the observations, and areas for specific clarification, in red font to each set of notes. I returned these to JJ and CW, who responded to the questions with further detailed notes. All were included in the analysis.

In-depth interviews

Purposive sampling was used to identify healthcare workers to invite for interview from each of the participating hospitals, based on the different formal and informal social positions that individuals were observed to have within the unit, from emergent interim findings from non-participant observations and also interim findings during social network analysis interviews. We hence sought variation of interview participants to identify and explore diversity of views

and experience, for example by observed social position (informed by interim NPO and SNA findings), profession, and other demographics such as gender and age.

Social network questionnaire

The data collection tool was informed by the four types of social support, as described by Langford (1997). In addition, the way in which social network data were collected was informed by participant-aided sociograms (Hogan et al., 2007).

All eligible healthcare workers (see inclusion and exclusion criteria) were invited to participate in the social network analysis questionnaire, aiming for a complete network. In Hospital 1 this was limited to the neonatal unit, due to the size of the workforce. In Hospital 2, this was limited to the neonatal unit, labour ward and the postnatal unit.

Complete staffing lists were compiled by speaking to the management of the hospital/units and relevant student representatives. CW and JJ assigned a random study ID code to each member of staff on the list, using a random sequence generator. A separate research list was thus used to locate the corresponding study ID code for each named staff/student.

Participants were asked to identify colleagues by name that they would speak to from the staffing list, for different workplace scenarios relating to different types of social support (see Appendices 2.2.3 and 2.2.4 for study tools). Participants were given a sheet of paper and asked to imagine themselves in the centre of the paper, and when each workplace scenario was read they were asked to place the names of those they would go to for the specific support onto the paper.

The identities of those nominated were changed to study ID codes when data were entered by CW/JJ into an excel template, for each scenario. Demographic data were also collected to explore homophily within the network (those with similar demographics forming preferential ties with one another) (Scott, 2000). These data were collected to better

understand for example, whether cadre/gender/academic training is associated with connections in the workplace.

Table 2.2.2: Data collection and contribution to realist programme theory development

	Non-participant observation (NPO) data	In-depth interview (IDI) data	Social network analysis (SNA) data	Stakeholder sense-checking event
Data collection	Different shifts (morning, afternoon, night) Neonatal units (H1 and H2) and maternity (H2 only) Prompt sheet followed to guide observations (Appendix 2.2.3) Used to sample participants for IDI	Interviews (45-60 mins) with staff of different cadres, identified as occupying a range of different social positions with the unit Semi-structured interview guide (Appendix 2.2.3) Sampling informed by NPOs and SNA	Researcher-administered social network questionnaire (30-45 mins), roster method, participants identified colleagues for four types of social support: 1) instrumental, 2) informational, 3) emotional, 4) appraisal Structured questionnaire and data collection template (Appendices 2.2.3 and 2.2.4) Used to sample participants for IDI	Structured presentations followed by interactive feedback Feedback given through structured summaries and feedback templates (Appendix 2.2.5) Recommendations for interventions shared on sticky notes Opportunity for group discussions
Theory development	Used for familiarisation and sensemaking, coded iteratively and used in initial theory building alongside IDI data. Used for triangulation of interview and SNA data.	Used alongside NPO data to identify demi-regularities and develop context-mechanism-outcome configurations (CMOCs) IDI data re-coded by CMOC, to verify strength of support and provide illustrative quotes	Analysed in Gephi to produce exploratory sociograms and metrics, used for sensemaking and triangulation of emergent findings Final summary sociograms and metrics constructed in Gephi (an SNA analysis software) to demonstrate triangulation of programme theory	GELLE Framework was tested with stakeholders, with opportunities for individual and group-based feedback to confirm, refute, and refine middle-range theory

Stakeholder group

A group of relevant stakeholders from eligible institutions were invited to participate in a 6-hour sense-checking and co-production event, following the data collection and analysis phases. The purpose of the stakeholder event was to sense check and confirm, refute and refine the programme theory, and also to seek out ideas and recommendations for interventions relating to the specific aspects of relational context identified in the programme theory. As part of the larger Pathways Study, the stakeholder event also sought feedback on additional research findings around nursing education and clinical learning environment (Wanyama et al., 2023), which did not form part of this DPhil and are not reported in this thesis.

The invited stakeholders were chosen from amongst the eligible groups shown in Table 2.2.1, based on relevant knowledge and experience, and convenience.

Data collected during the session were in the form of (see Table 2.2.2): interactive feedback following presentations of research findings, written feedback using templates in response to hand-out summaries of research findings, recommendations for interventions shared by participants on sticky notes, and group discussion.

The event took the following format, and was hybrid (I attended remotely):

- Presentations by myself (on the GELLE Framework), JJ (on social learning), CW (on clinical learning environments and nursing models of care)
- Handout sheets for participants feedback, completed during event (see Appendix 2.2.5)
- Discussion in facilitated groups
- Whole group feedback
- Recommendations from participants written on sticky notes
- Informal discussions over lunch (attended by CW and JJ)

Data management

Care was taken to comply with ethical data management processes, in both Kenya and Oxford. (Full details are described in the Appendix 2.2.3)

Ethical approvals

Ethical approval for the Pathways Study was received from Kenya Medical Research Institute (KEMRI/SERU/CGMR-C/241/4374) and Oxford Tropical Research Ethics Committee (OxTREC 519-22). (Appendix 2.2.2)

Analyses

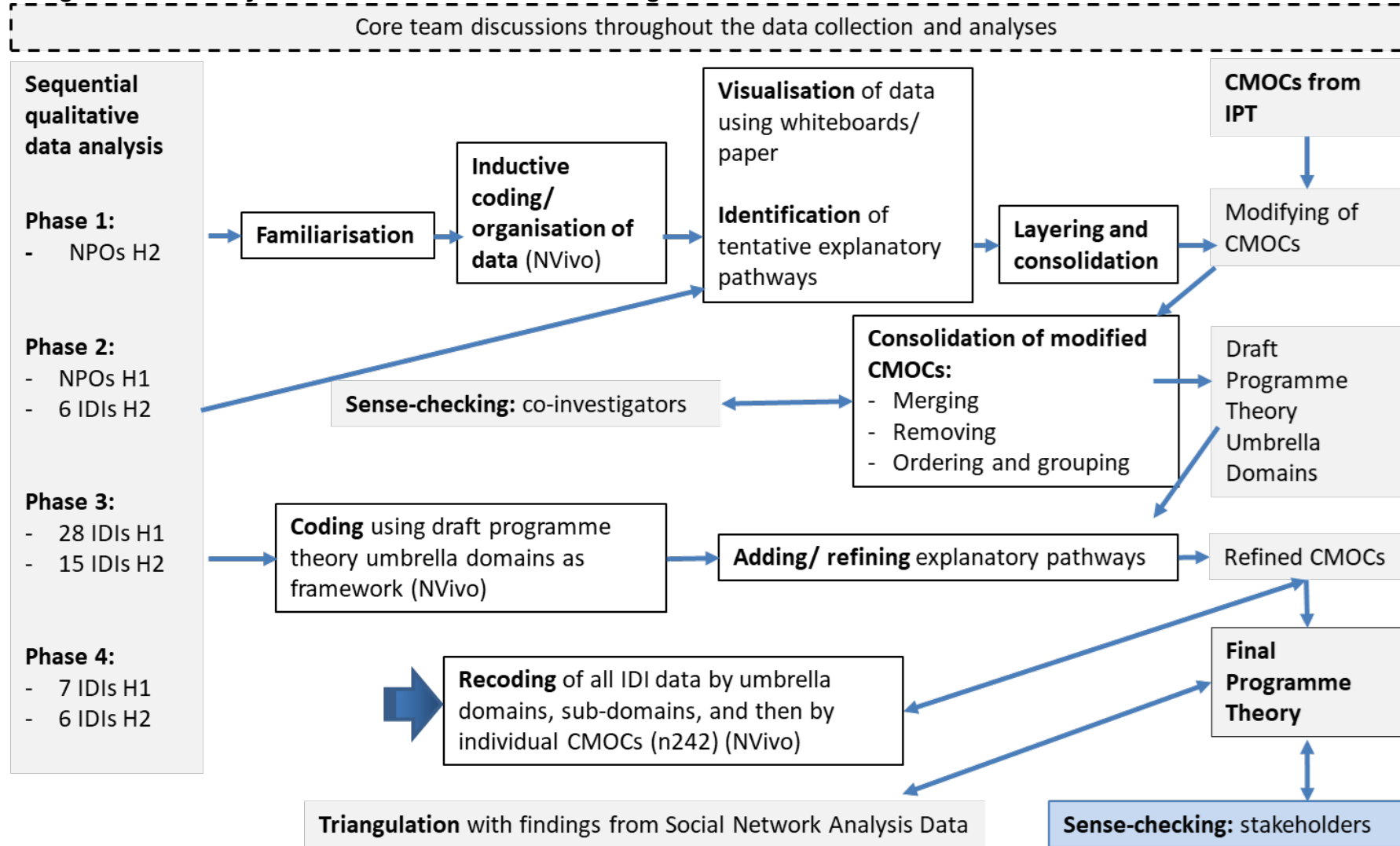
Data were analysed alongside collection activities, and informed the adaptation of study tools. Qualitative data were analysed in a sequential manner (Figure 2.2.2), using steps of familiarisation, inductive coding, visualisation (Figure 2.2.3), identification, layering, consolidating and sensemaking, to develop programme theory domains. These domains were used as a framework to organise remaining data. CMOCs were refined through layering of additional data, and all interview data were finally recoded using the CMOCs as a framework.

The realist approach to data analysis meant that demi-regularities that could explain causation were continually sought and tested within the dataset. Emerging explanatory arguments arising from observed demi-regularities were written in the format of context-mechanism-outcome configurations, which were then further refined as more data were layered onto the analysis.

Prior to the application of the realist logic of analysis, additional data analyses were undertaken of the raw data as a familiarising, exploratory and immersive activity, for example thematically analysing the qualitative data using NVivo software version 12, and using social network approaches to analyse the quantitative data using Gephi version 0.10.1.

To retain awareness of potential influence of relative social position of the participant (e.g. nursing student compared to senior doctor, for example), in-depth interview data were added into the theory-building process one transcript at a time, rather than analysing across transcripts.

Figure 2.2.2: Analysis of mixed methods data during realist evaluation



The collage illustrates a participatory design process. The top-left photo shows a whiteboard with a mind map titled 'Under all design' and 'floor design', with branches for 'the shop', 'the stage', and 'the stage production'. The top-middle photo shows a large board covered with numerous small, handwritten notes. The top-right photo shows a curved table covered with many small, handwritten notes. The bottom row shows seven vertical boards, each displaying a horizontal timeline or process flow diagram created from sticky notes.

Social network analysis

In addition to preliminary findings from the social network data informing sampling for IDIs (i.e. aiming for variation of social position), and contributing to the core team discussions around the interpretation of qualitative findings, the final programme theory was triangulated with the SNA data, which were analysed, explored and summarised, using sociograms (visual representation of the network, using graph theory) and metrics in Gephi version 0.10.1 (Scott, 2000; Wasserman & Faust, 1994). ForceAtlas2 (Jacomy et al., 2014) was used as an algorithm for network visualisation, in order that nodes better connected to one another appeared closer in the sociogram. As the final step in the SNA data analysis, summary sociograms were constructed with flattened edges (i.e. if any edges existed between Node A and Node B, for any type of social support, a flattened edge was considered present), the unweighted (i.e. any edge from Node A to Node B was combined into a single total binary value of 1/0, instead of weighted by number of different edges from Node A to Node B) sociograms were settled (i.e. the relative spatial positioning of nodes in the sociogram were 'frozen' during subsequent manipulations and visualisations), so that indegree and clustering coefficients could be manipulated for specific nominators and edge types of interest, to visualise these variables within the whole (definitions provided in Glossary of Terms, drawn from (Hansen et al., 2011; Wasserman & Faust, 1994)).

Analysis of the data in Gephi version 0.10.1 allowed in-depth interrogation to explore whether network features observed during NPOs and emerging during interviews were supported by network metrics. In order to analyse the quantitative social network data using Gephi, I took the following steps. First, I cleaned data and cross checked any data queries with my colleagues who collected data. I then created a master spreadsheet of nodes, and spreadsheets of edges, from the individual level data in Excel. Status codes

were developed at different levels (i.e. coarse vs granular status codes) and relevant demographic data were converted to binary variables, where appropriate. Excel sheets for nodes and edges were then converted to .csv for import into Gephi. I removed isolated nodes both for clarity and for better understanding of the results of network algorithms. This was done by filtering the network to k-core >1, meaning I filtered out any nodes not connected to at least one other person. The main exploratory analyses undertaken are described in Table 2.2.4. Within the analysis, labels of specific nodes were cross checked with granular cadre to understand for example which nodes represented formal leadership positions on the unit (e.g. nurse in-charge, team leader) and which were relatively junior or senior, etc.

Initially, in-degree, betweenness and closeness centrality were selected as principle metrics of interest (Zhang & Luo, 2017) ,however following an exploratory ranking exercise of nodes within the network, based on different measures of centrality, it was found that betweenness and closeness centrality were not reliable measures in the presence of missing data, so in-degree centrality and clustering coefficient (which is less sensitive to missing data) (Costenbader & Valente, 2003; Kossinets, 2006) were used instead.

Table 2.2.4. Exploratory analyses of SNA data

HOSPITAL 1
Analysis 1: All nodes used as all participants from NBU • Edges selected for Q1 (<i>instrumental support</i>): - o edge deemed present if named in answer to Q1 - o k-core (Wasserman & Faust, 1994) 1 applied (i.e. isolate nodes were excluded – those with total degree of 0) - o on sociogram, nodes were partitioned and coloured by cadre (i.e. CODE (CB)) (nurse managers were re-classed as nurses by CB as seemed easier to view) - o labels added to sociogram (i.e. Label (for GEPHI, unique)), so that core research team could identify individual nodes - o a comparative sociogram was also made by partitioning nodes by modularity class (using automatic community detection in Gephi; the solution derived from the Louvain method for community modularity (Blondel et al., 2008)) - o a table was exported from the analyses, which showed the following for each node (Wasserman & Faust, 1994): ▪ in-degree ▪ out-degree ▪ degree ▪ eccentricity ▪ closeness centrality ▪ betweenness centrality ▪ modularity class (i.e. the results of the community detection algorithm) (Blondel et al., 2008) ▪ eigenvector centrality ▪ clustering - o In addition, the following metrics were calculated and visible on the sociogram output (Wasserman & Faust, 1994): ▪ Average degree ▪ Network diameter ▪ Density ▪ Modularity ▪ Average clustering coefficient
Analysis 2: All NBU staff, Q2 (informational) – analyses conducted as above, for Q2
Analysis 3: All NBU staff, Q3 (emotional)
Analysis 4: <i>All NBU staff, Q4 (appraisal)</i>
Analysis 5: I then filtered respondents to just NURSES for Q1 (instrumental)
Analysis 6: I then partitioned the above analysis (#5) by JOB to visualise the different levels of nursing seniority within the nursing workforce
Analysis 7: I filtered respondents to just NURSES for Q2 (informational)
Analysis 8: I then partitioned the above analysis (7) by JOB to visualise the different levels of nursing seniority within the nursing workforce
Analysis 9:

I filtered respondents to just NURSES for Q3 (emotional)
Analysis 10: I then partitioned the above analysis (9) by JOB to visualise the different levels of nursing seniority within the nursing workforce
Analysis 11: I filtered respondents to just NURSES for Q4 (appraisal)
Analysis 12: I then partitioned the above analysis (11) by JOB to visualise the different levels of nursing seniority within the nursing workforce
Analysis 13: I filtered respondents to nursing students, and partitioned by nursing course/ institution, for Q1 (instrumental)
Analysis 14: I filtered respondents to nursing students, and partitioned by nursing course/ institution for Q2 (informational)
Analysis 15: I filtered respondents to nursing students, and partitioned by nursing course/ institution, for Q3 (emotional)
Analysis 16: I filtered respondents to nursing students, and partitioned by nursing course/ institution, for Q4 (appraisal)
HOSPITAL 2
Analysis 1: All staff working in NBU selected as participants (i.e. unit/SUBUNIT = NBU) Edges selected for Q1 and Q2 (<i>instrumental support</i>): • edge deemed present if either named in answer to Q1 or Q2 • duplicate edges were removed manually so that there were no parallel edges (i.e. edge was either present "1" or absent "0", regardless if present for Q1, Q2, or both) • no weighting of edges (i.e. edge was either present "1" or absent "0", regardless if present for Q1, Q2, or both) • k-core (Wasserman & Faust, 1994) 1 applied (i.e. isolate nodes were excluded; those with total degree of 0) • on sociogram, nodes were partitioned and coloured by cadre • labels added to sociogram, so that core research team could identify individual nodes • a comparative sociogram was also made by partitioning nodes by modularity class (using automatic community detection in Gephi; the solution derived from the Louvain method for community modularity (Blondel et al., 2008)) • a table was exported from the analyses, which showed the following for each node (Wasserman & Faust, 1994): - o in-degree - o out-degree - o degree - o eccentricity - o closeness centrality - o betweenness centrality - o modularity class - o eigenvector centrality - o clustering • In addition, the following metrics were calculated and visible on the sociogram output (Wasserman & Faust, 1994): - o Average degree - o Network diameter - o Density

- o Modularity - o Average clustering coefficient
Analysis 2: The same analyses steps were followed as above, but this time using edges for Q3 and Q4 (informational support)
Analysis 3: The same analyses steps followed as above, but using edges for Q5, 6, 7 (emotional support)
Analysis 4: Same steps followed for Q8 and 9 (appraisal support)
Analysis 5: I then focused on NURSES only (in the NBU), and repeated all of the analyses above, just for nurses – i.e. CODE (CB) = NURSE • All NURSES working in NBU selected as participants (i.e. unit/SUBUNIT = NBU and CODE (CB) = NURSE) • Edges selected for Q1 and Q2 (<i>instrumental support</i>): - o edge deemed present if either named in answer to Q1 or Q2 - o duplicate edges were removed manually so that there were no parallel edges (i.e. edge was either present “1” or absent “0”, regardless if present for Q1, Q2, or both) - o no weighting of edges (i.e. edge was either present “1” or absent “0”, regardless if present for Q1, Q2, or both) - o k-core (Wasserman & Faust, 1994) 1 applied (i.e. isolate nodes were excluded; those with total degree of 0) - o on sociogram, nodes were partitioned and coloured by cadre (i.e. CODE (CB)) (nurse managers were re-classified as nurses by CB as easier to view) - o labels added to sociogram (i.e. Label (for GEPHI, unique)), so that core research team could identify individual nodes - o a comparative sociogram was also made by partitioning nodes by modularity class (using automatic community detection in Gephi; the solution derived from the Louvain method for community modularity (Blondel et al., 2008)) - o a table was exported from the analyses, which showed the following for each node (Wasserman & Faust, 1994): ▪ in-degree ▪ out-degree ▪ degree ▪ eccentricity ▪ closeness centrality ▪ betweenness centrality ▪ modularity class ▪ eigenvector centrality ▪ clustering - o In addition, the following metrics were calculated and visible on the sociogram output (Wasserman & Faust, 1994): ▪ Average degree ▪ Network diameter ▪ Density ▪ Modularity ▪ Average clustering coefficient
Analysis 6: As above – NURSES in NBU – for Q3 and Q4 (informational)
Analysis 7: As above – NURSES in NBU for Q5,6,7 (emotional)

Analysis 8: As above -NURSES in NBU for Q8 ad 9 (appraisal)
Analysis 9: I then looked at the same sequence of analyses as above but for STUDENT NURSE in NBU
Analysis 10: I then took a step back and looked at NURSES in NBU and LABOUR WARD (LW) as quite high participation rate here (Q1 and Q2 only, as a trial)

Though the exploratory analyses provided triangulation of qualitative finds, as part of realist theory development, the associated sociograms and metrics were considered by CW, JJ and I to be too identifying to be shared as a research output. Indeed, the most appropriate and useful ways in which to communicate social network analysis findings were a subject of much discussion and ethical reflection (Tubaro et al., 2021), including with my supervisor Bernie Hogan, who had previously published on this subject (Hogan, 2021).

A final approach (Box 2.2.1) was taken to organising the social network analyses that would be communicated in this thesis and elsewhere. Whilst maintaining confidentiality of participants, this approach permitted the communication of pertinent social network findings, particularly in relation to sub-groups and the ways in which social support is accessed within the neonatal workforce.

Box 2.2.1: Final approach to social network analyses for communication in this thesis and other research outputs

1. Coarse status groups were used, i.e. all types of nurse = 'nurse'
2. A flattened network was visualised (i.e. if any edges existed between Node A and Node B, for any type of social support, a flattened edge was considered present)
3. The 'settle' function of whole flattened network was used in Gephi to 'freeze' the sociogram and therefore mitigate interpretation bias when examining specific groups of nodes or specific types of edge (i.e. the relative spatial positioning of nodes in the sociogram were 'frozen' during subsequent manipulations and visualisations)
4. Additional columns were created in the master node spreadsheet for in-degree and clustering coefficients, and participation/nomination/none categories for different types of social support and different queries respectively. Metrics for populating these master columns were calculated by running individual queries using Gephi and then inputting the resulting metrics for each node
5. Using the 'settled' network, specific subgraphs could then be illustrated by graduated colouring of nodes for specific edge types (e.g. instrumental support), based on:
 - i. in-degree centrality
 - ii. clustering coefficient
6. Visual inspection was undertaken of these subgraph layouts with an interest in whether the same nodes appeared most connected across different edge types.



2.3 The use of multiple methods and multiple perspectives

I have thus far described the process of developing the initial programme theory (2.1), then each method used in the realist evaluation (2.2). In this section (2.3) I set out how these methods have been integrated. In addition, I describe how I engaged with multiple perspectives during the course of the work, and how that influenced the research.

Integration of mixed methods

The realist evaluation used empirical data and a supplementary participatory stakeholder sense-checking approach (Fetters et al., 2013). The data collected were qualitative (NPOs, IDIs, stakeholder feedback) and quantitative (SNA). Qualitative and quantitative data from the two study sites were collected and analysed in a convergent manner (Fetters et al., 2013), allowing cross-comparison and discussion of emergent findings from the different data. As already described earlier in this chapter, sampling of participants for IDIs was informed by NPOs and preliminary SNA findings, to maximise variation and representation amongst those interviewed.

A realist approach to analysis offered advantages when using mixed methods data. Indeed, both qualitative and quantitative data could be used as sources from which to identify explanatory arguments in the form of context-mechanism-outcome configurations. As such, preliminary SNA findings informed discussions and sense-checking of emerging CMOCs, derived from the qualitative data. The full quantitative SNA analyses were completed following the development of the CMOCs from the qualitative data, and were used to triangulate the programme theory. Findings from the qualitative and quantitative data at times supported mutual theory building, but in some aspects of the theory building,

qualitative data expanded findings in these domains beyond the comparatively narrower scope of inference of the quantitative data (see Figure 3.2.3) (Fetters et al., 2013).

Engaging with multiple perspectives

Throughout the work presented in this thesis, I engaged with colleagues and stakeholders who held many different perspectives. Consequently, I frequently reflected on the findings, their interpretation, and their significance. The main individuals and groups with whom I engaged with during the work were:

- The core Pathways Study research team (CW, JJ and I) – our weekly meetings were an opportunity to discuss and reflect on emerging findings in-depth.
 - o CW – strong nursing education perspective, and had a wealth of experience working in neonatal care in Kenya
 - o JJ – no previous experience of the neonatal care environment, but was quickly accepted by the staff working on the units and immersed herself in data collection
 - o Myself – clinical healthcare experience, including paediatrics, and including in sub-Saharan Africa, increasing familiarity with relevant theory from the literature
- Co-investigators of the Pathways Study – these were highly experienced researchers, many of whom had in-depth understanding of the neonatal care context in Kenya.
 - o Co-investigators were given an opportunity to provide feedback on detailed CMOCs during the analysis phase, and commented on these from the perspective of their own research and clinical experiences, making annotations to the shared document.
- Stakeholders – senior clinicians, hospital-level decision makers and representatives from nurse training schools

- o Stakeholders provided structured feedback on the programme theory, as well as ideas for recommendations
- DPhil Supervisors – the fantastic range of expertise provided by my supervisory team provided me with much valuable food for thought, directed me to relevant literature, prompted reflection, and enhanced my appreciation of the different and nuanced perspectives that unique colleagues bring to the academic questions around relational ties in the workplace. I feel incredibly grateful to have learned such a great deal from each of my supervisors on an individual level, and from working with them together as a complementary team.
 - o Mike English (ME) – ME helped me to maintain an overall perspective and plan, and is my primary supervisor. Experience working as a paediatrician and researcher in Kenya, with extensive knowledge and experience of clinical paediatrics and neonatal care in this setting. ME is Professor of International Child Health at the University of Oxford and leads the Health Systems Collaborative.
 - o Jacob McKnight (JMCK) – JMCK particularly helped to direct me to early reading around relevant sociological theory. Experience working as a researcher in neonatal care settings in Kenya. JMCK is Associate Professor at the Health Systems Collaborative at the University of Oxford.
 - o Lisa Hinton (LH) – LH particularly encouraged me to think differently and creatively about the way in which I communicate specific aspects of my work that I would have likely otherwise neglected, and kept me reflecting on the core thread of my work. LH is Associate Professor at the Nuffield Department of Primary Health Care Sciences at the University of Oxford, and is a senior social scientist.
 - o Bernie Hogan (BH) – BH joined my supervisory team at a later stage in my DPhil due to his contributions to my engagement with social network theory,

and providing practical guidance and supervision which greatly enhanced the quality of the SNA component of my work. BH is Associate Professor at the Oxford Internet Institute, University of Oxford.

- o Geoff Wong (GW) – Despite never being my 'official' supervisor, I am greatly indebted to GW for his generous and consistent support and supervision of my personal development in using realist methodology throughout my DPhil. GW is Associate Professor of Primary Care at the Nuffield Department of Primary Health Care Sciences at the University of Oxford, and a practising General Practitioner.



2.4 Identifying candidate interventions from the literature that target relational aspects of healthcare delivery

I have set out the methods used to develop an initial programme theory from the literature (2.1). I then showed how the initial programme theory was used to inform the design of, and then further refined and developed using, realist evaluation of empirical data, and how further sense-checking with stakeholders was undertaken (2.2). In the preceding section I described the integration of methods and perspectives (2.3). I now report the methods used to search the literature for relevant candidate interventions targeting the relational environment of the hospital workplace (2.4).

The methods reported in this section have been published on Open Science Framework as a pre-registration protocol (Appendix 2.4.1).

Blacklock, C., Edgcombe, H., Wanyama, C., et al. (2022, August 12). Protocol: Identifying and mapping candidate interventions targeting relational contexts of hospitals - A review of the literature. <https://doi.org/10.17605/OSF.IO/GX47W>

Content from the registered protocol has been reproduced and adapted for the purposes of this thesis.

Approach

I took a blended approach to reviewing the literature, drawing on scoping review methodology, with some processes drawn from a realist approach to evidence synthesis in the selection of documents (for example, looking for relevance and rigour, prioritising richest data, and aiming for understanding rather than inclusion of all). I sought to identify the most relevant and richest data, seeking theoretical saturation of different intervention

approaches rather than comprehensiveness. The approach shares some features with Critical Interpretive Synthesis (Dixon-Woods et al., 2006) and is described in detail in a published protocol (Blacklock et al., 2022) .

Searches

To map relevant interventions, whilst managing a vast academic literature base, three ‘tracer’ (i.e. representative but not exhaustive) search concepts were used:

“organisational culture”, “quality improvement” and “hospitals”. Mesh terms were used where available. Ovid Embase, Ovid Medline, and EBSCOhost CINAHL were searched by an information specialist (EH) on 23/6/22 with no limits for language or publication dates. The search strategies used text words and relevant indexing to identify literature specifically about the impact of organisational (or corporate) culture on quality improvement in hospitals. The reference lists of included papers were assessed for additional relevant studies where needed, following the JBI Evidence Implementation guidance about the conduct of systematic scoping reviews. We also included relevant literature known to us and expert colleagues.

Searches were also conducted of UK professional websites using the terms “culture” or “quality improvement” or “quality”. Given the potential size and scope of the available grey literature, UK NHS, professional and government websites were chosen as a purposive case-based sample, given the relative richness of the UK quality and safety experience and familiarity to the authors. Particularly rich and relevant grey literature from outside the UK were also included when identified from authors personal libraries, snowballing searches or from discussion with experts.

Screening

All references were exported to Endnote X9 (Thomson Reuters, New York, NY), and deduplicated using EndNote X9 functionality.

I undertook screening of title and abstract using the inclusion and exclusion criteria (see Table 1: Inclusion and Exclusion Criteria), with the second author (HE – a UK anaesthetist and researcher, with extensive experience working in sub-Saharan Africa) screening a sample (20%) of documents retrieved from the database search, to check for systematic errors. Reasons for exclusion were noted during screening. Any disagreements were discussed between the two of us.

Full text screening was done in EndNote X9, with documents not fulfilling inclusion criteria excluded. Documents which fit the inclusion criteria I sorted into groups iteratively, based on similar types of intervention. I then tabulated all of these remaining documents by group, in MS Excel, and selected the richest documents from each group to be included in the final analyses, in line with a realist approach. Annotations were made in MS Excel to justify selection of specific documents. This stage was independently cross-checked by HE.

Data Extraction

The selected richest and most relevant full-text documents were then imported into NVivo. I extracted data relevant to interventions (implemented or recommended) targeting the relational environment from this final set of included documents. I extracted and tabulated characteristics of included documents in MS Word. HE checked the full final set of extracted data of included documents, to look for systematic error.

Data Analysis

It was initially anticipated that data would be coded in NVivo using deductive themes derived from the social support literature, followed by inductive coding. Indeed, data were initially analysed and tabulated by theme. However, disaggregation of the complex interventions identified into themed components in the form of discrete candidate intervention components proved difficult and was felt to compromise the utility of findings

for use in practice, because the nature of the complex interventions became lost or misrepresented when reducing them to their parts. Consequently, interventions were grouped by their principal typology in a mapping analysis to allow them to be recognised, conceptualised, and differentiated, at a group level, from other interventions. As such, specific candidate interventions would be more readily available for matching to prioritised contextual targets in a particular healthcare setting, using theory to guide and justify selection.

To sense-check the interpretation of data, recommendations and frameworks in the grey literature were used for triangulation of breadth of inclusion, and these documents also contributed data to the analysis if they provided specific examples of interventions. In addition, the co-authors of the protocol were invited to give any feedback on potential missing intervention types.

As a final step to the analysis, findings were mapped onto the GELLE Framework (see Chapter 3.4), to match candidate interventions to target contexts.

Table 2.4.1: Inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
• Hospital setting • The intervention primarily targets the relational environment of healthcare - i.e. not an intervention to improve a specific aspect/area of clinical care, for example. • Relevant to realist programme theory • 'Credible source' (i.e. published in peer-reviewed journal, case study in formal document, recommendations for practice by (or commissioned by) recognised professional organisation or government) • Adds new knowledge to existing identified documents	• Not hospital setting • The intervention does not primarily target the relational environment of healthcare • Not relevant to realist programme theory • Not 'credible source' • No new knowledge added (theoretical saturation during thematic analysis)

3.0 Results

Table 3.0 Outline of Results Chapter

3.0 Results		3.1 Initial programme theory	The findings from realist synthesis of the literature, from which the design of the realist evaluation was informed
		3.2 Programme theory: GELLE Framework	The main section of the results chapter, and the core of the thesis, in which the programme theory (GELLE Framework) is presented
		3.3 Candidate interventions targeting aspects of relational context	A summary of relevant candidate interventions identified from the literature

In this results chapter I report the findings of the research described in chapter 2. The chapter is divided into three sections. In the first section (3.1), I report the initial programme theory as derived from realist synthesis of the literature. Then, in section 3.2, I report the main findings of the DPhil – the novel GELLE Framework – developed from realist evaluation using mixed methods data. This section is divided into three: section 3.2a reports the data collected and initial analyses, 3.2b reports the detailed findings in the form of CMOCs supported by illustrative quotes, and social network data, whilst section 3.2c reports the abstracted summary narratives, umbrella CMOCs, the GELLE wheel and reflective questions aimed at practitioners. Finally, in section 3.3 I report the relevant candidate interventions identified from the literature, and how they relate to the programme theory.

My approach to analysis connects the three results sections presented in this chapter to address the research questions and aim of the DPhil. Firstly, the realist synthesis presented in section 3.1 produced an initial programme theory (addressing research question #1) which was further tested and refined for the specific setting of neonatal care

in Kenya using data from non-participant observation, in-depth interviews and social network analysis, as presented in section 3.2. The resulting programme theory (the novel GELLE Framework – addressing research question #2) provided a way to identify specific aspects of context amenable to manipulation, and as such was used to map candidate interventions identified from a scoping review of the literature by conceptual relational target (presented in section 3.3 - addressing research question #3, alongside stakeholder feedback).



3.1 Initial programme theory

In this section (3.1), I will report the initial programme theory as derived from realist synthesis of the literature.

This section has been reproduced from the published paper (Blacklock et al., 2022):

Blacklock C, Darwin A, English M, et al. The social networks of hospital staff: A realist synthesis. Journal of Health Services Research & Policy. 2022;27(3):242-252. doi:10.1177/13558196221076699

The formatting of references, naming/ numbering of tables and figures, and style/ size of font within this section has been adapted from the published paper, to align with the rest of the thesis.

The search retrieved 10,910 citations after deduplication, of which 365 underwent full-text assessment for inclusion. Of these, 75 documents were included in the review (Figure 3.1.1).

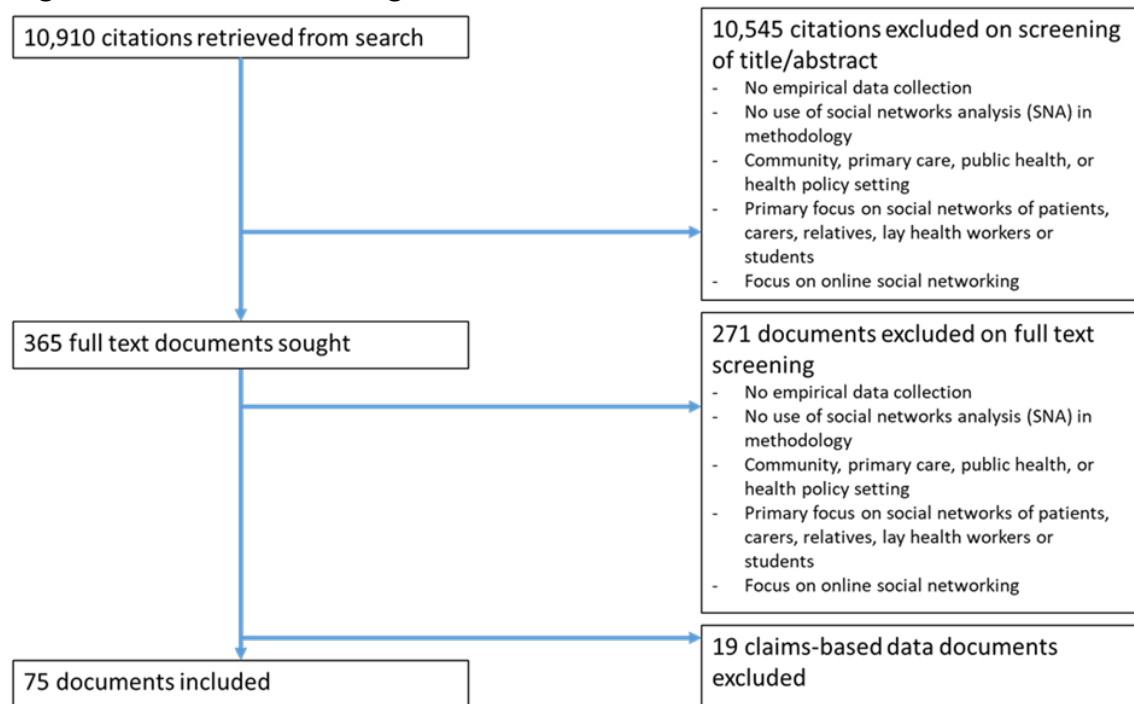
Included documents were from high income countries (92%, 69/75) or upper-middle income countries (8%, 6/75) (Table 3.1.2 – presented later in section 3.1). About one quarter of studies centred on doctors (17/75), 17% on nurses (13/75) and the remaining on more than one professional group (45/75). Social network data were mostly collected using surveys or questionnaires (56/75), with the remaining collected using interviews (10/75), routine hospital data (4/75), observation (4/75) and in one study the data collection method was unclear. Among included studies requiring participants to name the

colleagues they communicated with, a 'roster method' (i.e. using a list of colleagues as a prompt for participants) was used in 37 studies, and in a further study using a list of job titles. A 'name generator' method (i.e. where participants named colleagues without a roster prompt) was used in 25 studies. Two studies reported limits placed on the number of colleagues that participants were permitted to name. Studies examined different types of communication ties from which to collect social network data; - the majority examined general professional communication or a combination of different types of ties (51/75). Sixteen studies focused exclusively on advice-seeking ties, four on team composition, and one each exclusively on emotional support and assistance. Of the included studies, ten included additional complementary data collection methods, such as qualitative interviews, which added depth of data to contribute to theory building. Though included in the table of included documents, some studies had minimal contribution to theory building: one study had a very small number of respondents, another failed to provide adequate details of methods and two more were identified as having a potential conflict of interest.

In line with RAMESES standards, relevance and rigour of data included in theory building were considered in the inclusion of documents in the synthesis.

Examples of visualisation on whiteboards that was used during the analysis process are shown in Appendix 3.1.3.

Figure 3.1.1: PRISMA diagram



Box 3.1.1 presents the programme theory developed from the literature. It was developed from 35 unique CMOCs, which are given in Table 3.1.1. (An expanded version of Table 3.1.1 is available in Appendix 3.1.1, with illustrative quotes from the literature, and supporting data is tabulated in Appendix 3.1.2.) The CMOCs are organised in four overarching theoretical domains that we identified: 1) social groups, 2) hierarchy, 3) bridging distance, and 4) discourse.

Box 3.1.1. Programme theory

Hospital staff prefer to communicate with colleagues who are similar to themselves, and with whom they share trust. However, this can create boundaries, silos and redundant information within pockets of the workforce, and different behavioural norms adopted by members of different groups, dominated by influential individuals. Tacit hierarchical rules also determine communication with others in the workplace based on status, forming a landscape of differential access to information and others. Fragmentation between different status groups can occur, and space for status-enhancing behaviours is created. Workplace silos and status boundaries can be bridged in the presence of trust, confidence, and mutual understanding, or where need is urgent and immediate. The organisation can actively comply with or challenge social boundaries within the workforce by the formal processes endorsed, which allow day-to-day performances of relative power, based on identity and hierarchical status. Attempts to manage the discourse, and the effectiveness of formal workplace communication processes, act to construct or disassemble social boundaries in hospitals. Connections between staff influence access to information and other forms of capital, behavioural norms and perceived agency. Ties are continuously shaped and as such are amenable to intervention. The capacity of these connections and the overall structure of the workplace social network are vital to delivering quality patient care.

Table 3.1.1. Context-mechanism-outcome configurations (CMOCs)

DOMAIN 1: Social Groups Close social ties formed with others, based on identity and personal view of the world (representation), in relation to the individual.	
CMOC1	When health care workers share a common identity (C), they will be more likely to trust one another (O), as they share an underlying representation (M).
CMOC2a	When health care workers share a representation (C), they will preferentially communicate with one another (M) leading to insular communication (O).
CMOC2b	When health care workers share a representation (C), outsiders are easily identified (M), leading to communication boundaries (O).
CMOC3	When a health care worker has an existing reciprocal relationship with a peer (C), they will preferentially seek advice or support from that person (O), because they trust the person (M1) and feel comfortable (M2).
CMOC4	When health care workers share a representation (C), this can lead to redundant information (O1), group-think (O2) and echo (O3), due to insular communication (M).
CMOC5a	When a health care worker is central within a social group (C), their personal behaviours will embody group norms (O) because they will hold tightly to group identity as own (M).
CMOC5b	When a health care worker is peripheral within a social group (C), they may deviate in behaviour from group norms (O1), and oppose/conflict with central members of the group (O2) because they may not wholly identify with the group representation (M).
CMOC6a	When a health care worker is central within a social group (C), they will have greater power over group norms (O), because they have greater influence over group narratives and representation (M).
CMOC6b	When a health care worker is peripheral within a social group (C), they will have little power over group norms (O), because they have little influence over group narratives and representation (M).
CMOC6c	When a health care worker is central within a social group (C1) and has power over material resources (C2), they will have additional power over group norms (O) because they own the distribution of material resources and decision-making authority (M).
CMOC7a	Where a health care worker requires diverse information to undertake their role effectively, e.g. senior nurse, junior doctor (C), they will become more central in the workplace information-sharing network (O), because they must frequently seek information from others (M1) and others frequently seek information from them (M).
CMOC7b	When a health care worker is peripheral in the workplace information-sharing network (C), they risk isolation (O), because they are not actively engaged in information-seeking (M1) or information-sharing (M2) with colleagues.
CMOC7c	When a health care worker needs legitimate/defensible information (C), they will speak to someone who embodies desirable group norms (O), because the information received will comply with social expectations (M).
DOMAIN 2: Hierarchy Social ties or barriers formed based on hierarchical status of the individual.	
CMOC8a:	When an individual is senior in the hierarchy (C1), or is a custodian of hierarchical status (C2), they have permission to approach both high and low status colleagues (O1) because of understanding of the 'social rules of

	operation' (M).
CMOC8b:	When an individual is lower in the chain-of-command/hierarchy (C), they lack permission to approach some colleagues directly so accesses new/external information through the established chain of command (O1), or through a broker (O2), because of understanding of the 'social rules of operation' (M).
CMOC9a	Where hierarchical control is paramount to the functioning of a social group (C) members will be more likely to accept and follow orders from a senior (O) due to concentration of authority (M).
CMOC9b	Where hierarchical control is not paramount to the functioning of a social group (C) members will need to be convinced to change behaviour (O) due to flattened structure and distributed authority (M).
CMOC10a	Where parallel hierarchies are operating within the same workplace (C), permission to approach colleagues outside one's own hierarchy structure will vary (O), according to the specific authoritative power over the individual and their understanding of the 'social rules of operation' between hierarchies (M).
CMOC10b	Where doctors have historically taken the role of leader in health care teams (C), they will assume a position of authority (O), because of their understanding of the 'social rules of operation' (M).
CMOC11a	When there is a hierarchical structure (C), there is a risk of fragmentation into sub-groups based on status (O), because individuals identify more closely with peers of the same status (M1) and trust them more (M2).
CMOC11b	When an individual is higher up in the chain-of-command/hierarchy (C), they will preferentially communicate with other higher status staff (O), because they feel higher status colleagues will better understand their scope of work (M1), and will hold more useful information (M2).
CMOC11c	When an individual is lower in the chain-of-command/hierarchy (C), they will only expect specific types of support from colleagues of higher status (O), because of their understanding of the 'social rules of operation' (M1) and because they feel more comfortable with peers for usual support (M2).
CMOC12a	When an individual is higher up in the chain-of-command/hierarchy (C), they will preferentially communicate with other higher status staff (O), because they will further enhance their own status/power by association (M).
CMOC12b	When an individual is higher up in the chain-of-command/hierarchy (C), they will have power over information (O) by controlling the information and resources disseminated to low status colleagues (M).
DOMAIN 3: Bridging distance The ways in which an individual can be encouraged to communicate with others with whom they do not have a close social tie.	
CMOC13	When a health care worker observes a non-peer colleague displaying they are being 'careful' (C), they will exchange required information with this colleague (O), because they feel trusting towards the colleague (M1) and feel comfortable approaching them (M2).
CMOC14	When a health care worker has a longstanding or multiplex relationship with a non-peer colleague (C), they will approach that colleague as a 'go-to person' (O), because of mutual understanding (M1), and trust (M2).
CMOC15	When a health worker needs information urgently (C), they will select a colleague from those who are physically present (O), because they will receive an immediate response (M).

CMOC16	When a health care worker can speak to a colleague face-to-face (C), information exchange will be enhanced (O), because they can better read and respond to verbal and non-verbal cues (M1) and is more confident that they will be understood (M2).
CMOC17	Information can be exchanged between disconnected groups (O), when there is an individual who can act as a broker (C), because they communicate with members of both groups (M).
DOMAIN 4: Discourse The totality of the different ways of seeing the world, both content but also how each relates to the other and is communicated, in terms of overall dominance and power.	
CMOC18a	The pattern of ongoing exchange and negotiation between social groups in the hospital workforce (C) creates and maintains (O1) or challenges (O2) the dominant discourse in a hospital, by demonstrating and exerting the relative power of different group representations within the hospital workforce (M).
CMOC18b	For health care workers in an organisation, its rituals and norms (C) construct what an individual perceives is acceptable in the workplace (O), through the demonstration of social expectations and etiquettes (M).
CMOC19a	When a health care worker has to do or say something at work (C), they keep to within a 'bandwidth' of actions they perceive to be 'accepted' or 'permitted' (O), based on their understanding of what the dominant discourse is within a hospital and their relative personal position based on identity and hierarchical status (M).
CMOC19b	The perceived values of an organisation (C) facilitate the creation of status differentials within the workplace (O) because individuals benchmark their activities and identities against how much they embody these values (M).
CMOC20a	Where formal communication processes in hospitals are dysfunctional/unreliable (C), make-shift processes of informal information exchange dependent on social connections result (O) because individuals have to compensate to acquire necessary information (M).
CMOC20b	When informal information exchange becomes the norm in a hospital (C), access to information by specific individuals and groups is inherently skewed (O), because it will depend on how socially connected the individual or group is (M).

Social groups

Staff form or discover their own identity as they seek to place themselves relative to others within the social landscape of the hospital, wherein *identity work* (the ongoing process of forming and maintaining a sense of self) occurs (Sveningsson & Alvesson, 2003). For example, due to the long-established, rooted, tightly-held, defended and sometimes hidden objects which comprise a profession and its associated representations, group membership is strong and barriers are often very distinct between different professions (Ferlie et al., 2017). People tend to spend time and communicate

with people who are like them in some way (*homophily*) (Scott, 2000). As such, social groups form whose members share a way of seeing the world, or *representation* (Dunn & Neumann, 2016). This builds trust between group members (Table 3.1.1, CMOC1).

Group representation, that is, a way of seeing, telling, and interpreting the world, gives content, structure and boundaries to the social identity of the group and its members, and meaning to purpose and behaviours. It is socially communicated by means of narratives (Hopkinson, 2003). Sense making of day-to-day experiences uses ordering and labelling to construct a continuous underlying explanatory narrative to life (Weick et al., 2005). As an individual health care worker, or a group of workers experience some action or event (either first-hand, or through the observed experiences or reports of social peers), sense is made of the experience by measuring it against the group narrative and representation (Weick et al., 2005). Therefore, those belonging to the same social group are more approachable to one another than outsiders (CMOC2a), whereas those who do not affiliate with the group's representation are easily identified as 'other'. Assumptions and judgements are made regarding values, background and behaviours of the 'other' (Johnson et al., 2004). In the hospital workplace, othering can occur between health care workers and patients (Johnson et al., 2004; Roberts & Schiavenato, 2017), and between different professions (Roberts & Schiavenato, 2017). The labels, judgements and assumptions that are made about the 'other' can lead to communication barriers with those colleagues who are outside one's own immediate social group. Over time, individuals become increasingly easily identified as part of the group, or outsiders (CMOC2b).

Health care workers will preferentially communicate with peers with whom they have an existing reciprocal relationship, due to familiarity and trust. Reciprocation is associated with commonality and work tasks which require interdependence of colleagues, for example administering drugs and manual handling of patients. Reciprocating peers are

more likely to form strong ties with one another. As communication and reciprocation increases, trust is further enhanced (Granovetter, 1985).

Communication within a social group becomes more frequent and more insular over time, enhancing homophily of group members and hence trust and preferential communication (Scott, 2000). While the consequences may be positive in some instances, an unchallenged uniform outlook can develop and intensify over time. Insular communication can thus risk redundancy of information within the group, where individuals cannot access novel information and knowledge (Scott, 2000). A strong preference to communicate only with those who are like oneself can lead to unchallenged collective convictions, and social-tailoring of information acting to strengthen existing outlook and tacit knowledge, i.e. groupthink (Janis, 1972; Mascia & Cicchetti, 2011), and echo (Burt, 2005; Mascia & Cicchetti, 2011) (CMOC4).

Within a social group, individuals who most strongly identify with that group's representation, and act to defend its position in the wider field and discourse (Dunn & Neumann, 2016), are usually most central to the process of information exchange within the group. As such, central members (Scott, 2000) model the group's behavioural norms to its members, and are more influential over the behaviours of other group members than those in peripheral positions (CMOC5a). When an individual is less invested in mainstream group identity, their behaviours may deviate from the expected group norms, either due to oversight or by intentional action. The opposition by central powerful members to such deviance from group norms by peripheral members can lead to conflict and even potential risks or threats (CMOC5b).

Group representations (Dunn & Neumann, 2016) and narratives are protected, shaped, and propagated by those most central within the group with the most social power. Behavioural norms are established from group narratives, and group members experience social pressure to conform to expected norms (CMOC6a). Conversely, those

in the group who are peripheral have little influence on the formation and stewardship of group representations and norms, but are expected to conform or face disapproval or remediation (CMOC6b). Material resources are more often controlled by central members, who are also more likely to be involved in decision-making within and on behalf of the group. The group centre-periphery structure is therefore maintained by the distribution of both physical and social capital within the social group and power can be enhanced when formal authority is aligned with social centrality (CMOC6c).

The entire multidisciplinary health care workforce also displays a macro centre-periphery structure in hospitals. In this macro centre-periphery structure, centrality of individuals is linked to job activity and status. In many hospital wards, junior doctors, senior nurses and some ward-based allied health professionals (e.g. ward pharmacist) occupy central positions, even though in the example of junior doctors the specific individuals filling these roles often frequently rotate (CMOC7a). Staff on the periphery of the macro communication network in the hospital workplace (e.g. senior doctors, junior nurses) can become isolated from information flowing from and between more central members. Fragmentation of the macro communication network can be exacerbated where ward activities are undertaken in isolation from other staff, or where staff are separated by shifts or physical proximity without adequate information sharing (CMOC7b). Since central individuals are seen to model and influence behaviours, advice or information received from a central colleague will have legitimacy. Indeed, seeking advice from a central colleague can hence be justified to others (CMOC7c).

Hierarchy

Health care workers operate within different hierarchies, each with a set of tacit social rules by which the workforce is expected to abide in daily workplace interactions. Such rules show respect and deference to status, and maintain lines of command. Those higher up in the hierarchy are permitted to communicate freely with colleagues of their

choosing. By virtue of their “custodial” hierarchical status (Tasselli, 2015, p.853) junior doctors also have direct access to colleagues who are of both higher and lower status to themselves (CMOC8a). Hierarchical rules rarely permit direct communication by those lower down with those higher up the chain of command, instead risking offense or discipline. Lower status staff are therefore limited to communication with peers, direct seniors, or brokers (individuals positioned between two otherwise disconnected groups) (Burt, 1992, 2005; Scott, 2000). Information and knowledge accessible to such staff is therefore limited, and risks lower status individuals becoming disenfranchised if information sharing is perceived to be inadequate (CMOC8b).

Hierarchical rules in hospitals provide a backdrop against which the behavioural norms of staff operate. The strength of influence of hierarchy on norms, compared with other factors (e.g. social groups), will differ by setting and by social group. In some instances, hierarchical control may be a principal determinant of norms, whereas in others hierarchy may play less of a role (CMOC9a and 9b). A health care worker’s own professional hierarchy will also dictate with whom they are permitted to communicate from other professions. As such, profession-specific hierarchies not only create the rules of communication within professions, but also determine rules for communication with colleagues of other professions (CMOC10a). Social rules based on historical hierarchies between different professions (i.e. doctors historically senior to nurses) are also significant in some settings (CMOC10b).

A hierarchy can escalate differentiation and power imbalance without sensitive leadership and management skills and awareness, and risks alienation of lower status health care workers from those of higher status, and vice versa. This can occur when perceived commonality and mutual understanding across hierarchical bounds is lost and replaced by difference, distance, division and even conflict (CMOC11a). As well as line-management responsibilities over more junior staff, senior staff often undertake greater

problem-solving and resource allocation work, compared to their juniors, who undertake a greater proportion of activity-driven work (Cott, 1997). The workforce can therefore become internally differentiated by its dichotomous scope of work, by seniority (CMOC11b). Junior staff differentiate themselves from their seniors, with peer relationships at a common hierarchical level often preferred (e.g. amongst junior doctors) (Creswick et al., 2009). Consequently, junior staff can become increasingly functionally independent of seniors, albeit for specific purposes of communication, legitimisation or support (MacPhee & Scott, 2002). Peers within the same status group learn to primarily depend on one another for support and information, leading to redundancy and loss of information transfer between different levels of seniority (CMOC11c).

If an individual exchanges information or builds a relationship with a high-status colleague, their own status will increase by association (Scott, 2000). In addition, the individual may gain access to other forms of capital (e.g. material resources) from the high-status colleague, which will further increase own status (Gans, 1974; Morris & McClurg Mueller, 1992) (CMOC12a). When there is a strong chain of command structure, those lower down in the hierarchy will be dependent on their higher status colleagues for information and resources. Higher status staff therefore have power over the acquisition of capital by their lower status colleagues, by determining how information and resources are distributed (CMOC12b).

Bridging distance

The workplace allows health care workers to observe behaviours and attitudes of colleagues, including those not part of their immediate social peer group. They will use this learning to choose which non-peer colleagues to trust and feel comfortable to approach, that is, bridging distance, for exchange of information, based on the personal communication skills and behaviours they observe, i.e. are they being 'careful' (MacPhee, et al., 2020). In addition to personal observations, the stories and accounts of others,

particularly those of trusted peers, will allow an individual to assess whether to trust a non-peer colleague (CMOC13). Some health care workers build up relationships with non-peer colleagues over time, or through multiplex ties (when two individuals are connected by more than one type of interaction) (Scott, 2000). Multiplex ties can form, for example, as the product of previous postings, or through knowing an individual through another means (e.g. on same committee). If a health care worker works for a long time in the same place, understanding and commonality will accrue through collective experience and observation. The worker will become familiar with areas of expertise and resource capital of specific colleagues (Wegner, 1986), and will understand how best to negotiate access to required information or resources (CMOC14).

When information is required urgently, a health care worker will preferentially seek information or support from a colleague who is physically present to increase the immediacy at which their need is met. Colleagues who are physically present in the workplace are thus more likely to be approached by others (CMOC15). Face-to-face communication allows picking up on non-verbal communication cues and, as it is interactive (Benham-Hutchins & Effken, 2010), clarification of misunderstandings and reciprocal information sharing. Alternative forms of communication might include telephone, email or written notes (CMOC16).

Brokerage of information occurs when an individual who is independently accepted by two otherwise disconnected groups, transmits and mediates information between these groups (Burt, 1992, 2005; Scott, 2000). Acceptance as a broker can be gained by merit of interpersonal skills, other desirable attributes, e.g. reputation for being hard-working, cross-cutting scope of work activities, or alternatively by a formal role, such as senior nurse. Information transferred by a broker is usually advantageous to the group and novel, however the broker must mediate information, which may lead to incomplete or selective information sharing. Significantly, the broker is able to 'translate' the information

for the specific and different 'languages' of both groups. The position of broker is fundamentally tied to power and status (CMOC17) (Burt, 1992, 2005; Scott, 2000).

Discourse

Discourse is not only the summative but also the relational landscape of representations held within a hospital's entire workforce, both present and past (Dunn & Neumann, 2016). Through the process of exchange over time, communication is dominated and characterised by certain representations (Schofield et al., 2012). Discourse maintains or challenges the dominant status quo (Wodak & Meyer, 2014). By ordering the hospital workforce in relation to one another by means of representations, it is possible to understand the relative power of others compared to oneself, which can be important in framing and interpreting one's "life space and the world at large" (Millar, 2013, p.214). Similarly, the theory of fields describes a "struggle" (Fligstein, 2001, p.109) between different social groups, with powerful groups seeking to maintain their advantage, and challengers seeking opportunities to create "a new order" (CMOC18a) (Fligstein, 2001, p.118). Rituals and norms communicate discourse, by embodying "how things are done around here" (Drennan, 1992, p.1). Rituals and norms (e.g. ward rounds and handovers) communicate tacit power structures in the hospital workplace, sustaining workplace power structures by defining and reinforcing expectations and social rules (or 'etiquettes') (CMOC18b).

Discourse places people within the social whole, based on relative dominance of their held representation. However, representations also shape the discourse (Dunn & Neumann, 2016; Morris & McClurg Mueller, 1992). Location and power of a specific representation within the discourse determines the agency of its members, through a process of comparison with others. Resultant agency is compounded by hierarchical status (CMOC19a). How a health care worker perceives organisational values is dependent on what is observed (either directly or through reputation from others) and

then interpreted, through the lens of the representation held by their social group (Dunn & Neumann, 2016). If an individual feels aligned with organisational values, they will assume greater legitimacy and confidence in the workplace, but they will not if they do not feel aligned. For example, some health care roles will attract greater esteem at institutional level, depending on their degree of embodiment of perceived organisational values. Clinical roles, particularly those associated with decision-making and cure (i.e. doctors), are often more highly esteemed. Conversely, roles such as cleaning, while of great importance, are less esteemed. Distribution of social capital and power in the workplace, and the identity work of individuals and different occupational groups within the hospital, are influenced as they act to continually construct a sense of self within the health care workplace (CMOC19b) (Brown, 2015).

Where formal communication processes are inadequate, socially-determined exchanges become essential for acquiring necessary workplace information. With time, informal exchanges can bypass or even replace formal processes, leading to their further deterioration (CMOC20a). While socially determined exchanges might be preferable for well-connected individuals, they inherently construct systematic inequalities in access to information. For those more peripheral or of lower hierarchical status, reliable information can become very difficult to access. This leads to skewed information access in the hospital workplace, determined by the social position of the individual worker as reflected in the theory of embeddedness (CMOC20b) (Granovetter, 1985).

Table 3.1.2 Characteristics of included documents

	Author	Year	Country	Participants	Social network data collection	SNA measures	Main findings
1	Anderson (Anderson & Jay, 1985)	1985	US	Physicians of a private group practice in a private, university affiliated, teaching hospital in US	Roster interview method identifying professional contact between individuals, by self-reported communication activity over the preceding 6 weeks. Demographic and computer usage data collected from hospital records.	Density 'Sender, Relayer, or Receiver' (based on ratio of in-degree vs out-degree) Prestige (In-degree)	Four sub-groups of physicians were identified, each displaying similar communication structures, similar demographics and similar computer usage. Sub-groups formed an overall core-periphery pattern.
2	Anderson (Anderson , 1991)	1991	US	Nurses working in surgical unit of private general hospital	Name generator questionnaire method to identify colleagues on unit who most often provided them with support when under stress	Path distance matrices Centrality Distance from centre	Nurses under stress tend to look for support from nurses who are like themselves in some way, and are also experiencing stress or burnout. Nurses under stress were centrally located on the day shift, and more peripherally located on evening and night shifts. Nursing managers were not always centrally positioned in the network (varied by shift), impacting on their ability to provide support.
3	Anderson (Anderson & Talsma, 2011)	2011	US	Operating room staff of general surgical and neurosurgical specialities large teaching hospital in US	Staffing and case data from all operations in 2008	Core-periphery structure, Coreness Centrality: Closeness, Betweenness, Eigenvector	Both specialties showed a core and periphery structure, more pronounced in neurosurgery. Core staff tended to work on longer cases, earlier in the day, and in larger teams. Nurses were disproportionately core staff.
4	Altalib (Altalib et al., 2017)	2017	US	Neurologists and other health care providers to patients with epilepsy in US.	Patient-sharing data from electronic health records of patients with epilepsy/convulsions.	Node degree Adjusted node degree	Connectivity increased over time, with networking within and between facilities.
5	Bae (Bae et al., 2017)	2017	US	Oncology nurses in an acute care hospital in the US	Roster method to explore patterns of assistance at work and demographic electronic survey.	Centrality: In-degree, Out-degree, In-closeness, Out-closeness, Betweenness, Eigenvector, Shortest path in, Shortest path out Other: Density, Reciprocity, Transitivity	Help was perceived to be given more than received. Shift (day >night) and education level (less for degree holders) were significantly associated with amount of help received by each nurse. Nurses working overtime provided more help to colleagues.
6	Barrot (Barrot et al., 2013)	2013	US	Anesthesiologists in charge of purchasing equipment at a specific hospital, as identified as manufacturers contact person	Survey using name generator in which asked to name up to 6 people in work-related network, and the connections those people might have with one another	Centrality	Clustering of purchasing anesthesiologists Network overall between purchasing anesthesiologists at different hospitals was fragmented, however there was one main component, and one central node. Some individual purchasing anesthesiologists were isolated

7	Benham-Hutchins (Benham-Hutchins & Effken, 2010)	2010	US	Staff involved in patient transfers (hand-offs) between departments in an acute care hospitals in the US.	Questionnaires completed by staff about communication activity between themselves and colleagues during five patient hand-offs. Job title list (no names) used as prompt.	Individual (provider): betweenness centrality, closeness centrality, eigenvector centrality and total degree centrality Network (handoff): betweenness centralization and hierarchy measures	Information exchange during hand-offs were found to be nonlinear, unpredictable and shaped by the information needs of the providers. Patient handoffs often coincided with shift changes, adding further complexity to communication.
8	Boyer (Boyer et al., 2010)	2010	France	Staff working in the psychiatry department of a French public hospital	Name generator questionnaire method used to identify with whom individual staff have ties and with whom they would discuss important matters. UCINET software used in analysis	Centrality (Out-degree) Prestige (In-degree) Cliques (cluster analysis)	Centrality was associated with job title (physician vs. nurse/psychologist/administrator) and work activity (transverse working). Prestige and clique participation (no of cliques per actor) were associated with male gender, job title and work activity.
9	Brewer (Brewer et al., 2018)	2018(a) HERD J	US	Staff in twenty four nursing units in three US acute care hospitals with different physical space design/layouts at four points in time over a 7-month period	Roster method used in questionnaire to identify communication patterns between nurses. Patient fall rates and style of physical space design/layout were also measured	Node size, density, weighted density, total degree centrality, betweenness centrality, eigenvector centrality, clustering coefficient, average distance, diffusion	Nursing unit design was associated with different communication patterns between nursing staff, and also with patient falls.
10	Brewer (Brewer et al., 2018)	2018(b) JNA	US	Staff in twenty four nursing units in three US acute care hospitals with different physical space design/layouts at four points in time over a 7-month period	Roster method used in questionnaire to identify communication patterns between nurses. Patient fall rates and style of physical space design/layout were also measured	Node size, density, weighted density, total degree centrality, betweenness centrality, eigenvector centrality, clustering coefficient, average distance, diffusion	Larger teams were associated with more medication errors and patient falls. More patient-related communication was associated with fewer medication errors and lower fall rates.
11	Cerne (Cerne, 2004)	2004	Slovenia	Nurses working in four Slovenian hospitals	Ring method used to identify contacts in 1 st , 2 nd and 3 rd social rings of closeness.	Closeness of rings	Nurses wanted a larger network. Nurses trusted those colleagues in the closest rings more, who were likely to be peers. They were more likely to discuss major decisions or emotional support with those in the closer ring. Trust and respect were linked to those in closer rings.
12	Chan (Chan et al., 2017)	2017	Australia	Geriatric wards in four tertiary referral urban teaching hospitals in Australia.	Roster based method was used in staff questionnaire to identify communication about medication advice. Medical records were assessed for drug errors.	Cohesiveness, density, degree centralisation, hierarchy value, transivity Evaluation of importance based on multi-indicator	Junior doctors, senior nurses and pharmacists acted as links. Junior doctors linked to senior doctors. Doctors were often sought for medication advice. Junior doctors often sought one another. Apart from the ward-based pharmacist, other allied health professionals

						(EIMI) method	were peripheral.
13	Cott (Cott, 1997)	1997	Canada	Healthcare workers on three ward teams at multilevel geriatric care facility in Canada; nursing home ward, chronic care hospital ward, and palliative care ward.	Roster method was used by questionnaire to assess professional communication. Block modelling was performed in SPSS	Block modelling Density within blocks	Senior nurses are linked to multidisciplinary professionals and are involved in decision-making work, whereas lower level nurses are involved in task-orientated work.
14	Creswick (Creswick et al., 2009)	2009	Australia	Staff in the emergency department of a teaching hospital in Australia	Roster method was used in survey to identify colleagues who were sought in problem-solving, medication advice-seeking and socialising. UCINET and NetDraw used	Connectedness Isolates Degree centrality (in-degree, out-degree) Betweenness centrality Degrees of separation Reciprocity	The unit was highly connected overall (except socialising), with professionals however tending to be more connected to those in their own professional group. Senior nurses and doctors occupied central positions, particularly doctors in the medication prescribing network.
15	Creswick (Creswick & Westbrook, 2010)	2010	Australia	Staff of renal ward of teaching hospital in Australia.	Roster method used in questionnaire, focusing on medication advice-seeking. UCINET and Netdraw software were used in analysis	Cohesiveness (geodesic distance) Density Tie strength Reciprocity In-degree, Out-degree, Degree centrality Betweenness centrality	Relatively infrequent medication advice-seeking was seen, with professional group cliques. Reciprocity of advice-seeking was 30%. Hierarchy (not based on seniority) was seen, where key individuals were sought for advice, as well as gatekeepers.
16	Creswick (Creswick & Westbrook, 2015)	2015	Australia	Staff of renal and respiratory ward of Australian teaching hospital.	Roster method – for every colleague respondents asked to indicate frequency of medication advice seeking from that colleague in a survey.	Density, reciprocity, in-degree, centrality ('hubs'), interprofessional communication density,	Medication advice-seeking was mostly directed to pharmacists, junior doctors and senior nurses, with senior doctors peripheral or even disconnected to the rest of the network.
17	Currie (Currie et al., 2014)	2014	UK	Hybrid mid-level managers, senior managers and professionals in three hospitals, and external producers of patient safety knowledge in the UK.	This was a mixed-methods study, comprising qualitative interviews, SNA and quality improvement activities. Name generator used as part of semi-structured interviews. Snowballing used to identify further participants. UCINET software used in analysis	Centrality Fernandez and Gould typology analysis of brokerage roles	Nurses found to occupy gatekeeping roles, with two doctors occupying a coordinating role in the overall management network.
18	Dauvrin (Dauvrin & Lorient, 2015)	2015	Belgium	Staff in five primary care services and four hospitals.	Roster method used in questionnaire to construct social networks. Competences in Ethnicity and Health questionnaire was used to measure cultural competency.	In-degree centrality used to identify leaders	Some elements of cultural competence of staff were linked to cultural competence of leaders. Leaders identified by social networks analysis were not always the formal leaders
19	Dauvrin (Dauvrin &	2017	Belgium	Staff in five primary care services and four	Self-administered questionnaire divided into three parts: cultural competence,	Reciprocity Popularity (in-degree	Cultural competence did not seem to be a socially shared phenomenon, however

	Lorant, 2017)			hospitals, from geriatric, intensive care, oncology, psychiatric, communicable diseases, palliative care and endocrinology units.	including three distinct dimensions, social relationships (roster method) and sociodemographic data.	centrality) Socialness (out-degree centrality)	awareness of exposure to cultural situations was.
20	Di Vincenzo (Di Vincenzo & Mascia, 2017)	2017	Italy	Physicians in 6 hospitals of a Local Health Authority in Italy	Name generator method used in paper questionnaire. UCINET software used. Number of publications per doctor also collected as part of assessment of knowledge level and ego-network redundancy.	Network constraint	Doctors tended to seek advice from those with greater knowledge prestige than them, and in same speciality. This was associated with concept of redundant networks. Effect moderated by being in the same professional group, e.g. manager
21	Effken (Effken et al., 2013)	2013	US	Nursing staff from seven medical-surgical patient care units from three acute care hospitals in the US, involved in shift handovers.	Roster method used in survey to identify colleagues with whom an individual gave and received information with at handover. Patient safety outcomes were also measured. *ORA used in analysis	Clustering coefficient Component count: strong Component count: weak Density Diffusion Fragmentation Hierarchy Isolates Centrality in-degree Eigenvector centrality Cliques Triads	Stronger connections among handoff staff were associated with fewer falls. Similarly, more clusters or small groups, cliques and triads were associated with fewer adverse drug events. Different associations were seen in regards to patient satisfaction and symptoms.
22	Espinoza (Espinoza et al., 2018)	2018	Chile	Healthcare providers at a large hospital in Chile, who had worked with the same clinical team for a minimum of 6 months.	Mixed methods study including surveys relating to satisfaction and team climate, interviews and social network analysis (using name generator). UCINET software was used in analysis.	Density Isolates Centrality Sub-groups	Team climate predictor of team satisfaction, as well as length of time working with team. Highly satisfied teams were more closely connected and centralised than least satisfied. Nurse leaders, common goals, focus on patient-centred care, communication style, fostering innovation and focus on task with clear team roles were all found to be important.
23	Fong (Fong et al., 2017)	2017	US	Three intensive care units in a teaching hospital in the US	Name generator self-administered social network survey relating to trust, advice seeking, support, help, confiding and influence ties.	k-Means clustering to identify influencers	Three typologies of influencers found: 'well-rounded', 'relational' and 'knowledge- or skill-based' influencers, which have characteristics of particular relevance to an ICU.
24	Forsyth (Forsyth et al., 2018)	2018	US	Pre-operative team briefings in the surgical gynaecology department of a quaternary care hospital in the US	Video-recorded team briefings were used to measure communication flow between team members. Data analysed using Code XL	Graph density Reciprocated edge ratio In-degree centrality, out-degree centrality	Surgeon-led team briefings were most common, with communication from surgeon dominant and little communication between other members. Resident-led briefings were still dominated by surgeon, however other team members communicated more. Anaesthetists were the least involved in briefings (sometimes not even present)

25	Grace (Grace & VanHeuvelen, 2015)	2015	US	Staff of neonatal intensive care unit of a children's teaching hospital in the US.	Roster method used in face-to-face interview to identify "highly productive working relationships". Measures of distress and burnout and social support also collected.	In-degree Reciprocity	Both network position and perception of social support are important (and not interchangeable) for reducing workplace distress. Perception of social support is also important for reducing burnout
26	Heiligers (Heiligers et al., 2008)	2008	Netherlands	Part-time and full-time doctors working in teams in internal medicine, surgery and radiology in the Netherlands	Postal questionnaire with three question domains: consulting, communication or (intended) relationships of trust with partners within their own team, and perceived socio-emotional relationships (using roster method). Semi-structured interviews were also conducted with a representative from each team on individual and team characteristics	Ego-network size Reach efficiency	Size of network and trust did not differ between full-time and part-time doctors. Reach-efficacy was lower in part-timers. Communication was higher in full-time teams. There was no differences in consulting networks. Team size, formal leader and age were associated with communication network size and trust relationships.
27	Heng (Heng et al., 2005)	2005	Australia	Department heads in a tertiary referral hospital in Australia, with a focus on facilities management.	Name generator used in questionnaire around professional communication regarding facilities management.	Density, degree centrality, betweenness centrality, structural holes measure	Facilities managers occupy central positions in hospital facilities networks. They occupy structural holes and connect across disciplines. Their work is central to the functioning of the hospital.
28	Heng (Heng & Loosemore, 2013)	2013	Australia	Snowball sample from facilities management group in a tertiary referral hospital in Australia	Name generator used in interviews to identify key contacts in other departments with whom aspects of facilities management are discussed. Strength of tie and content/purpose of communication also collected. UCINET software used in analysis. Semi-structured interviews also conducted.	Density, degree centrality, betweenness centrality Brokerage potential across structural holes: effective size, efficiency, constraint and hole signature.	Facilities management departments were seen to broker information between different departments of the hospital and to connect otherwise disconnected areas. A few facilities management departments were found to be particularly powerful in their network position in the hospital.
29	Hurtado (Hurtado et al., 2018)	2018	US	Registered nurses and certified nursing assistants from the medical/surgical and intensive care units of a community hospital in the US	Roster method social networks survey administered by research assistants to identify peer support for safe patient handling, as well as data on usage of manual handling equipment.	In-degree, out-degree, reciprocation	Use of equipment was associated with out-degree and reciprocal nominations. In-degree nominations were not associated with use of equipment.
30	Iacopino (Iacopino et al., 2018)	2018	Italy	Physicians and nurses in three surgical wards in Italian NHS	Questionnaire in which respondents asked to name colleagues or other professionals with whom they exchanged advice about a new surgical system (name generator).	Dyadic approach to analysis. Same adoption, connectedness, ego network size similarity, ego network composition similarity, ego network constraint similarity.	Similar perceptions relating to technology were associated with social connections, particularly those ties displaying homophily and similar network constraint.
31	Iyengar (Iyengar et al., 2011)	2011	US	Physicians prescribing a new drug associated with potential high risk in	Name generator method used as part of a postal survey to identify discussion and referral ties (conducted by a drug	Visualisation of sociogram	When controlled for sales calls and individual characteristics of the physician, earlier adoption was associated with network and

				three large cities in the US	company). In addition prescribing data collected for 17 months after the new drug was introduced.		self-reported leadership. Physicians with lower leadership scores were found to be more influenced by peers. More central physicians and those who prescribed more (and therefore more credible), were found to be the most influential in the network. Sub-groups were seen of physicians of different ethnic backgrounds, with a single broker between the two groups.
32	Iyengar (Iyengar et al., 2015)	2015	US	Physicians prescribing a new drug associated with potential high risk in three large cities in the US	Name generator method used as part of a postal survey to identify discussion and referral ties (conducted by a drug company). In addition prescribing data collected for 17 months after the new drug was introduced.	In-degree centrality	Discussion and referral ties found to influence the trial of a new drug by physicians (particularly those with low self-reported leadership), but not repeat prescribing of that drug. Close colleagues (i.e. working in the same institution) have a peer influence on prescribing, moderated by status, which increases with time.
33	Janmano (Janmano et al., 2018)	2018	Thailand	Staff of a district hospital in Thailand, which included male and female general medical wards, an intensive-care unit (ICU), and a private medical ward.	Name generator as part of interview on medication advice-seeking. UCINET software used in analysis. Data on medication error reporting also collected.	In-degree, out-degree, Betweenness centrality	Similar out-degree across cadres. Pharmacists and physicians were most central in network (in-degree). However different centralities for different aspects of medication chain. Females and those with lower degrees were more likely to report errors. In-degree centrality was the most influential characteristic for reporting medication errors in the hospital inpatient medication system
34	Jippes (Jippes et al., 2010)	2010	Netherlands	Supervisors and residents in obstetrics–gynecology and paediatrics in the Netherlands	Social networks analysis conducted of supervisors with their fellow medical specialists in their own departments, using web-based questionnaire (roster method). Medical specialists rated their communication intensity.	Degree centrality, betweenness centrality, closeness centrality	Social ties were more important than formal training in adoption of new innovation (giving feedback in postgraduate clinical training). Strength of tie, both strong and weak ties and age were important.
35	Jippes (Jippes et al., 2013)	2013	Netherlands	Supervisors and residents in four clinical training programmes in the Netherlands: obstetrics–gynecology, paediatrics, radiology, and anesthesiology.	Social networks analysis conducted of supervisors, using web-based questionnaire (roster method). In addition, data were collected on provision of feedback, attendance at 2-day teach-the-teacher course by supervisors, as well as on feedback received by residents.	Centrality	The clinical supervisor's centrality within his or her department's social network was significantly related to both self-assessed and resident-assessed innovation adoption scores, whereas attendance at the 2-day training course was only related to self-assessed adoption.
36	Landim (Landim et al., 2010)	2010	Brazil	Nurses working in a haematology unit in Brazil.	Name generator method used in questionnaire (only 10 staff included, but 25 more named). UCINET software used in analysis.	Density, reciprocity, centrality	Group density found to be very low, suggesting difficulty in group working and processes of achieving consensus, as well as limited support on problem-solving.
37	Lindberg (Lindberg et al.,	2013	US	Hospital-based outpatient haemodialysis unit in the US.	A social networks survey was conducted before and after the intervention, in addition to other methods of process and	Connectivity, inclusion, reach, centralisation	Following the intervention, staff social networks were found to be larger, and the network for collaborative ties more centralised.

	2013)				outcome data collection. Intervention was a quality improvement collaborative established, involving 21 haemodialysis facilities. This intervention included "positive deviance" team quality-improvement activities to reduce hospital-acquired infections.		
38	Llupia (Llupia et al., 2016)	2016	Spain	Healthcare workers from two hospital departments following an influenza vaccination campaign at a hospital in Spain	Name generator method during face-to-face interviews focusing on who individuals talked to or shared activities with during the vaccination campaign.	Dyadic analysis: sender, receiver, mutuality	Links were more likely between healthcare workers from the same profession, sex, age, and department, but not between healthcare workers who shared the same vaccination behaviour. Older and vaccinated HCWs were more likely to be named by interviewees.
39	Lurie (Lurie, Fogg, & Dozier, 2009)	2009	US	Staff working in intensive care unit in hospital in the US.	Observation of team rounds, followed by a survey using roster method to identify frequency of communication with colleagues and patients' family members.	Visual inspection of sociograms	Two different teams were observed for one unstable and one stable patient. The staff networks around the two patients were observed to be very different, with a physician being central in the first team, which is denser with the family more connected (unstable patient), and nursing staff central in the second, which is less dense with the family more peripheral
40	MacPhee (MacPhee, 2000)	2000	US	Nurses working flexible and traditional schedules in a tertiary referral paediatric hospital in the US.	Name generator with closeness rings diagram used as part of a survey. Emotional support and satisfaction variables also measured.	Position of alter in social ring structure	Flexible and traditional nurses were found to report similar social networks. Colleagues who were closest and provided the most support to nurses were peers, rather than managers.
41	MacPhee (MacPhee & Scott, 2002)	2002	US	Nurses employed in ten rural hospitals and one urban hospital in the US.	Name generator and social network circle diagram used in questionnaire, ranking and rating named colleagues for nine types of personal support.	Position of alter in social ring structure	Three levels of nurse managers were identified, with each level providing specific types of support to (and from) nurses. Nurses generally felt well supported.
42	Marquez-Sanches (Marques-Sanchez et al., 2018)	2018	Spain	Healthcare employees at a public hospital (Surgical Unit, Dialysis Unit, Management Team, General Medicine, Microbiology Laboratory, Paediatric Unit and Intensive Care) and a primary healthcare centre in Spain	Name generator and roster method used in questionnaire to identify colleagues with whom individuals sought advice on career and working environment. UCINET software was used in analysis. Team performance ratings were also collected.	Out-degree ties (Split into those within the organisation - internal, and those outside of the organisation - external)	External ties were found to improve the performance of physicians at both the individual and team level. In contrast, external ties did not improve work performance of nurses.
43	Mascia (Mascia et al., 2011)	2011(a) BMC	Italy	Physicians employed in six hospitals in an Italian local health authority (LHA).	Name generator used in questionnaire, including tie strength for advice ties. UCINET software was used. Attitudes towards evidence-based medicine were	Physician dyads	Homophily was seen to result in inter-physician collaboration, particularly the same field of specialization, co-authorship, affiliation with the same organizations, and similarities in

					also measured.		attitude toward evidence-based medicine.
44	Mascia (Mascia & Cicchetti, 2011)	2011(b) SSM	Italy	Physicians working across six hospitals in Italy	Name generator in questionnaire (with roster list for reference) used to identify colleagues with whom an individual discussed professional matters. Propensity to adopt evidence-based medicine was also measured.	Ego-network constraint indicator (controls: size, number of ties in ego-network)	Physicians who had highly constrained interpersonal networks were less likely to report adopting evidence-based medicine. The presence of structural holes in networks were associated with a greater likelihood of a physician using evidence-based medicine.
45	Mascia (Mascia et al., 2013)	2013	Italy	Physicians employed in six hospitals in an Italian local health authority (LHA).	Name generator used in questionnaire, including tie strength for advice ties. UCINET software was used. Attitudes towards evidence-based medicine were also measured.	Network Coreness score, derived from centrality and interconnectedness	Those with less self-reported use of evidence-based medicine were more central in the network than those using evidence-based medicine.
46	Mascia (Mascia et al., 2015)	2015	Italy	Physicians working across six hospital sites in an Italian local health authority (LHA).	Study used data from Mascia 2011(a), 2011(b) and 2013	Multiple regression-quadratic assignment procedure (MR-QAP), using physician dyads	Professional (speciality) homophily was found to be of stronger influence than institutional homophily. Doctors graduating less recently were seen to show fewer collaborative ties. Doctors holding managerial roles did not collaborate with others holding similar roles
47	McCurdie (McCurdie et al., 2018)	2018	Australia	Staff working in the intensive care unit of a hospital in Australia.	Participant observation of 'primary participants' for a minimum of 3 hrs, looking for intersections/interruptions ('secondary participants'). Two-perspective method used to examine each interruption. Social network of interruptions constructed from data using Gephi software.	In-degree, out-degree, standardised in-degree, standardised out-degree, weighted in-degree, weighted out-degree, sociometric status, generalised in-degree centrality, generalised out-degree centrality, network density, modularity	The in-charge nurse role was the most frequently interrupted. However the bedside nurse role initiated most interruptions, and interrupted every other role in the ICU. Team-leader and in-charge roles had high in-degree values, and had sole access to keys for the restricted medications cupboard, which the bedside nurse was unable to access without. Nursing roles were highly connected.
48	Meltzer (Meltzer et al., 2010)	2010	US	Physicians working in the general inpatient medicine services at a hospital in the US.	Roster method to identify frequency and quality of interactions with physician colleagues using survey.	Degree centrality, net degree, density, betweenness centrality	Sub-groups of physicians by speciality, gender, self-reported hospitalist status, and research activity were seen. More connected physicians communicated with other more highly connected physicians. Non-redundant connections held by a specific group is explored.
49	Menchick (Menchik & Meltzer, 2010)	2010	US	Physicians working at 6 academic medical centres of different sizes in the US	Medication advice-seeking networks constructed for high-esteem and low-esteem hospitals using survey (name generator). Structurally equivalent positions were compared between high and low esteem hospitals.	Esteem: In-degree centrality, adjusted by number of physicians in hospital (population size)	Within high-esteemed hospitals, physicians from higher esteemed medical schools, and those doing less clinical work were held in higher esteem. In lower-esteemed hospitals, physicians who read across journals and engaged in more patient care were more highly esteemed. Stigma was associated with graduating from a high-esteemed medical school but now working in a low-esteemed hospital.

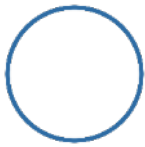
50	Myers (Myers et al., 2016)	2016	US	Surgical teams in a large academic teaching hospital	Dataset of surgical procedures, sharps-related percutaneous blood and body fluid exposures (BBFE) and index of collaboration, based on social network measures applied to surgical team data.	Team stability index score	Incidence of BBFE reduced with greater team collaboration score. Not much absolute reduction in real terms, but was significant for non-suture needle device related BBFE (and large numbers in analysis)
51	Pappas (Pappas, et al., 2003)	2003	US	Middle managers in a hospital in the US	Roster method of measuring communication network of mid-level managers using survey. Measures of strategic consensus, based upon qualitative interviews with management team, and measures of managers' knowledge of the internal and external organisational environments were also collected.	Degree centrality	Knowledge of the internal workings and vision of the organisation is important for consensus building, as well as the social standing of the manager in the organisation
52	Pappas (Pappas, et al., 2004)	2004	US	Middle managers at a hospital in the US.	Qualitative interviews, followed by a survey. Roster method used in survey to identify communication and friendship networks. Middle manager activities and strategic knowledge were also measured.	Centrality	Information flow was found to be controlled by those managers with close relationships. Social position in informal networks was found to mediate the association between 'strategic knowledge' and 'upward-orientated influence' of middle managers.
53	Pappas (Pappas & Wooldridge, 2007)	2007	US	Middle managers in a hospital in the US	Roster method of measuring communication network of mid-level managers using survey. Measures of strategic activity, based upon qualitative interviews with management team, and measures of role boundary-spanning activity were also collected.	Degree centrality, closeness centrality, eigenvector centrality	Divergent strategic behaviour is undertaken more by those who are more central in the social structure, and also by those who are boundary spanners (though not exclusively). Socialisation with diverse people allows one to 'learn' innovation.
54	Patterson (Patterson et al., 2013)	2013	US	Emergency department staff in a hospital in the US.	Roster method using a survey was used to construction social networks of communication about problem-solving, medication advice, and socialising.	Network density Network centralisation In-degree centrality	Variation was seen in communication over time, shift, and for different purposes. General problem solving communication was also associated with medication advice-seeking and socialising (however these two were only loosely linked themselves).
55	Pinelli (Pinelli et al., 2015)	2015	US	Patient discharges from a medical unit at a university teaching hospital in the US.	Electronic medical records for seven patient discharges were used and providers were asked with whom they communicated by chain interview technique.	Density, betweenness centrality	Junior doctors were most central in the discharge process, which was a multidisciplinary event.

56	Rangachari (Rangachari, 2008)	2008	US	Purposive sample of two good-performing hospitals and two poor performing hospitals in the US. Performance was assessed specifically in regards to medical coding.	Roster method using a survey was used to construct knowledge sharing network in regards to quality measurement and hospital coding performance.	Structural equivalence analysis (SEA) and visualisation of SEA	A stark difference was seen in communication structure between good performing and poorer performing hospitals. In good performing hospitals there was better interdisciplinary communication, with senior managers taking a proactive central role, and measures taken to raise the status of medical coding in the hospital.
57	Reed Elliot (Reed Elliot, 2012)	2012	Brazil	Staff in four hospitals in Brazil	Roster method used to identify ties and tie strength. Block modelling was used in the analysis.	Concor groups/"blocks"	Formal hierarchies did not predict block modelling findings. Hospitals varied as to who was in each block/core. Core-periphery patterns were seen. This is attributed by the authors to the history of the organisations and related to institutional culture.
58	Regts (Regts & Molleman, 2016)	2016	Netherlands	Medical and orthopaedic nurses in four hospitals in the Netherlands.	Roster method using questionnaire to identify advice network of nurses. Personality traits, job satisfaction and performance also measured.	Affect-based network centrality (combination of in-degree and out-degree centrality)	Study found an interaction between certain personality traits (neuroticism and introversion and stable extraversion) and benefit from network position for satisfaction and performance.
59	Riley (Riley & Manias, 2009)	2009	Australia	Operating room departments in three hospitals in Australia	Ethnographic study comprising observations and qualitative interviews, examining the interactions between operating room staff, to identify gatekeeping roles.	Ethnographic data	Gatekeeping activities of theatre nurses explored, and findings grouped into: Protecting; Facilitating and Disseminating; Providing Access; and Negotiating Social/Cultural Position. Associations between gatekeeping and power discussed, as well as the potential impact of gatekeeping activities on patient care.
60	Shafiei (Shafiei et al., 2018)	2018	Iran	Nurses from six departments in a hospital in Iran	Data for construction of social networks gathered from qualitative interviews with nurses (roster method).	Degree centrality, closeness centrality, betweenness centrality, eigenvector centrality	Nurses formed cliques within their own departments. Different departments had different communication structures/density, with surgery the most dense. There was little communication across departments, with just a few central nurses
61	Shoham (Shoham et al., 2015)	2015	US	Staff working in a burns unit in the US	Survey administered to staff to elicit frequency of discussing patient care with colleagues in a 24 hour period (roster method).	Out-degree centrality, in-degree centrality, betweenness centrality, density	Junior doctors were found to occupy central positions, despite frequent rotations. Staff communication was found to cluster around two groups of patients (ill vs less ill).
62	Shoham (Shoham et al., 2016)	2016	US	Staff working in a burns unit in the US	Survey administered to staff to elicit frequency of discussing patient care with colleagues in a 24 hour period (roster method).	Degree centrality, dyadic ties	The burns unit was generally well connected across different professional groups. However, Nurses tended to communicate more with other nurses. Doctors tended to be more central overall.
63	Sreeramoju (Sreeramoju et al., 2018)	2018	US	Healthcare staff on six medical wards at an academic hospital in the US.	Intervention study to improve patient safety culture related to infection prevention. Three wards were assigned to a social change intervention, implemented over nine months.	Degree centrality	Core staff in preventing hospital infections were identified as the patient's nurse, patient care technician, charge nurse, ward manager, and ward clerk. There was no deterioration in hospital-acquired infections in intervention

					A social network survey was conducted at 6, 15 and 24 months, to identify which colleagues an individual collaborated with to prevent infections, colleagues with whom they were involved in projects, colleagues who inspire them, and colleagues with whom they would like to work in the future. Patient safety culture and rates of hospital-acquired infection were also measured.		arm.
64	Sykes (Sykes et al., 2011)	2011	US	Doctors working in a private hospital in the US	Roster method used in survey to identify advice networks. Adoption of electronic medical records was also measured.	Degree centrality, eigenvector centrality (adapted)	The more central doctors were more likely to be associated with higher patient satisfaction, but were less likely to adopt electronic medical records. This was hypothesised by authors to be due to ease of alternative communication pathways and compliance with organisational norms.
65	Sykes (Sykes et al., 2015)	2015	Australia	Surgical procedures involving staff members across four surgical teams (general, thoracic, orthopaedic, and paediatric) in a large tertiary hospital in Australia	Data were retrospectively extracted using the electronic database Operating Room Management Information System (ORMIS). Gephi software was used in analysis.	Edges between nodes to create a visual map only	A small number of staff were shared across the teams. Longer procedures involved more staff, some of whom rotated during the procedure itself
66	Taselli (Taselli, 2015)	2015	Italy	Doctors and nurses of the nephrology department of a hospital in Italy	Roster method was used to identify professional knowledge exchange networks using survey. Qualitative interviews were also conducted to explore aspects of knowledge transfer	Average degree centrality, hierarchy score, average betweenness centrality, closeness centrality, brokerage	Structure of professional networks of nurses and doctors found to be very different, with strong professional boundaries. The roles of mediators and brokers in knowledge exchange explored.
67	Tsang (Tsang et al., 2012)	2012	Taiwan	Nurses in dialysis department of a medical centre in Taiwan	Social networks data relating to information exchange at work and sharing of personal issues using survey. Organisational citizenship behaviour, workplace stress and work satisfaction were also measured.	Degree centrality	Work network centrality positioning was different to friendship network centrality. Centrality was associated with organisational citizenship behaviour, which also reduced work stress and increased work satisfaction. Expected reciprocity associated with organisational citizenship behaviour was discussed by authors.
68	Venkatesh (Venkatesh et al., 2011)	2011	US	Staff working in a hospital in the US, after the implementation of a new IT system	Roster method used as part of a staff questionnaire, to identify advice networks. UCINET software used in analysis. Data on IT system use and patient satisfaction also collected.	In-group degree centrality Out-group degree centrality	A different influence for centrality on IT system use was found in different professional groups. Ties among doctors had a negative association with IT use, as did ties with doctors on IT system use by other staff. This is despite the use of the IT system being associated with better patient satisfaction.

69	Wagter (Wagter et al., 2012)	2012	Netherlands	Staff of intensive and medium care unit in a large teaching hospital in the Netherlands	Roster method used in questionnaire to identify inter-professional learning networks.	Density, reciprocity, tie strength	The underlying network structure was found to consist of two distinct networks, with a single group of nurses being isolated. Staff were found to learn from within their own profession, particularly from senior doctors. Authors comment that opportunity (e.g. physical proximity) and homophily contributed to explain the patterns seen.
70	Walton (Walton & Steinert, 2010)	2010	Canada	Staff involved in ward rounds on general paediatric wards of a tertiary care, university-affiliated children's hospital in Canada	Non-participant observation of eighteen ward rounds (noting all verbal interactions). Self-administered survey also collected ratings of the primary purpose of ward round, its utility for patient care, education and team administration, and the degree of disruption caused by the presence of the observer	Freeman normalised graph centrality index	Ward rounds conformed to patterns, and were often dominated by the same individuals. Time taken per patient was longer at the start than at the end of the ward round. Perceptions of educational value by ward round attendees was higher than the authors' opinions.
71	West (West et al., 1999)	1999	UK	Clinical Directors of Medicine Directors of Nursing working in hospitals in England	Name generator used in survey to identify people with whom the individual had spoken to about important professional matters, and how those identified were connected to one another.	Group degree centrality, actor information centrality	Directors of nursing were found to be in less dense networks, more hierarchical, with greater bridging/brokering role. Whereas medical directors were found to have denser networks which were less hierarchical, and were not seen to broker across structural holes in the same way as directors of nursing.
72	West (West & Barron, 2005)	2005	UK	Clinical Directors of Medicine Directors of Nursing working in hospitals in England	Name generator used in telephone survey to identify people with whom the individual had spoken to about important professional matters, and how those identified were connected to one another.	Category of alters	There were few doctors in the nurse managers' networks, and few non-doctors in the medical directors' networks. Both networks did however include some managers. Gender was found to be strongly associated with communication patterns, particularly amongst male doctors, who spoke to mostly other male doctors (also those similar in age and rank), but also as many male nurses as female nurses.
73	Westbrook (Westbrook et al., 2007)	2007	Australia	Staff working on three wards in a public hospital in Australia.	Roster method used in survey to identify which colleagues individuals sought medication advice from, or socialised with.	Sociograms	Staff interacted mostly with those from the same professional groups, however some professionals were seen to occupy bridging roles, such as the pharmacist, junior doctors and ward clerk
74	Yi (Yi et al., 2017)	2017	China	Doctors working in outpatient department of a large children's hospital in China, which had recently implemented a new EMR system.	Roster method used in interview to identify advice-seeking and advice-giving networks in regards to IT-related information. Data were also collected on electronic medical records usage.	Seeking-network closure Giving-network closure (Controls: seeking-network size, giving-network size)	Contacts who were connected with each other in advice-seeking networks, but not in advice-giving networks, were more likely to use electronic medical records.

75	Yuce (Yuce et al., 2014)	2014	Turkey	Doctors employed across three divisions in state university hospital in Turkey	Free recall method used in questionnaire to construct advice-seeking networks for technological/computer-related and also clinical/professional matters.	In-degree centrality and Cattel's method to identify influential physicians	Medical advice-seeking networks were more cohesive than technical advice-seeking. Residents tended to go to mentors for advice, which may have presented a limit to IT adoption. Women were found to seek advice from women and men to seek advice from men.



3.2 Programme theory: the novel GELLE Framework, from detailed to abstracted

In the previous section (3.1), I reported the initial programme theory as derived from realist synthesis of the literature. In this section(3.2), I report the main findings of the DPhil – the novel GELLE Framework – developed from realist evaluation using mixed methods data.

This section is divided into three parts (Figure 3.2.1):

- *3.2a: A summary of the data collected and initial analyses*
- *3.2b: Documentation of all detailed CMOCs which were used to build the GELLE Framework programme theory, with illustrative quotes from interview data and summary social network analysis findings*
- *3.2c: The GELLE Framework programme theory, in the form of narratives, ‘umbrella’ CMOCs, the GELLE Wheel, and reflective questions for practitioners*

Figure 3.2.1: Overview of section 3.2 of thesis

Due to the large number of detailed CMOCs that were derived from the data, section 3.2b contains a large table (Table 3.2.2) of CMOCs and illustrative data. This has been intentionally included in the main body of the thesis, for transparency of theory development and to enable interrogation of the detailed findings. However, review of a single domain may be sufficient, and preferred to a review of the table in its entirety, given the size. Alternatively, the table can be passed over towards the more concise GELLE Framework, following in section 3.2c.

Section 3.2a – Data collected and initial analyses

Data collected

The total data collected as part of the realist evaluation is shown below in Table 3.2.1.

In total, JJ and CW completed 81 hours of non-participant observations (observations of clinical shifts, unit meetings, and observations made during familiarisation visits), and conducted 62 in-depth interviews and 135 social network questionnaires, across the two study sites. Due to high levels of interest in the study findings, 34 stakeholders attended the sense-checking event, in response to invitation letters sent to the relevant institutions.

Table 3.2.1: Data collected during realist evaluation

	Non-participant observations (NPOs)	In-depth interviews (IDIs) (n)	Social network analysis (SNA) (n)	Stakeholder sense-checking event (n)
H1	40 hours observation (7 shifts, 1 meeting, familiarisation)	35	76	34
H2	41 hours observation (6 shifts, 2 meetings, familiarisation)	27	59	

A breakdown of the interview participants by profession is shown in Table 3.2.2. Whilst efforts were taken to recruit across all cadres, the interviews were dominated by nurses. This was felt appropriate, given the composition of the neonatal units, in which nurses represented the largest professional group. All interview participants in Hospital 1 were recruited from the NBU. In Hospital 2, a small number of interview participants were also recruited from the labour ward and postnatal units.

Table 3.2.2: Interview participants by profession

Profession	Number of participants	
	Hospital 1	Hospital 2
Doctor	5	4
Nurse	19	14
Clinical Officer	n/a*	3
Nutritionist	2	3
Student Nurse	9	3
Total	35	27

*Clinical officers were not employed in the neonatal unit of Hospital 1

Participation rates for the social network analysis, as a proportion of the whole network (defined as staff whose name appeared on the rotas during a 2-week period in H1 and a 1-month period in H2), are presented in Table 3.2.3.

Isolates (i.e. nodes with no edges, in other words receiving no nominations by participants) are described here:

- In hospital 1, isolates were mostly student nurses (n 10) who had not participated in the SNA questionnaire, and were not nominated by participants. Other isolates were two doctors, one nurse and another member of staff.
- In hospital 2, isolates represented junior staff (4 interns) and students (n 19) who had not participated in the SNA questionnaire, and were not nominated by participants. Additionally, two nurses were isolates.

Table 3.2.3: Participation rates in the Social Network questionnaire in Hospital 1

Note: Whole network defined as staff on NBU rota during a 2-week period

Cadre	Total on rota	Participants in SNA	Participation rate %
Doctors	28	12	42.9
Nurses	85	41	48.2
Nursing students	41	20	48.8
Nutritionists	2	2	100
Other	2	0	0
Total	158	75	47.5

Table 3.2.4: Participation rates in the Social Network questionnaire in Hospital 2

Whole network defined as staff on rota during a 1-month period

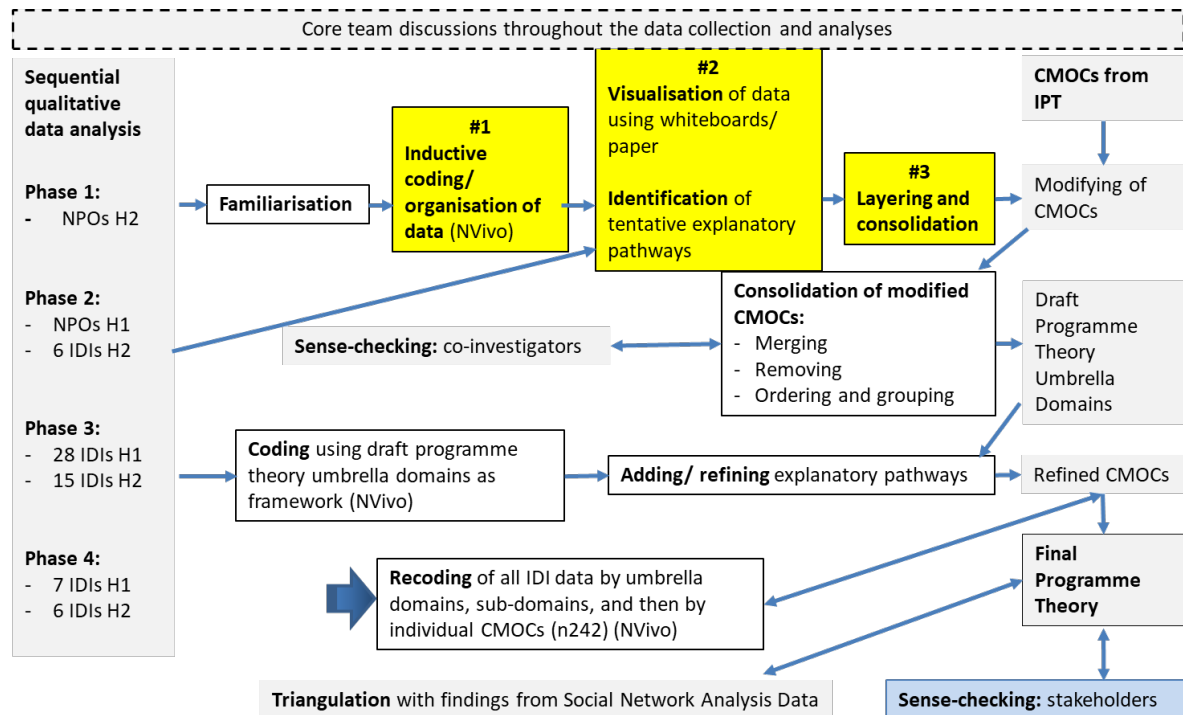
Unit	Cadre	Total on rota	Participants in SNA	Participation rate %
NBU	Doctors*	9	5	55.6
	Nurses	15	10	66.7
	Student nurses	33	11	33.3
	COs*	8	5	62.5
	Nutritionists*	8	5	62.5
	Other	1	0	0.0
	Overall	74	36	48.6
Labour ward	Doctors*	20	2	10
	Nurses	24	15	62.5
	Student nurses	22	1	4.5
	COs*	12	1	8.3
	EMT students	7	0	0
	Overall	85	19	22.4
Post-natal	Nurses	15	4	26.7
	COs*	7	0	0
	Overall	22	4	18.2

*Including interns

Initial analyses

As described in the Methods Chapter, initial thematic analyses (yellow highlighted box #1, in figure below) were undertaken of qualitative data following data collection, to aid in the identification of explanatory pathways. Following this, an extensive process of visualisation (#2 in figure below) and then layering and consolidation (#3) was undertaken.

Figure 2.2.2: Analysis of mixed methods data during realist evaluation (adapted to show initial analyses)



Initial coding

Thematic analysis of the non-participant observation (NPO) data for Hospital 2 was undertaken inductively, following extensive familiarisation with observation notes (see Methods Chapter). As part of this initial and limited thematic analysis, the following inductive codes were used to sort H2 NPO data before visualisation to identify explanatory pathways: Accountability, Authority and credibility, Clinical supervision, Cliques and silos, Distribution of duties, Engagement and disengagement, Escalation to hospital management, External tie, Failed communication examples, Gender, Handover, Hospital environment, Identification of staff, Implementation of standards, Leadership, management and following, Multiplex tie, Physical presence or absence, Social chat, Specific equipment examples, Specific interprofessional communication, Ward rounds and teaching opportunities, Written communication

As reported in the Methods Chapter, interviews were also initially coded inductively, however, due to differences in the relative social position of respondents, interviews were instead added to the explanatory analysis one-by-one (instead of initial aggregation of interview data by theme, which obscured differences in social position of respondents).

Visualisation

Visualisation of data to identify explanatory pathways is described in the Methods Chapter (for both the realist synthesis and realist evaluation components, including example whiteboards in the Methods Chapter and also in Appendix 3.1.3). However, I also include a brief description of how data were drawn upon during this process here, to facilitate clearer linkage between the steps taken in analysis which led to the formation of the CMOCs presented in the following section of this chapter.

Visualisation of data was one of the most time-consuming steps of the analysis, and arguably one of the most challenging. I systematically examined all non-participant

observation and interview data and added data to my analyses in a sequential layering manner to identify explanatory patterns of causation. The breadth of data was substantial, and required extensive analysis during steps #2 and #3 on the diagram above, before CMOCs could be modified and draft programme theory developed. To undertake the highlighted steps #2 and #3 of the figure above, I used the following:

- All floor space available to me (for example, empty offices when colleagues were away, shared office floor when I was alone, unused meeting rooms, coffee room, etc.)
- Two whiteboards, which I kept next to my desk at all times, and as many coloured whiteboard-pens I could find
- A set of old shelves that I found in a store cupboard and were very useful for sticking paper to
- Flipchart paper, sticky notes, scissors, cellotape, highlighter pens, bluetack

For what seemed like several months, I spent a substantial amount of my time on the floor with my shoes off, visualising data and looking for patterns. I gained a reputation, both within my immediate team and with wider colleagues on my floor of the building, and it was not unusual for colleagues to appear at the door of whichever room I was using that day with a camera.

But as the time passed, the copious coloured markers, whiteboards and arrows, became replaced by floors covered instead with snipped out pieces of typed paper, as I worked hard to consolidate my findings and develop and refine CMOCs. In addition, I used the visualisation of cut-out strips of paper to group CMOCs and start to develop draft programme theory.

During this phase of analysis, I was highly immersed in the data. At the time, I felt like the data were producing an enormous hot air balloon of findings, but that as time went on and

the layering and consolidating process progressed, this hot air balloon felt like it was slowly deflating and becoming more manageable.

Section 3.2b - Detailed CMOCs with illustrative data and SNA findings

I originally wrote this chapter without the inclusion of section 3.2b, but it has become increasingly clear to me that display of these detailed findings is essential to the thesis, despite the lengthy tabulated form. Of note, I also previously tried removing all illustrative quotes from the tables of CMOCs presented below, with the intention of placing them in the appendices, but again this seemed unsatisfactory – the quotes gave necessary substance and relevance to the otherwise dry, unembellished statements of causation.

I therefore feel that section 3.2b is required here, within the thesis itself rather than moved to the appendices, in order to more fully understand and appreciate the abstracted and summarised findings presented in section 3.2c. For this reason, I made the decision to display these detailed context-mechanism-outcome building blocks – indeed, if not in this thesis, where else? It is from these detailed explanatory arguments presented here within section 3.2b that the abstracted and summarised theory has been formed (presented in section 3.2c).

Overarching analysis and data

As previously presented in the Methods Chapter, realist synthesis of the literature provided an initial programme theory, which was then tested (i.e. confirmed, refuted and refined), through realist evaluation of mixed methods data (non-participant observations, in-depth interviews, social network analysis) collected from neonatal care settings in Kenya to produce CMOCs and abstracted programme theory. As such, relevant aspects of relational context could be identified through explanatory realist programme theory of causation and inform quality improvement interventions.

Senior nurses

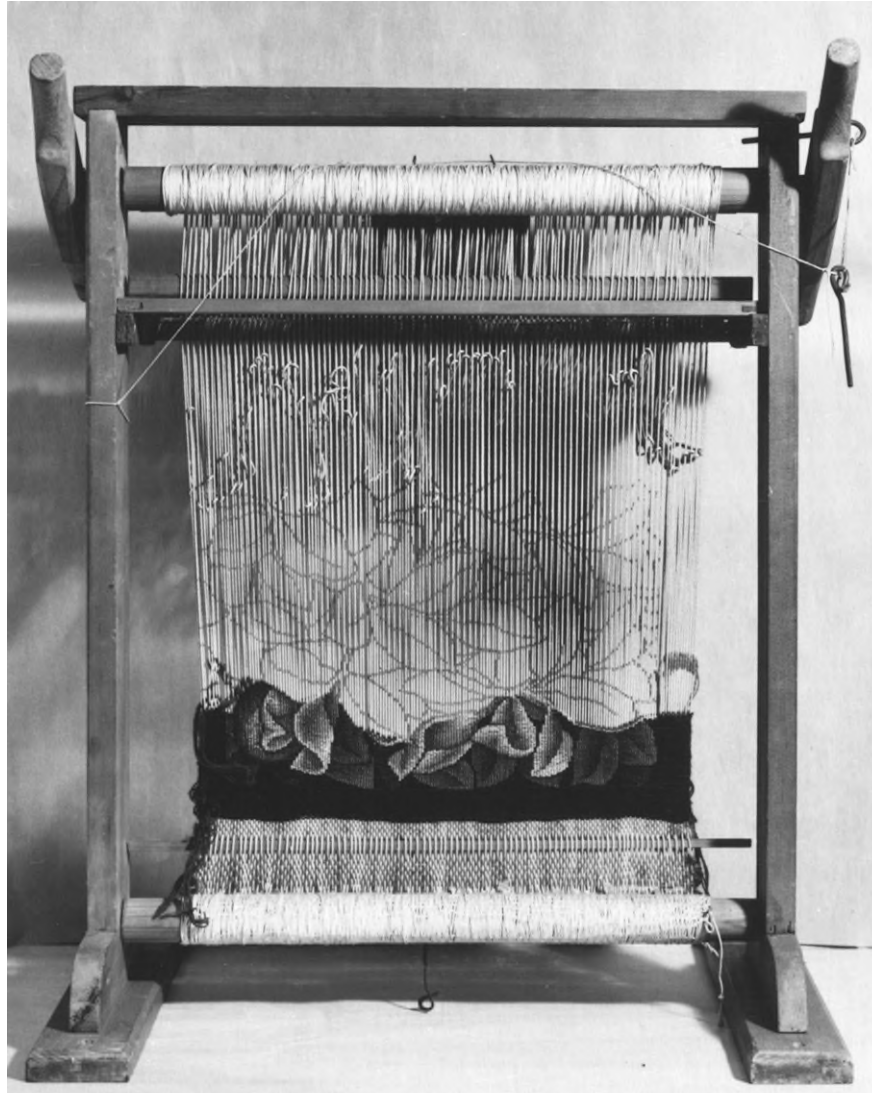
Two expanded examples of CMOCs are provided below, which also illustrate the approach taken to understanding the influence of senior nurses within the complex adaptive system of relational whole. As set out in the Methods Chapter, and in line with complexity theory and social network theories as guiding conceptual principles, senior nurses and their relational influence were assumed not to be isolated from the rest of the relational workplace. The theoretical findings of particular relevance to senior nurses are hence integrated throughout the results presented in this chapter, aligned with clinical relational workplace complexities. Notably, the concept of leadership as one of the five overarching domains of the GELLE Framework, also recognises that relational leadership can span both the formal and informal.

Rather than diluting or losing grasp on the findings relevant to senior nurses, their integrated and inter-dependent relational roles and influence are given new clarity. Furthermore, key aspects of workplace context that trigger causative mechanisms and associated outcomes of relevance to senior nurses are identified and disaggregated, to help guide targeted improvement interventions. In this way, my DPhil explains the influence of context on staff social ties, particularly senior nurses who are identified in the developed GELLE Framework as being highly influential in the relational workplace.

Throughout the process of my DPhil work, I have had in mind an analogy of creating a tapestry, or rich embroidery (Figure 3.2.1) – focusing on each small weave or stitch, whilst expectant that the whole will in time assume recognisable form. Indeed, the recognisable form (GELLE) has been validated by stakeholders (see later in this section), but a true reporting of the results (and indeed of quality) is incomplete without showing the stitches.

Figure 3.2.2: Loom used for creating tapestries

Miniature tapestry loom used by William Morris, late 19th-century, England. Museum no. 156-1893. © Victoria and Albert Museum, London (reproduced with permission)



I have presented the social network analyses alongside the detailed CMOCs in section 3.2b, as these also contributed to essential thinking which is later reflected in the summarised GELLE framework. As such, section 3.2b demonstrates integration of methods throughout data collection, analysis and interpretation (see Chapter 2.3). Realist evaluation as an approach assisted the integration of research findings in a structured way (i.e. by developing CMOCs).

The development of theory, from initial programme theory to refined programme theory (see Figure 2.0.1), is shown in Table 3.2.5. The CMOCs from the initial programme theory that were retained following empirical data collection and analysis (i.e. realist evaluation) are indicated, along with the new CMOCs derived from the data. In addition, those CMOCs from the initial programme theory that were not retained in the final programme theory are listed.

The illustrative data presented under each detailed context-mechanism-outcome configuration (CMOC) are taken from the interview data (Table 3.2.6). Where supporting interview data were sparse, but the CMOC was strongly supported by observations, this is indicated. Observation data, interview data and social network data were debated and discussed within the core research team at length during the analyses and informed all results.

The abstracted GELLE Framework, in the form of summary narratives, umbrella (i.e. summary) CMOCs, the GELLE wheel, and reflective questions for practice, are presented in section 3.2c, but a summary is also given here to assist in navigation of the in-depth findings presented in Table 3.2.6.

Summary of GELLE Framework

The relationships between healthcare workers influence how work is done, and patient care delivered, on a unit. Specifically, social ties, or channels of communication and support between individuals are shaped by the following integrated theoretical domains (GELLE).

G. Who individuals consider to be their peers and trusted colleagues, based on their observations of others (GROUPING)

Shared identity and purpose: Within a hospital unit, staff will group with colleagues who they identify with in some way, based on observations of their appearance and conduct. When staff feel they have aspects of identity in common, they will develop trust towards one another, and work together more collaboratively. However, assumptions linked to shared identity can lead to the formation of insular cliques, with those external to the clique recognised as outsiders, and judgements made. As such, factions and division deepen, and different cliques can operate in parallel within the same unit. Being 'careful'

towards colleagues and patients: The conduct of individuals is continually observed by others on the unit, and colleagues will feel comfortable approaching an individual for advice or support who displays that they are 'careful' in the way they communicate.

Access to knowledge, skills, experience: In addition, when individuals demonstrate that they have good knowledge, skills or experience, colleagues will also seek them.

Conversely, colleagues will avoid approaching individuals who show 'lack of care' in their conduct, or who are deemed to have poor knowledge and skills.

E. The aspects of formality and structure within the unit which influence the ability of specific individuals to act (EMPOWERING)

Facilitative hierarchy: Social constitutions, for example the tacit structures of social hierarchy and formality within the unit, influence the actions available to individuals by

empowering or disempowering. Indeed, hierarchy in a unit can improve oversight and communication and therefore empower staff, which can improve a sense of belonging and purpose within the unit team. However, when filled with tension and fear, a hierarchy will disempower and divide staff. Constructive centrality: Likewise, within social sub-groups on the unit, individuals who are most central within the group have most power and influence on group behaviours, unlike those on the periphery, regardless of competency. Roles clear and aligned: Communication on the unit is enhanced when the roles of individuals are clear. When roles are not clear within the team there will be confusion, conflict, individuals may adapt their own roles, and activities and tasks may not be completed by the most appropriate staff.

L. How leadership within the clinical unit influences the relational culture **(LEADING)**

Setting positive values tone: The approach to leading on the unit influences culture. The ways in which leaders act, and display their own attitudes towards work, communicate a strong 'values tone' to staff and students and influence their behaviours and collective habits (either positively or negatively). Respected, self-confident: Effective leaders earn the respect of unit staff by showing they possess admirable values and personal qualities, through their conduct, delivered with self-confidence and humility. Inclusive, collaborative: Leading in an inclusive and collaborative manner cultivates a sense of belonging in others, and members of the team will be encouraged to share and contribute to unit activities and innovations. Situational awareness: Likewise, leading from a place of well-informed understanding of the unit and awareness of the capabilities within the team, is essential for achieving meaningful support to staff in their day-to-day work. Appropriate delegation: Leaders must also delegate clearly and wisely, to empower others in appropriate leading roles, and to avoid personal overwhelm.

L. How those within the unit support learners to become competent professionals (LEARNING)

Structured learning on unit: Teaching and learning on the unit is socially determined, and influences how learners are supported to become competent professionals. The structure of training on the unit can either help or hinder the development of shared understanding amongst the team, and when structured well can be used to achieve both greater inclusion of staff and improved consistency and quality in patient care. Well-managed student placements help to create clear expectations and a better learning environment. Conversely, poorly managed student placements lack clarity and oversight, and lead to chaotic teaching and learning. Allocation of learner to teacher: When students are allocated to specific staff on the unit, they will feel more a part of the team, and will be better supervised. Indeed, without adequate supervision, students may undertake tasks they are not competent to complete. Student initiative: Moreover, when teaching and learning places ultimate responsibility on students themselves to seek and initiate their own learning during clinical placements, they will differ widely in approach, and therefore only some will gain the necessary knowledge and skills needed for their ongoing professional career.

E. How physical order within the unit influences relational processes within the workforce (EQUIPPING)

Physical environment intentionally enabling: Finally, the environment of the unit itself can help or hinder social processes. For example, when the physical environment is organised in an intentional and enabling way, 'the right way' becomes 'the easy way'. However, when the physical environment is chaotic, this leads to wasted time, frustration, incivility and workarounds by staff, impacting on work activities and delivery of care. Likewise, physical overcrowding on the unit can trigger overwhelm of staff, and reliance on shortcuts. Orderly storage and use of clinical records: When patient records are stored

on the unit in an orderly manner, and their use is routinely integrated into day-to-day clinical practice by staff, the quality and use of documentation improves. Staff rest and recovery: In addition, the provision of a rest space for staff enhances wellbeing, and gives an opportunity to step away from their physically and emotionally demanding work, support one another, eat and refresh. Support for adaptation of learned norms: Since the environment of a unit shapes the workarounds developed and used by staff and learned by students, when staff and students transfer to new unit, they will require support to adapt to its unique set of norms.

Expanded illustrative CMOCs

The importance of consistently communicating and upholding standards and expectations on the unit was found to be of particular relevance to nurse leaders (i.e. senior nurses), who were found to have the opportunity to greatly influence the workplace behaviours of other staff. Maintaining standards within the workplace, such as reliable punctuality for shifts and clear expectations around meetings and handovers, were found to be reliant on this aspect of leadership. Where workplace standards were not consistently reinforced, lax adherence was normalised and standards crumbled.

The conversion of semi-regular patterns from the qualitative data (non-participant observations (NPOs) and in-depth interviews (IDIs)) to explanatory statements in the form of context-mechanism-outcome configurations (CMOCs) is captured in the two examples below, drawing on illustrative data from both NPOs and IDIs:

Example CMOC #1:

LD9: When a leader communicates clear consistent expectations for staff behaviours on the unit, e.g. punctuality, attendance at handover (C) these are more likely to be upheld (O) as all staff are aware of expectations and will fear consequences of deviance (M).

This CMOC was supported by observational data, illustrated by the following excerpts from observation notes:

#1: The nurse-in-charge is seated at the reception area writing in a book. She asks if there's anyone who hasn't clocked in, she tells them she is about to draw the line. Shortly afterwards she draws a line across the book below the name of the last person [meaning that those arriving after this will be late for work] The tone is neither friendly nor angry but firm, meaning business kind of tone. she is audible enough for all the nurses to hear.

#2: The meeting is called to order by the ward nurse manager, saying: Time for hand-over team, let us convene now. She is firm and loud enough that those .. can actually hear. The first nurses ..who arrive sit on the few available seats. The rest come with their own plastic seats and/or wooden stools and quickly make several orderly rows as they sit and join their colleagues...

Supportive illustrative quotes from interviews supporting this aspect of leadership are provided in the table below and reproduced here:

(Consultant) "Yeah, there is this baby who is dirty. I will say it twice. If you're not going to clean, I'm going to clean myself..... Then you will see the outcome. So the next time you see the baby is dirty. You probably do it coz you know if you don't do it, I will do it.....So, I am not going to order you around, but don't push it. Monday, Tuesday you have not washed the incubators, on Wednesday I will remove the incubators and wash them myself.....So, you will be the one who would be answering as to why your consultant is washing incubators."

(Nurse) "People come here ready to work. You see, it's not like you know other wards I... where I've worked in ward where by you go, you receive a general report ...and then you wait to be allocated..... Here we come when we are already allocated and you go and you start your work then there is so much routine here, mothers coming every 3 hours it keeps us on our toes.... I must have done this before they come."

(Student Nurse) "We would be called in a room, if it specifically for the students... Yes, we are called in a room and we are given the advice and the motivation. We are told first you did this and you are supposed to be doing this. Then after that you are told..."

Example CMOC #2:

LD10: When there is a legacy of poor reinforcement of standards by a leader (+/- no processes for reporting) (C) digressive behaviour will be normalised (M) leading to a poor working environment for all, sense of futility for leader, and frustration by others who do not have necessary power to intervene (O).

This CMOC was supported by observational data, illustrated by the following excerpts from observation notes:

#1: three nursing students, ...trickle in when handover is done. They are supposed to arrive at 0730hrs but them arriving late is a non-event.

#2: one .. nursing officer arrived for the [afternoon] shift at 1:30PM while the second nursing officer... arrived at 2:30PM. This was a non-issue. She was jovial and happy. She was jovial and happy as she greeted the in-charge and they responded in the same mood.

Supportive illustrative quotes from interviews supporting this aspect of leadership are provided in the table and reproduced here:

(Senior Nurse) "Okay. Let's say now like right now we have, our numbers have gone up, maybe, like yesterday we had seven turns, you have somebody who just comes how, he wants only to do, to do documentation and not hands on. Just to sit down and document. Maybe now as a [senior nurse] you have to do other managerial work. Maybe let me say that very day the in charge is not around or she's gone for meetings, and you're alone there with the same staff who like sitting..... She doesn't know many procedures. Now you have to do all those things, before you start managerial work maybe it will be around three, you leave here at six or seven-ish?.....And you know you, you cannot be telling an adult to do this and she knows what she's supposed to do.... And she doesn't want also to know.... So it becomes difficult..... And they're rigid to change.....And they're just timely. Somebody just want to, okay, maybe now you, she reported in the morning and is supposed to leave at 12:30, once 12:30 reaches, she doesn't know the procedures. [laughter]. Where the, where she had reached for document, that's where she will stop.....Yeah. You know now this nursing whoever said is handing over is, because now somebody says, I now want to handle over all the procedures I had not done, but she was just sitting."

(Student Nurse) "Yeah. You're forwarded to the, to the, it's called what? To the sixth floor, the nursing standards..... She was, okay... the, the reason to that she was giving excuses. Sometimes they weren't making sense, but, to some extent they were being believed. [Laugh]. Yeah.Let me say, it was just luck."

([removed]) "mmmh, (Pause). Why does that one person keep coming into my head? Like I said, they are very chauvinistic, ...yes, it's the same person I described. I feel like, their people skills, you know, how they interact with people is, really missing.... And I was just like, I don't know what we are supposed to do! Cause like the people that we would

have approached, you know, with this behaviour, are the ones who are present when these behaviours are happening. When these words are being said, they're present in there, and they are like, and they just laugh it out. So, you are like, okay. I guess that's the new normal, and you just move on...."

The remaining CMOCs developed from semi-regular patterns in the mixed methods data (NPO, IDI and SNA), are presented in Table 3.2.6, with illustrative supporting quotes from the IDIs.

Table 3.2.5: The development and refinement of the programme theory during realist evaluation.

GELLE Framework Domain and Sub-Domain	Initial Programme Theory CMOCs retained in GELLE	NEW CMOCS included in GELLE	Initial Programme Theory CMOCs not retained in GELLE
GROUPING			
Shared identity and purpose	1, 2a, 2b, 3, 4	G1-G25	14, 17, 18a
Being 'careful' towards colleagues and patients	13, 15	G26-G71	16
Access to knowledge, skills, experience	7c	G72-G81	
EMPOWERING			
Facilitative hierarchy	8a, 8b, 10a, 10b, 11a, 11c, 12b, 17	EM1-EM14	9a, 9b, 11b, 12a, 19a
Constructive centrality	5b, 6a, 6b, 7a, 7b	EM15-EM25	5a, 6c
Roles clear and aligned		EM26-EM42	
LEADING			
Setting positive values tone		LD1-LD20	19b
Respected, self-confident		LD21-LD26	
Inclusive, collaborative		LD27-LD35	
Situational awareness		LD36-LD41	
Appropriate delegation		LD42-LD47	
LEARNING			
Structured learning on unit	18b	LN1-LN18	
Allocation of learner to teacher		LN19-LN29	
Student initiative		LN30-LN32	
EQUIPPING			
Physical environment intentionally enabling		EQ1-EQ22	
Orderly storage and use of clinical records	20a, 20b	EQ23-EQ29	
Staff rest space		EQ30-EQ36	
Support for adaptation of learned norms		EQ37-EQ44	

Table 3.2.6: Context-Mechanism-Outcome configurations (CMOCs) developed from empirical data, with illustrative quotes from interviews

GROUPING	
Shared identity and purpose	G1: When staff share a similar scope of work (C) they will understand common information needs (M) and will be able to share useful information/ support (O).
	(Nurse) nurses, (laughs).....I think because we have a lot in common... because most of the time they're giving me reports, am inquiring about duties... am inquiring about commodities, so, most of the time I would find myself more,.... MO, MOIs..... yeah, we talk, but not like frequently. I may talk to him maybe asking, what about this treatment sheet... do we administer this drug now? maybe, do I put a cannula, so.... not as often as nurses.
	(Nurse) Well, I think being colleagues and the type of work that we do, it's the same. So, you'll find us most of the times together performing our procedures.
	G2: When staff or students are considered peers (e.g. same cadre, alike in age, employed at same time, training institution, etc.) (C) they feel comfortable/ more relaxed with one another due to shared understanding and perceived commonality of thinking (M) and will help one another, share new information, correct one another, be concerned for one another's welfare, swap shifts, social enjoyment (O).
	(Nurse) I will go maybe to an older person like me because we have same thinking.
	(Nurse) But you find there is that feeling, you have a common feeling towards the patient. We're here for the patient.
	(Student Nurse) Yeah, we could... there are those we could discuss with, the same, same guys because it's like we...we are familiar, not even familiar that they are at some point in life, you can relate with them they can relate with you. The kind of life I've gone through; they have gone through.....Yeah, some common life experience that could allow... that could allow others to relate with you and even encourage you and even discuss about my career.
	(Senior nurse) Okay. When it comes to emotional support, I don't base in mind the seniority, eh, they are those ones who are just, you feel like me being a Christian? They are those ones who you, from their appearance, you see that you sail together in terms of Christianity, you can pray together. So in case of such a thing, emotional support, spiritual support, they are those ones that I go, I go to, I go to, eh, like we have (female nurse), we have a (female nurse), whereby I just express myself to them, and sometimes we pray together. So when it comes to that, I don't base in mind seniority, the ...
	G3: When staff are friends (C) they will understand, trust, feel safe enough to be vulnerable, and have pre-existing foundation of reciprocity with one another (M) so will communicate truthfully and frequently, confide in, and help one another, and enjoy being on shift together (O)
	(Nurse) If you are, if you are my friend, I will definitely open up some things for you, because you are closer to me.
	(Student Nurse) When in the NBU, I made friend, as in, we became good friends with her. So apart from the NBU and hospital stuff, we would talk other things apart from the NBU. So, yeah, I found it like very, as in I confided in her very much in most of the things. Yes
	(Nurse) She's my friend and whenever I'm in she will come and find me where I am. Yeah. And she has some stories [laughs]..... Now when you are free, when you have a free time, maybe you can meet in the tea room and start talking.... And you can talk to her and tell her everything.
	(Nurse) typically, they are my friends (laughs).... I value friendship.... career wise, for progression. Coz, I trust them, they will give me good feedback coz they know my qualities, they know how I work.. so, they understand me better, that's why, I opt to seek their advice.
	G4: When there is fragmentation within a cadre, e.g. by age (C) friction may occur between subgroups (O) due to 'othering' (M).
	Observations
	G5: When colleagues are trusted (C) others will go to them for advice (O) as they feel "at home", that they can speak in confidence, and the colleague is interested in their good (M).

(Nurse) Yeah, I think it also involves trust and you see people are different and you cannot just tell everyone how you feel, there are specific people that you choose among the circle you have that you can express your feelings. Yeah
(Nurse) And you feel like you are at home with them. Cause they give you the best advice, they feel that will help you.
(Nurse) I think when we met, we bonded and when we, we can keep a secret. If I tell them something, they can they can keep a secret, and when they tell me something, I do keep their secret.
(Nurse) Another thing, I go to somebody who is loyal. Somebody can give you time, listen to you and give her your views.
G6: When there is cordiality and respect across cadres (C) free communication is encouraged (M) and teamwork improved (O).
(Student Nurse) Now, we have a students' instructor and we also have the team leader. So for the supply stuff, you have just to get the key because she's the one who holds the key to the store. So you have to go talk to her to go pick the clients. At the same time, she's also very receptive, like, yeah, now how she handles students is a bit different from, from other people. So, I would prefer talking to X other than other people..... Politely. You know, you are a student requesting for store key. You know like, it's not something simple. Yeah, so you see, when you go to her, she will treat you like, just like a student; very polite. If the supply is there in the store, she will send you, you go pick it and then you return the key
(Clinical Officer Intern) As in you talk to them but you can be like more close you find yourself being free....Yeah. Yes you can approach them in terms of work and so on but now the friendly part.
(Nurse) That one we just go to the doctor, because sometimes you may find that. OK, the as a nurse you... You look at the patient, the way the patient presents. So you go to the doctor, Let's say, doctor, this patient has this 123, I think with this and think, OK, you can also give your own suggestion as a nurse. So maybe, maybe I think this drug will not work. Maybe. Let's go to the second line. The baby has finished first-line antibiotics and there is no improvement. So maybe we can go to second-line or this baby's having persistent fevers. Even with the, even with the intervention, but still the patient has persistent fevers. Maybe let's go to, maybe you can do a full hemogram or a CRP or blood culture to find out more. so that one you go to the doctor.
(Nurse) I just say let's just have a good working relationship, let's just respect one another regardless of your level of education. Because here people we have... there are those who have done diploma, they're those who have a degree, there are those who have a degree and they also have specialization...there are those who have just degree only, without specialization. So regardless of wherever you are in your level of education. And then another thing, don't undermine someone and then if you are corrected, just take it positively.
G7: If advice received aligns with existing beliefs, is evidence based, patient-centred, and the person feels that they were listened to (C) advice will carry more weight (O) because it is deemed reliable (M).
(Student Nurse) Okay, we, if I receive something like that, I think the best thing I do is just goes by the evidence-based practice.... You know, if you give me some, let's say, literature, you'll just have to tell me where you got the literature.
(Nurse) yeah. Once we've referred to our nini (whatever), our opinions, whenever, whoever's opinions aligns to the procedure manual, the standard policy.... is the one we shall adopt.
(Nutrition Intern) ...Especially if it's like evidence based, which is like what we are, it's been drilled into our brains. so, if, if, like say, am giving, am calculating a baby's feed by 150, for me, a maximum is 150, right? And then a colleague comes and goes like, no, no, no, actually a maximum is 180, this is why it's 180, this is where I read it. I wouldn't continue with 150.... as much as I would want to be rigid and go like, no, my answer is correct, if it is, if their way is more, it makes more sense and it's more patient centred and it's, there is evidence that that's what's supposed to go, am just gonna change from my 150 to 180 and, you know,
G8: When there is inconsistency of messaging/discourse between different cadres (C) there is lack of clarity of approach (M) preventing effective teamworking on the unit (O).
(Nurse) yeah. It happens, because some of the time, you'll find, most times,.. what we almost disagree in, it's about CPAP... a criteria for putting a baby on CPAP....and aaah,

you'll find sometimes, let me say, as nurses..we feel like, this baby is not suitable for [CPAP].... but the consultant will insist, this baby to be put on CPAP.....
(Nurse) Yeah, that one normally happens so many times. Like, for instance, I was working this morning shift then I resuscitated a baby... So, from my practice or from what I know, such baby I'm not supposed to return to CPAP. So, I did, I did the, I did put the baby on, on non-rebreather mask, then I put 10 litres of oxygen. So, an hour later when I was almost handing over and there was a Clinical Officer intern who was insisting that they are saying, I don't know he's calling I think MO and they were saying that I put the baby on CPAP.....The consultant. So, she was like, "I'm being told that you having difficulty to put this baby on CPAP." So, I didn't want to argue...
(Nutrition Intern) it does, it does affect a lot, in impacts a lot. Because like I said before, if I cannot really consult on, eer, say approaching a COI, and telling them, you're the primary doctor of this baby, this is day 10 of life, I think we should calculate these feeds by either 180. If I cannot approach them and go like, no, it's day 10 so we are calculating with 180, but the mum does not have enough milk so can we calculate with say, 170? If am not able to have that type of conversation with them, I'll probably just go like, ah, we mpatie tu hii daktari alisema hivyo (just give the baby this, the doctor said so), or, consult my in charge and go like, I know alisema hivyo (s/he said so), but, this is what, mimi kama mshauri wa chakula (me as a nutritionist), this is what I would want you to do! So, at the end of the day, it becomes very, coz the patient now doesn't know who to follow, ...they end up following who they feel, is more accommodating, or who talk s to them in a very friendly manner, yeah. It does affect, a very huge chunk.
G9: When there is effective teamwork/ collaboration/ inclusion (C) staff and students will feel valued by colleagues and have a sense of belonging (M) increasing enjoyment at work (O).
(Nurse) then the...there is the teamwork in the unit, the... we are very many we are over 80 but we know each other where you meet with them you know, sometimes you... when you are on leave you even miss to come back.
(Senior Nurse) Mm. I think the spirit of teamwork, when, especially when I came here, I don't do, I don't I think the spirit of teamwork, that when I have an issue, people can come chip in, stand in for me, I have a problem. They've told me, go. They've stood in. Next time when somebody has a problem, I will stand. So the spirit of teamwork, it's very good. And I think that one is motivating staffs. The way we are also working with the doctors. The doctors we have, they are good doctors, you approach them and give suggestion, you just talk and agree, there is not this one is learned, this one is not, we are all working as a team. What else can I say a motivator? I think I can say basically teamwork.
(Nurse) You know when you come to work you know that you have a big team which is prepared and ready for anything It boosts your morale... Unlike when you're coming to work you see your people maybe they are not ready, there are those late comers, people have their own social issues. So it doesn't add up.
(Student Nurse) I like someone. When I am working, I like really working as a team, I like working as a team. We, are there for each other. If you are able to help.
G10: When staff respect colleagues of other cadres and mothers (C) inclusive inputs will be valued (M) and contribute to decision making (O).
(Resident) We all in the unit, we all would call as a package Yes. So if you want certain things to be done, and then you ask the nurse that is with you on that, with you in that particular room, you tell them, "This is ABCD, I want this and this, this is what we want to do, this is the plan we have for this patient. Kindly execute this an ABCD." If there's a line that needs to be fixed, I'll fix the line while she prepares whatever we have discussed. Okay, what else? There so many that they know actually they're better than some of us and then you tell them, "I have done this ABCD." Or for example umekwama [you are stuck] somewhere, let's say you get stuck somewhere, and then like she's, she's done this several times, she will tell you 'I had done this way, severally.' Yes, and she will then say, "Yes, you're doing it correctly."
(Student Nurse) Because I at least my opinion is accepted. When we are discussing the care of a patient, whatever I say has some weight.
(Resident) The nurses, yeah, we also interact a lot with them. They have a lot of knowledge about how things are done in the NBU, they are very familiar with the protocols, so they can very easily guide us on what the protocol, they will assist us, before doing a procedure, they know what is needed to prepare for that procedure. So, they're very good at that. Yeah, that's it. They also give us support. I mean, some of the intensive care nurses are also good at intubation. So if you're stuck at night, they will, sometimes they will even intubate for you. Yeah. So, of course, the relationships come into play, but yeah, they are very good at that.
G11: When staff feel that they share a passion for work/ patient care with their colleagues (C) mutual support and teamwork (M) will lead to improved staff wellbeing and patient care (O).

(Nurse) Their character, their principal... Hardworking, someone who's focused. As nurses, we advocate for the patients, so, someone who advocates for the patient.
(Nurse) Communication, when you have a common goal then communication will be much easier and like having feedback also from...if there is an issue that you are discussing we need feedback...
G12: When staff feel safe with their colleagues at work (C) there is a sense of freedom (M) and wellbeing improves (O).
(Nurse) You'll feel more comfortable. When you are around them.. as in you feel so comfortable and you feel so comfortable, feel so happy. When they are there, let's say that. What can I say? Let us just say that they will help you whenever you need help.
(Nurse) And they are people that, maybe if they have some cake they can share with you. Yes, they can share with you. .. Yes. Or a person who is always having advices, they can advise you in a better way. They see you doing mistakes, they correct you in a lovely manner. So you feel protected when you are with them. You feel safe. .. And also they support you. When you're overwhelmed, you just see somebody's coming, holding your hands, instead of just relaxing and you are stretching this side.
(Nurse) I'm safe.... Yes, we have those people, when you are doing them, you're safe, cause if you are stuck somewhere they're there to help.....They are helpful. You can consult and they help. If there is a crisis, they're the ones to run to. They, they only, they take the action immediately. Yeah... They act quickly... Mm. Any other apart from, they're helpful. You can consult them freely. When in a crisis, they're very quick. ... I just like how they work. Some are perfectionist, you see when in when they're in the room, taking care of the babies, you just see everything is smooth. And they're responsible for everything that is happening.
(Consultant) When I know that I can be the best and the person who I want to be, it definitely improves my wellbeing. Yes. Because it almost becomes like another home, that I know I am coming to where I can talk to people, I can, discuss what affects me, and, am not alone....i develop a more communal approach to issues, including difficulties, knowing that I don't have to crack my head so hard...why should I think so hard when I can walk across and share the same load with somebody?...yes
G13: Where there is friction/ conflict between members of different cadres (C) staff may feel stressed at the start of the shift (O) because they anticipate difficult communication (M).
(Nurse) If it's someone difficult like let's say like that scenario of the MO and you, you know when you, like now when you go on overriding his decisions and going to the consultant, you see it, it brings... friction between you and even if you meet to work, you're kind of not comfortable with each other because of the friction that it was brought between you two.
(Student Nurse) There is this group they are called registrars, I do not know whether they have worked prior or maybe they are MOHS, totally disrespectful people. Especially now those who are here, leave needles everywhere, and they leave blood without cleaning after they spilled it, I feel they are a bit unprofessional. every nurse who comes there is complaining. These people are leaving needles everywhere. They are pouring blood everywhere; they do not want to be told
(Nurse) Of course, other cadres, not really, you see some of these things. I will say they are more of individual because there is this perceived silent rivalry between the nurses and the medical officers because the nurses feel they have the experience and medical officers feel they have the knowledge. So, there is that perceived cold war between them, but I will not bring that out actively because equally, I have medical officials, either interns or qualified that we still, I can easily go and seek for advice from. So, I don't find any difficulties.
(Nurse) Behaviour let me start with the negative one that is influencing them negatively...Is when there is lack of coordination from let me be specific ... the MOs who are on the ground... Yes that one really impacts negativity, because you can't be talking like... you there is urgency we said it's about seeing and acting there ...immediately. If you're not acting there, then you will end up having a bad outcome. So there are some people who take to...to delay by time like no, let's do this when you know it's not supposed to be... ..like that way. So you keep on arguing arguing for the sake of the patient and at the end of it you feel like ...what are we doing here?
G14: When multidisciplinary colleagues are allocated to sub-units together (C) they will work as a mini-team/ dyad (M) conducting mini-rounds and delivering care to patients (O).
(Nurse) Yeah, even the ward rounds. For example, if they decide that these are the IV fluids for today or this is what the babies are supposed to feed on. We are always there. OK. I would say in the new neonatal we always attend ward rounds so that we get to know what has been said. And the plan of care we discuss together.

	(Nurse) Yes, I normally attend when I'm available. I normally attend my own rounds. Actually, I can give the nurse's perspective on how the patient is progressing, what needs to be adjusted and one needs to be added on the treatment. Yeah, okay.
	(Resident) Actually, it's okay. The good thing about NBU is that there is a pathway.... So I think everything from the nurses, to the doctors, to the seniors, it's organized, okay.... So how it's organized is that let's say, I'm in a certain room, maybe we are sharing with two people, three people, maybe the other people are in this room, so that is already organized. So if you're there, you know what is happening here. If I'm here, I'm doing the correct thing on the side, the nurses, the doctors, the everyone else. So it's like if you're doing a certain room, you're responsible for that room, we take care of everything that is there. If you can't do, what do you call, if you can't, if you don't find it quite okay, then you call for help. The seniors are always there, they always come and review the patient, we discuss the patient with them, yes.
	G15: When multi-disciplinary colleagues are allocated to the same patients and work together as a mini-team (C), a shared purpose and sense of belonging (M) enhances communication (O).
	(Senior Nurse) Most of the time I take the fellows and the residents, all of them, they are the doctors. We are working together, and we are working as a team. So for the part of the doctor, we are always working, since we are working as a team, we work together in terms of aseptic technique on our patients. So we have to keep on reminding them because most of the time you get, when they are doing procedures, they are not able to, they remember, they know, but they can't really remember to use the aseptic part of it. So that is the time we meet and talk. And sometimes during the management of patients, especially for patients who are due for discharge, we talk and agree whether the patients can be discharged or not. Sometimes when our mothers have issues and they would like to know more about their babies, you find that, that is the time I talk to the mothers and I incorporate the doctors also to talk to the mothers. So I talk to the doctors frequently also.
	(Nurse) Like the doctors, the doctors, well, I speak to them like for example, let's say I'm in a room, the doctor who is in that room, I'll constantly speak to the doctor because I'll need, because you see we are... Yeah, we are collaborating on the care of the babies. So if for example you, if I have IV lines, if I have a very sick baby, you see we would constantly talk with the doctor then I'll see the plans that he has for the babies on that particular day. Yeah.
	(Resident) So how it's organized is that let's say, I'm in a certain room, maybe we are sharing with two people, three people, maybe the other people are in this room, so that is already organized. So if you're there, you know what is happening here. If I'm here, I'm doing the correct thing on the side, the nurses, the doctors, the everyone else. So it's like if you're doing a certain room, you're responsible for that room, we take care of everything that is there. If you can't do, what do you call, if you can't, if you don't find it quite okay, then you call for help. The seniors are always there, they always come and review the patient, we discuss the patient with them, yes.
	G16: When different cadres are used to working together in a team (C) they will assist one another proactively and accept assistance, pooling knowledge, expertise, and differences (O) as they recognise that mutual assistance and support is for the common goal of patient benefit (M).
	(Resident) We all in the unit, we all would call as a package Yes. So if you want certain things to be done, and then you ask the nurse that is with you on that, with you in that particular room, you tell them, "This is ABCD, I want this and this, this is what we want to do, this is the plan we have for this patient. Kindly execute this an ABCD." If there's a line that needs to be fixed, I'll fix the line while she prepares whatever we have discussed. Okay, what else? There so many that they know actually they're better than some of us and then you tell them, "I have done this ABCD." Or for example umekwama [you are stuck] somewhere, let's say you get stuck somewhere, and then like she's, she's done this several times, she will tell you 'I had done this way, severally.' Yes, and she will then say, "Yes, you're doing it correctly."
	(Resident) The nurses, yeah, we also interact a lot with them. They have a lot of knowledge about how things are done in the NBU, they are very familiar with the protocols, so they can very easily guide us on what the protocol, they will assist us, before doing a procedure, they know what is needed to prepare for that procedure. So, they're very good at that. Yeah, that's it. They also give us support. I mean, some of the intensive care nurses are also good at intubation. So if you're stuck at night, they will, sometimes they will even intubate for you. Yeah. So, of course, the relationships come into play, but yeah, they are very good at that.
	(Medical Officer) I would say it's everyone. Everyone... we influence each other in different things. Yeah... each other it's not like a particular person we all have... today somebody has like something to add on to what we are doing tomorrow It's a different team. ... Like everyone helps and influences each other. Yeah..... I think it's good because say sometimes if I'm overwhelmed a nutritionist will tell me let me help you put this this this. Sometimes if the nutritionist are overwhelmed maybe they'll be like could you

help us ABC. I think its team teamwork gives us good outcomes.
G17: When staff see their individual actions as contributing to collective action (C) they will be motivated in their own tasks and value the inputs of others (M) leading to improved satisfaction and care delivery (O).
(Nutrition Intern) Okay for my others also like um... it was easier for them because maybe the child we would see that there is a stagnation or there is a weight loss and then the medical side maybe the baby was dehydrated. So it helps them know also that there might be something wrong or maybe feeds like during the night they were not being given..... So it came up with solutions and actually it did help the baby. Yeah.
(Nurse) Okay as a, when you are a team leader one thing you when support you have to give to the staff if you don't then you are failing, ensure the consumables are within reach. There is really... it is really very bad when a...a nurse who is in NICU with ventilated very sick babies having to come for things in the store.
(Nurse) Yeah, I gain knowledge because, especially, handover is a routine, but...it's not... You don't do it casually. You have to be in detail, because this person you are leaving the care to of the patient has to know what you've done and what... What you've done to the patient and what is remaining and what is expected. So you have to give a detailed report for the patient. So that's the handover part of it. So, you do it thoroughly, not shallow. It helps because once you get the information is complete, this patient will get the correct management.
G18: When different cadres of staff feel they are valued members of a team (C) patient care will benefit from more holistic inputs (O) as staff will be encouraged to express their different professional lenses/ selves (M).
(Nutritionist) I can say collaboration of the staffs some admire, because you see, in other areas, some nutritionists even they are not even acknowledged that they are there; but here, they can't do anything if a nutritionist is not there because they want your view concerning a baby. So, all of us, the collaboration is so good.
(Resident) We all in the unit, we all would call as a package Yes. So if you want certain things to be done, and then you ask the nurse that is with you on that, with you in that particular room, you tell them, "This is ABCD, I want this and this, this is what we want to do, this is the plan we have for this patient. Kindly execute this an ABCD." If there's a line that needs to be fixed, I'll fix the line while she prepares whatever we have discussed. Okay, what else? There so many that they know actually they're better than some of us and then you tell them, "I have done this ABCD." Or for example umekwama [you are stuck] somewhere, let's say you get stuck somewhere, and then like she's, she's done this several times, she will tell you 'I had done this way, severally.' Yes, and she will then say, "Yes, you're doing it correctly."
(Nurse) Of course the, the interest of the patient comes first, like for example the doctor is insisting on collecting the samples for bilirubin first before starting the patient on phototherapy. I would choose to start the patient on phototherapy first, as I, I wait for the bilirubin's, because at the end of the day, it's the patient who is going to benefit. Sometimes the, the physical symptoms, might lie to your eyes.
G19: When a doctor does not communicate appropriately when providing patient care (C) the nurse will feel undermined (O) because the doctor has displayed a lack of awareness and respect for her professionalism/ competence (M)
(Student Nurse) But you see here most of our doctors are a bit reluctant to be helped. You see someone standing with something that you can do in seconds. When you tell them that want to help them it is like you undermining them. So, you give them a face and let them try and try and when you see, they are not able to do it when you step in.
(Nurse) ..are we having a barrier? Mmmh, I think mostly it will go to, communication concerning maybe care of a neonate, care of a baby, from maybe the medical team to the nursing team..... I think sometimes, they, they give orders, with no reasons. You know, if you tell me, do this, put this baby on CPAP, I think you should tell me with reasons,.. not just, 'put this baby on'....., and its final. You see?.. so, I think, I think, communication between maybe, medical team and nursing team. Mostly that's where barrier is. I think so.
(Nurse) Maybe now you know something and you are sure you know, but here comes your senior, like the MOs and the whatever, the consultants, you try to tell them these things is supposed to be like but they think that they know much better and they don't believe that you know. So, they can say, "No, that thing is done like this and this." So, maybe you're not given chance to apply. So, that's the thing.
G20: When subgroups of staff work in parallel with little collaboration (C) staff are unlikely to take instruction or recognise inputs from an outsider, instead disregard or 'look busy' (M) leading to inaction, frustration, blame, and worsening of collaboration/ feeling of being let down by other subgroup (O).

	(Resident) Yeah, I mean, we, there were certain instances when it was at night and we needed to intubate a baby that had just been delivered and the nurse that was assigned to that particular admission room would not help, so you look for the gel, the lubricating gel and I had to personally go to the ICU two in the morning to look for it because that was the only thing missing and like no one was helping, so that made it a bit difficult. Of course, it made me hesitant after that, to, you know, even when working for them, I would just, I would not ask for..... Yeah, they would not assist..... Yeah, it's not everyone, but there will be one or two. So when I knew I was working with them, I would not ask I, if I could get something, I would get it myself, just to reduce the stress....
	(Consultant) It is frustrating...because the cadre lines are very clearly drawn in our public facilities, so I have to take it with caution. It is very difficult for me to discipline a nurse regardless of, you know, of the occurrence. I have to go through their ranks. So, I'll discuss with their in-charge, I'll give her a chance to institute whatever measures she feels are appropriate...and if does doesn't happen, I will still communicate my displeasure that whatever concerns I had, have not been addressed. And then, my second line of escalation is a more senior manager....
	(Nurse) That one I think it's based many times with the issue... its just some not all, but when you reason together you you come to an agreement. It's about like if I'm communicating an information like as a nurse to an MO he would ask like you're not supposed to talk to me directly. Is there an MO intern on the ground? Are you seeing....So such issue.... You know at times maybe I have something which needs to be done. Maybe the MO on the ground is busy or we are not reasoning together. So like I feel like can we... I talk to the higher level. So somebody will know let the MO on the ground call me you see?... Yeah. So long as you are on duty that day..... anybody who is on duty if there is a challenge can communicate to you. Direct yes.
	G21: When staff cannot communicate effectively to come to a unified plan for the patient (C) senior staff instruction will usually be followed (O) due to authority (M).
	(Nurse) Yeah, that one normally happens so many times. Like, for instance, I was working this morning shift then I resuscitated a baby... So, from my practice or from what I know, such baby I'm not supposed to return to CPAP. So, I did, I did the, I did put the baby on, on non-rebreather mask, then I put 10 litres of oxygen. So, an hour later when I was almost handing over and there was a Clinical Officer intern who was insisting that they are saying, I don't know he's calling I think MO and they were saying that I put the baby on CPAP. So, me I told her I'm not comfortable to put a floppy baby on CPAP, because going to the fact that the baby doesn't have enough respiratory effort to sustain the CPAP. And also, is in the guideline that you're not to put a baby who's floppy and doesn't have enough good respiratory effort to attain CPAP. So, I didn't do. When the, (consultant) came... The consultant. So, she was like, "I'm being told that you having difficulty to put this baby on CPAP." So, I didn't want to argue, so I just told her, "I don't have any reservation, but if you think the CPAP will help with the baby, you can go ahead and put the baby on CPAP." I think is what they did. And I was informed by 9 the baby had collapsed.
	(Medical Officer) The same thing about CPAP for example... ..there's a there's a very sick baby who came...that time you know, some staff were trained on CPAP some of us were not. So it was like a baby came very very sick and came from a different facility... ..and qualified the criteria for CPAP the silverman's score was six... which it says If the score is more than four you should put a baby on CPAP. So there was like a team of people who felt this baby will die if you put the CPAP..... And there was me who felt if I don't put this CPAP I'm answerable to my consultant coz... if they meet the criteria so if the baby dies and I didn't do it... it will deserve that I explain myself..... I personally Put it....So that's what I felt the baby had more chances to survive if I put on CPAP.....And the nurses felt this CPAP will killed the baby coz that's what's been happening to CPAP babies. And the baby eventually anyway died.
	(Nurse) An example now, you see now we are with the MO intern at night, that happens several times, this MO now, intern, is calling the MO, MO is not around, "There is a kid here who requires CPAP or who requires referral." Then I assist the neonate, then I tell the MO, "This one doesn't require such a CPAP or referral." So, you know what now, the MO now can call the consultant, remember they have not come on the ground, I'm the one on the ground..... So now, the MO is calling, " the nurse is refusing to do one, two, three. You see now it has happened most of the times. So, the consultant is calling me direct at night, "Why are you refusing to do one, two, three?" Then I say, "I've assessed the kid, he doesn't require CPAP." "No, put the CPAP." Why? How can I put the CPAP and the kid doesn't require the CPAP, the neonate? So, this thing calls the office in the morning, "This nurse is refusing to do what we order." You see now it's contradicting. And when you access the neonate, he doesn't require now the CPAP in the morning. You see now they contradict the things. So, that's why they don't come to the ground to access, they don't want to come ... they are on call. Yeah, doesn't want to come. He's just

ordering the MOI who doesn't know anything. In fact that, that neonate, because the MO is explaining, "Oh, it's like this, like this," that one is saying, "You can defer." Why? For example, there's a kid I referred through the MOI, because that thing happened and I was blamed by the, that one of the CPAP.
G22: When staff and students are engaged to participate in activities on the unit (C) they will feel valued, encouraged and a sense of belonging (M) and will have confidence to make contributions (O).
(Student Nurse) You know if there is some procedures being done and someone is involved, you can easily gain them..... I think having, having mentors.
(Nurse) there is this time, there is a COI giving information to a doctor, but she wasn't really sure of the baby....so, I really helped give them information about the baby.
(Nurse) Also we normally have CMEs. The CMEs we have them where we are in different target groups. Every group has its own target, which is supposed to be done every financial year. So if you are in a particular target group, there are those things we normally sensitize people on what we are dealing with and we do audits. Like if maybe you are doing an audit on vital signs, you have sensitized people on the importance of taking vital signs and recording, you do a follow up. You do an audit, people doing vital signs the way it is required, the way it is being recorded, are people taking action after maybe a recorded vital sign which is beyond the normal levels. Yeah, so we do CMEs.
G23: When there is collective habit (C) resistance and established norms (M) will mitigate efforts to implement change (O).
(Nurse) Maybe if people are used to doing things in a certain way.
(Nurse) Relevance. Somebody doesn't find it's relevant, there's a sort of traditions and cultures. People are used to doing things differently. And also they are resistant to change So you find somebody is used to doing something in a particular area and doesn't want to change the current practice
(Student Nurse) Mostly the students change but correcting a staff is difficult. Because this is maybe a norm here and you cannot change a norm.
G24: When staff do not agree a unified plan (C) conflict and confusion will result (M) with staff (and mothers) weighing advice based on personal characteristics of individuals (e.g. seniority, friendliness) (O).
(Nurse) Yeah, that one normally happens so many times. Like, for instance, I was working this morning shift then I resuscitated a baby... So, from my practice or from what I know, such baby I'm not supposed to return to CPAP. So, I did, I did the, I did put the baby on, on non-rebreather mask, then I put 10 litres of oxygen. So, an hour later when I was almost handing over and there was a Clinical Officer intern who was insisting that they are saying, I don't know he's calling I think MO and they were saying that I put the baby on CPAP. So, me I told her I'm not comfortable to put a floppy baby on CPAP, because going to the fact that the baby doesn't have enough respiratory effort to sustain the CPAP. And also, is in the guideline that you're not to put a baby who's floppy and doesn't have enough good respiratory effort to attain CPAP. So, I didn't do. When the, (consultant) came...The consultant. So, she was like, "I'm being told that you having difficulty to put this baby on CPAP." So, I didn't want to argue, so I just told her, "I don't have any reservation, but if you think the CPAP will help with the baby, you can go ahead and put the baby on CPAP." I think is what they did. And I was informed by 9 the baby had collapsed.
(Nurse) Yeah, sometimes, you, the feeling comes especially when you have two opposing information. Maybe an as an example, when you manage a patient and you have maybe your consultants around. Now consultant A says this, consultant B says the opposite. So, you're torn between the two. And you see this is someone you regard as a higher-level person in terms of knowledge and even experience. And sometimes it happens, what consultant A and B varies in that they differ in terms of the opinions they give. So, in such an example, you, you really torn in between and you will not even know what to do now. So, when that happens, then now it goes back to the level also of the experience of this consultant. So, if I have a consultant that you've been with for 10 years, but with a lot of humility, I have another one you've been with for maybe a year, I'll consider the senior consultant.
(Resident) Actually, that happens a lot because consultants sometimes have different ways of management plans... Their management sometimes differ a little bit, depending on whatever they trained. So, if someone will tell you if a patient is this way, we don't really, we're not very aggressive in management. Someone will tell you, "If a patient is this way, you still have to try and do this and this." So how you take it is, you take it depending on who is there and you make sure you consult. So, if it's a particular situation, if it's of a certain complexity, if it's a patient with a certain complexity, you just make sure you always refer so that you have backup... You refer to the fellow who's on call, you refer to the consultant who is on call.... No, the consultants will not agree even if they're in one room, they will not be able to agree on the way forward, because it depends with

	their clinical judgment. So, you, it's contradicting because the person last week that managed patients in this room did this because this particular person was doing the round. The next week, they'll be told, do this..... You do whatever the consultant tells you, the one that you are with.
	G25: When communication is not intentionally developed between cadres (C) staff of different cadres may default to giving task-based directives (O) as collaborative communication is absent (M).
	(Nutrition Intern) And then there are those who come into the ward, and everyone is like, haki ni nani ndio ako ward round (oh no, it's so doing the ward round), I: mmh, mmh. R: so everyone is just like, you make sure your things are correct, the only time you talk is when you're asked a question! Beyond that, be in the ward round, (claps), be seen, and not heard, period.
	(Nurse) ...yeah, consultants..... I think coz of their attitude... I think they feel entitled... yeah.... and at most, they think that like maybe, we're just seated. like, we are doing nothing..... they felt like nurses were not doing anything, they're just seated. There is a day there was a baby who was unresponsive, ... so, she was doing her normal rounds, when she came to that baby, she started shouting like, you guys are here, a baby is not breathing,...so, maybe one of you is feeding, another one is on medication, one is changing linens for babies...so, there are times when you can't see everything.... you know, so,.....everyone, the whole, everyone. Then, they put down to the students, they say students are not doing anything....
	(Consultant) I think it is culture. I sometimes feel we don't engage them enough in the ward-round, to feel useful. For instance, in my ideal world, I would like to see a baby, listen to the presentation (from the interns) and listen from the nurse...like actually hear from the nurse: What is your feel managing this baby? Many times, the nurse is the silent bystander... and within 15 mins they (nurses) disappear on to do other things where they feel more visible. So that is my feeling, because I compare this with...and I have the privilege to work in other settings where the nurse is very central to care, and I feel that we don't give voice enough to our nurses.

Being careful towards colleagues and patients	G26: When staff are willing to listen, take time to understand, show patience (C) others will go to them for advice (O) as they feel comfortable to express themselves, feel understood and know they will not be dismissed/ judged (M).
	(Student Nurse) Yes, there reason why I had to go to X, you know doctors are, they seem to be so busy especially when, when they're doing the procedures. So, even taking that time to explain something back to you becomes a problem. So, with X, he's, he's humble, he has got the time to explain... He gives us the time to, to ask questions and then he responds. Yes. So, there's that environment for learning with X as compared to other people.
	(Nurse) You look at somebody's you know, you, when you interact with people, you know, you know sometimes their character, even if it's not their whole person. But you know somebody who listens, somebody who encourages, somebody who maybe talks when you talk to them, you feel like they really understand you.
	(Nurse) and they are attentive, like, they'll stop what they're doing, and they'll listen to you, then...yeah.
	G27: When staff are considered religious or trained in counselling (C) they feel they can be true without judgement, and will receive comfort and advice (M) so will go to them for emotional support (O).
	(Nurse) Yeah, I would say a factor that can make me approach someone is their relationship with God. You see, not all. Not everyone is a believer. And for me to approach you, I must see something that attracts me to you, and a very important factor is the relationship you have with God. So, I think that is a factor that I will also consider before I share my emotions or my break, my breakups, or anything that is putting me down I would also consider
	(Nurse) I think for that, I'll open up to a religious person, which is X... since, for them they won't take sides, they are not biased.. and for them they'll opt for, they'll comfort you... I can also go to a nurse or a doctor.. coz of, I think they've learnt the bereavement process.. yeah, so, cause they'll know how to take care of me. They'll know what to say, what not to say.
	G28: When staff show humility (C) they will respond positively to correction and others will offer them advice (O) because they recognise the importance of continuous learning (M).
	(Student Nurse) A nurse. Okay. I did offer an information, I guess it was, it, it was once sometimes ago, about the medication of the drugs.. She received well and she, she said she'll go and refer and later the next day, he told me, actually, you are right... It had an impact on her.
	(Nurse) Oh, yes. Not? Yeah, not all, the particular ones who are ready to listen and the ones who are, the ones who are, who you are friendly with.....Or ready to, ready to be taught something... To learn, yeah.
	(Nurse) There is. Like now there is a time the MO can hold her, the patient needs a CPAP, you can just go there and access with her or him and you can change everything and you can listen, she can listen and change. Or concerning medication, cannot one tell you, tell her, "I see this one is supposed to be one, two, three." She can change.
	G29: When staff show humility (C) others will ask them for advice (O) because they show integrity (M).
	(Nurse) ... and if, let's say they are not able to do it, they'll seek somebody else to help them, let's say.... like inserting an IV line, if it's troublesome, they'll ask someone else, they won't keep on putting the child through pain.
	(Nurse) and emotions? Now, like a hard day or what, or what?... Most of the time, I'll find a colleague who is close to me.. that is one. Like someone, who will not, who will not favour any team.. if am explaining like so and so did one or two to me,.. he will be like, 'ooh, he did that? but, you see',... and there is someone who will tell them the truth... it's not someone who will just side by you because you're a friend, he will just say 'you see, even you, you were at the wrong side' you see?.. like, like X, will tell you the blank like, 'you know, you did wrong, that's why you did so and so'.....
	(Nurse) ...eeer, first things first, she'll communicate, when she's sure of something, she'll tell you. If she's not sure, will confirm from a book...
	G30: When an individual treats mothers with respect (C) others will go to them for advice (O) as they model esteemed values (M).

(Nurse) Yes. You know, there are those people who are just gifted in communication. They just talk and it flows out nicely, and makes things easier, even for a client.
(Nurse) ... mmmh, and the way they relate, maybe if the mother is there, ...their relationship with the mother and the child.
(Student Nurse) And even the way they could maybe handle the mothers could...could help you to learn how... because here it's only... not only about the neonates,...it's about even the mothers who come here, others have issues, so the way they handled them with... could even cause you even to desire to be with them
G31: When an individual has a positive attitude to work, e.g. joyful, not complaining, not gossiping or talking negatively about people (C) others will feel good (M) and want to work with them (O).
(Nurse) They're jovial, they're helpful, positive, they're just a vibe
(Nurse) These are, okay, they're positive in every aspect. Not a time, you'll, you, you'll hear them talking negatively, or commenting negatively about people, about situation. About the nature of allocation, that person would work anywhere
(Nurse) So they're willing to help, they are like joyful. They are lively. They, you feel like you are working as a team
(Student Nurse) There are those people who are very positive about what they are doing... Very positive, whether they are being watched or not, they're doing the right thing. .. Doing the right thing, handling those babies well, when the mothers come others have issues they will handle those mothers well, that in fact touched me because there are those people unless you are there watching over them they could not do the right thing. There are those who work because they want to earn but there are those people who work because it's a call. ... So there are people I watched and said, surely I would like to work with such people because they have that heart.. for... okay whatever they're doing they're not doing it for the sake of earning, they're doing it because it is from inside their hearts....
(Nutrition Intern) Positive colleagues. ... So it makes you work better because you are motivated as well.
G32: When a member of staff is committed, hardworking, resourceful, takes responsibility, punctual, reliable and helps other staff (C) others will esteem them as patient-centred, selfless and a good team worker (M) and will feel supported by them, and want to work with them because they will reduce overwhelm at work (O).
(Student Nurse) That man, can leave what he's doing, to come and assist you on what maybe you've asked a question about or maybe you don't know how to do something. Or maybe you're fixing an NG, and then you've gotten to a point you're stranded, he will leave what he's doing to come and sort you out.
(Senior Nurse) So first when I'm considering, or people I'm comfortable with, they are people who are always available when they are on duty. You can get them in, if they are at admission, you get that person there. Then another thing is somebody who is able to sort out issues, not only all issues in the nursery you are referred to. Mama asking anything, go to the office, somebody who is able to take charge without even being delegated. Able to handle mothers able to handle issues on the ground.
(Nutritionist) They're easy to approach.. And then they are friendly, and they tend to share the same values as me. So we can reason on the same level...Values are like maybe someone who's God fearing. God fearing, honest. Honest in the sense that, you know, like sometimes we have people who just want to shortcut, who don't do their work well. Integrity in short
(Resident) Those that you can work with. The person you see you know what this person is reliable, reliability. One, if this person you give them a certain task, they don't leave that task unattended, they make sure that they do it up to the latter, yes. So mostly I like to work with people who are hardworking, people who are task oriented, people who are like, "You know what? We're going in and but you have to finish than we don't leave anyone behind." Even if they finish on their side, they will come and assist the other person, yes.
(Nurse) Very much available, very much committed to the work. For X, she knows everything by the way, she can help you in anything, you tell her to do this, she can do. She also is hardworking. She motivates, she does the right thing. You know there are some people who have shortcuts in doing the job, so, she likes straight.
G33: When staff see a colleague reliably completing tasks, arriving early etc. (C) they know their colleague will complete the work (M) so may take advantage and negatively adapt their own behaviour, e.g. arriving late (O).
(Nurse) ...Yes, especially the machines we are using, if, if you instruct somebody to prepare a CPAP and they will tell you, "I don't know what parts go where." So even if you explain it 10 times, they will always tell you they don't know, so you avoid that.

(Nurse) .. sometimes heh, when some people are working heh, some people will take advantage because they know things will be done... yeah, even in reporting, they know. when they know someone, so and so may come early. Someone will come late because they know so and so will be there early. You know that kind of a thing.
(Nurse) Yeah. I'm not mentioning anyone. If you work with them, you are not comfortable. It's like someone is going this way, the other one is going that way because in a shift you have to, to be in a team. ,, So if I say I'm going to, to do the routine procedures on the mothers and the babies then my colleague may say I'm going to, to write the Kardex but here you see one, we do the routine procedures, we do the Kardex, we do the medication, they are just there..... So I don't know if it's rudeness or maybe take advantage of you because you're doing the work.. So sometimes you just prefer to be, or you come early, she comes late and she's not doing her work..... Yeah. Then she's the one going to leave early and you're the one who have been there earlier than her or him
G34: When staff are ready to help (C) they will be sought for support (O) as others will know that they will receive what they need quickly (M).
(Medical Officer Intern) ...they are present, and they'll come really fast and are willing to help.
(Student Nurse) Like let's say, if there is a patient with an issue, like a baby, and then you would tell, her, a certain patient doesn't have a line, or something, please review, she was easy to. she would, like, fast.
(Nutritionist) I think, even if, when, when you go to them, asking for assistance, for making some inquiries, they, they give time to.... they address it at quickly... yeah. You are.... there is some support you need from them; they are ready to offer.
G35: If a staff member can explain the rationale behind advice given (C) it will be deemed credible (M) and carry more weight (O).
(Student EMT) About them they were also during break time or tea breaks... during maybe we are documenting they will tell you why, they educate they tell you why we do this, this is how you do it and explain to you why we do this way
(Medical Officer) Okay, there are those few doctors I can... I cannot remember their names, but few around three doctors who were really there to teach you, to guide you, to help you understand what they are doing.
(Nurse) She has hers. So you tend to go back, sit back and start looking is her reasons weighing mine or mine are weighing his? So you look back on that scenario then when you start listening to the person, you leave yours and see that the other person's it's making a lot of sense. So you back off then you let it go, you pave the way for it.
G36: When a colleague shouts (C) staff/ students will feel intimidated/ ashamed/ humiliated/ fear (M) and will not approach them again, will lose self-confidence and will opt for workarounds (O).
(Resident) Maybe you want to ask a person for help, a person maybe starts scolding you, the person maybe. You know there is no that approachable face kind of maybe just like, let me just veer away let me just, you get this one there other so many people let me do it..... Nope, is just a personality, the character of the person, so you can't change the character. If the person's character is like that, you just leave. But has nothing to do with the age or, yes.
(Student Nurse) When you are being shouted at.... Yes, you'll have low self-esteem and you'll find that nobody even maybe believe that you can do so maybe you are doing something and someone, that's not done that's not done that way, so you will just develop the fear and you will just like doing things when somebody is not watching you.
(Nurse) They are not patient, and then they shout. I don't like people shouting. When you go to somebody, maybe you are inquiring something instead of solving that thing in a calm manner, somebody shouts. ... And then when maybe you go to somebody to inquire something and then somebody puts you down It's like you are nothing you don't know. Why don't you know this? It's like you would have known this before why? Some people don't know that learning is continuous.
(Student Nurse) Harsh.... uh Like how somebody communicates to you....depending on...okay there is... I can come and ask you maybe what... maybe like something simple or I was doing something ...instead of coming and telling me you do it like this you are doing it the wrong way, when you start shouting at me...I won't come to you next time. Yeah.
G37: If someone is blaming, dismissive, domineering, condescending, bullying (C) others will feel uncomfortable approaching them (M) and will not go to them for advice or want to be on shift with them (O).
(Student Nurse) I don't like people with condescending demeanours.... it spoils my day. like, you know, it just spoils my day. Like after that run in with her, I just, my psyche just went from here to, pshh..... actually, I didn't even touch another patient that day... the whole shift, I was just seated.

	(Nurse) ...they don't have good communication skills, you know, you can ask me, 'please help me' or you can just call someone out of, 'we(you) student!' do this and this', you get?
	(Student Nurse) Of course, it will, because they are rude to you and I will be like, I have asked you a question, probably I am a student, but I am also a qualified nurse so... I have come up with this... that am a qualified nurse. so, they expected me to know it. So, the manner in which you are going to approach like maybe I am having like sister...Let me say a name X, there is this and this... how do I go about it? There is a way that you just tell me to either wait or like. Maybe I will explain it. I will show you how to go about it in a procedural way. But there are times in a way you ask someone something and they are like ...you do not know how to deal with that. As much as I would like to undermine you. Or to judge you, maybe... Sometimes. Maybe judging like they do not understand. It is something like basically the supposed to understand, which is assuming that you are supposed to know, and you do not know.
	(Clinical Officer Intern) You know, because those are the guys whom we are within the ground. So, any challenge you get you can discuss with them easily other than calling an MO, maybe a consultant who maybe is not available and maybe when you call her, he may perceive you in another way....Okay, you understand the kind of the knowledge they have, when you ask simple things is like they will see you don't know, maybe they had you one extra, an extra week for you to study.
	G38: When a sub-group is blamed collectively/ there is an air of blame (C) the subgroup will protect one another, feel aggrieved and defensive (M) leading to othering/ avoidance/ incivility, diversion of blame to another subgroup, cover-ups, and no change (O).
	(Student Nurse) she doesn't want to listen. Like, me personally, I had a run in with her...(laughs) like she's blaming for something that somebody did not do over the weekend. I was not there over the weekend. Am trying to explain that I was not here over the weekend.. why are you not giving me time to explain? Then she goes like, 'you know, this is why I don't like students, they are just many here and they are doing nothing'... she was just adamant, 'no, no, no. it is you students, sijui (I don't know), it's your fault, you're messing up everything, nini nini(what and what)!' I was like no. I can't deal with you. (laughs).
	(Nurse) with these our consultants, if there is a thing which is not done, it's only nurses who don't do, (laughs). it's only nurses who don't do, who don't do their work. And then you're helping their students to learn, you're even teaching those MOs how to prescribe drugs (clicks)... Anyway.....
	(Student Nurse) IPax: Others are very... what do I say? Others would look down upon us as students. So when you face... even there is a time they... they didn't know that I'm a student. So it was among them I was wearing a what? ... a scrub, so she didn't know that I'm a student and whatever she spoke about students I could not even imagine... so what she said is, these ..students are like mashetani [demons/devils] ... In fact, when I tried to talk later on, she could not even listen to me but there are those who listened and one of them called me and said don't... don't worry because you know, she generalised us ... You see; one makes a mistake you generalise all of those people it... it's a challenge.
	G39: If a member of staff corrects colleagues in front of mothers (C) others will not to work with them (O) as it damages the confidence of mothers and makes colleagues feel bad (M).
	(Nurse)..mmmmh, let me say, I also don't like someone who will correct you in front of other patients... sometimes it happens. Like, you find someone, you're with someone at job, and eeh, he or she is like, 'don't do that to that baby', and is in front of all mothers, you know you feel bad... so, correction, the manner in which people correct others.
	(Nurse) Now you see it's about communication, how I'm going to communicate. I don't want to communicate in such a way that the patient feels like whatever the other colleague was doing is wrong.... I'll just talk in a polite way and being a colleague you know he knows maybe he or she will understand. I'll just kind like let me help you. So in that process of saying, let me help you. I'll chip in and do the right thing. Then later I will come...
	G40: If a colleague's behaviour makes staff/ student feel like they are bothering them, e.g. not listening, harsh one-word answer, body language, etc. (C) they will avoid that person (O) as they fear asking (M).
	(Nurse) Sometimes you also check you, you saw, you have asked somebody for help before, but they were not able to like fully help. So you can choose to find somebody else. You also check how friendly they are. In offering their help. There are some, you ask for help and they'll take like forever before they respond. There are some who will like you'll, when you ask for help and you observe them, you feel as if they, you are disturbing them. So you just decide, let me not ask this one, let me ask so and so.
	(Student Nurse) it's just those, people who were degrading and also they are like you are bothering them, when you ask questions

(Nurse) Yeah. Yeah. It's like the ones, okay. Or you just get a one worded answer, and even the tone of voice just tells you, they don't want to be asked questions, so, you get yourself busy
G41: When a colleague is not discreet/ shares conversations/ gossips (C) others will not trust them (M) and will not share with them (O).
(Nurse) It's very tricky because you know at some point, I cannot say I can go to so and so sometimes you have identified one person you share your feelings, your problems too, but that person again will go and start spreading telling other people. So, in this nursery, just keep to yourself. As for me, I just. I just talk to people. But sharing my feelings I only talk to one person.... OK she's mature, yeah. Let's say she's just mature because if I. And if I trust you with a very intimate secret of mine and you don't go telling any, you don't go telling people, that means you, you're mature, mature.
(Nurse) Others are, other are very talkative, you can't even share anything with them; they will shout.
(Nurse) There are these who are, okay, there are these who are, they'll disclose your problems to other people....
G42: If a colleague uses sexualised/ inappropriate talk, particularly if behaviour not challenged (C) this will lead to avoidance and development of coping mechanisms by individuals (O) due to harm/ injury (M).
(Nurse) I think for him, you need to be, you don't need to take his jokes, he jokes a lot....so, you don't need to take his jokes seriously... yeah, for girls, but for guys...for us we're just okay,
([removed]) (sighs), arrogance, yeah, male chauvinism, probably because I didn't like him,... with his attitude, and the way he handled bab..., people.. yeah, he's very detached...he's very detached with his care. I don't know if it's with everyone, I don't know if it's with all the patients coz, like I said, first impressions, and I block you out of my face.
([removed]) ...the sexualization by that one person... would sometimes just make me want to go like, today I am going in that unit, where there is that one person, and I, for so me reason I always like, I knew when they would, when they were there for night calls, aaarg, and I would just be like, please God, wacha nifike kama ashatoka (let me arrive when he has already left), ... but then, there was no way, coz I used to come very early, and they have to wait for the other nurses to come in so that they hand over and then they leave. So that, that, that..., until I, like I got to grow, it's not really growing thick skin, that's just basically tolerating him. That's when it became easier for me to come to work and just go like, hah.... wherever, am just here for my patients.
G43: When staff are dismissive of, or display incivility towards mothers (C) colleagues will not feel comfortable approaching them for advice (O) as they do not agree with their bad attitude (M).
(Nutrition Intern) ...how they respond to patients.... first of all, how they handle the patients, if I see, eer, a colleague, a mum brings up a question, a concern, and they are very quick to dismiss.. to dismiss the mum, anything, even if it's something simple as, " mtoto wangu mbona...?" (why has my child...?) you know, either amelala (slept) this side and not the other side, and they are very quick to dismiss the mum, I prefer not to.. not to engage with them.
(Student Nurse) The way they handle those mothers; a mother comes maybe ...you know these mothers most of them are emotional ...because of the...the whatever their...their babies are going through and they cannot even listen to them or she wants to ask something to understand what's going on....with the baby, they could not even take time to explain to the mother, they just tell the mother just go out I've told you go out... wait there..... They dismiss the mothers. But they...they are of rare cases, you can say rare cases not always.
(Senior Nurse) Yes. They are there. they are those ones with just this attitude, when they see mothers, it's like mothers asking them anything is like a crime [laugh], they, whatever they answer those mothers, even the mothers themselves just report and say, Aih, when this one is on duty, we are in trouble. So they are those ones, I, I don't want to put to them that their attitude is bad. But their relationship, the relationship with the workmates, relationship with our clients is not really good. So maybe they have an attitude or they have issues that they've not opened up. I don't know. But such a people I'll really feel uncomfortable.
(Nutritionist) Maybe they are shouting at a mother
G44: When staff complain a lot and have a negative attitude (C) colleagues will feel emotionally drained (M) and will not want to work with them (O).

(Nurse) ... People who complain a lot. People who want to be treated maybe, to be given first, how do I describe it?... They want to be put first, they want to, if they want assistance, it's them first. Even if yours is ...
(Nurse) Those who just continue complaining of others. ... Those who don't embrace teamwork.
(Nurse) Yes, there are people who complain who make life so difficult, even something they can get for themselves they do not want to get...And if you send them they keep on asking you what is the work of the team leader I need this things there are people who can get on their neck the whole day including the small thing they make that something to a big thing. They keep on complaining a lot...They do not want to be sent, they do not want to contribute...they criticize want to be done for everything, they criticize you, they criticize the place, they are not happy with anything.. That is negative attitude actually and it is not new it happens everywhere.
G45: When a member of staff/ student is felt to put others down/ be condescending to those who asks questions (C) others will not ask them (O) as they do not wish to be made to feel stupid (M).
(Nurse) .. mmh, maybe you ask a question, and somebody says eer, 'you should read about it'..
(Student Nurse) Yeah, there's some, there's some, there's some who are, they're seeing some questions as being stupid or what? I don't know if it was something, of ego or something or just a bad attitude of the day or something. Yeah. There are some people who you could not go and approach directly
(Student Nurse) ako na kiburi sana, sana (he has so, so much pride)... he's knowledgeable, yes, but he has this negativity on him, (clicks), like he looks down upon you...you as students, yes.. yes, I don't think there's any student who likes him... he's so full of himself. So full of himself.
G46: When staff display a proud attitude (C) colleagues will be wary of them (O) because they will not admit if they are wrong and respond badly to correction (M).
(Student Nurse) Another personality I don't want to be on duty with is the one who doesn't want to receive from other people. That is what I mean, we can call it, they're not dynamic. They're not flexible. Yes, maybe you try a procedure, it fails, or you bring up an idea, but she doesn't want to buy it easily. Like the one I told you, the doctor. I was telling her the same thing to position the client and then begin the procedure. But you see, if the client was in a worse situation, we might have even lost, we might have even lost the client. It was good that the fellow doctor came just a few minutes and then the situation was rescued... They are rigid.
(Student Nurse) Maybe someone who's not sure about the answer they are giving me... Maybe they lack the knowledge about that particular question you are asking them, but because they don't want to show you, they don't know, they just tell you. So when you consult someone else, you find the answer that they gave you was wrong.
(Nurse) aaah, she is too much of herself. That I can say. As in, you can't, you can't share even ideas, as in, she's know it all.... yeah. She even can go to an extent of telling you that, 'I've been in this service for like, aah, since X? So, you're barely.... employed recently, you lack experience to tell me anything. Yeah.
(Nurse) Maybe now you know something and you are sure you know, but here comes your senior, like the MOs and the whatever, the consultants, you try to tell them these things is supposed to be like but they think that they know much better and they don't believe that you know. So, they can say, "No, that thing is done like this and this." So, maybe you're not given chance to apply. So, that's the thing.
G47: If a colleague greets advice with anger/ defensiveness (C) others will cease from offering advice (O) as futile (M).
(Nurse) They don't want correction. Sometimes even though you, you, you, you are going to them in a, in a, in a good way, they're just explosive out of, out of control.
(Student Nurse) Colleagues? Yeah. Some of them, maybe we give them advice that is kind. Okay. It's kind of affecting their personality and their attitude, most of them replied negatively. Like, okay, why are you walking into my line? Or What's the reason to this? I know what I'm doing here. Sometimes there's negative and both positive, but most of it is positive.
(Nurse) Yeah, the person is because there's someone you can tell and get the person angry but there's someone else who'll just take it positive, the person won't take it negatively.
G48: When approachable staff are physically present, e.g. on same shift (C) will be approached (O) for quick/ immediate answer (M).
(Nurse) Those ones I talk to them frequently, because most of the time I go to the bedside, and that is where I meet them and we deliberate on patient management, on documentation, on how better or they are feeling on the bedside

(Nurse) Sometimes, if a baby changes condition, you consult your next neighbour. Also, you miss something like gloves, maybe when you are a bit committed, very busy, you can send your neighbour who is next to you.
(Nurse) Of course, the nurses, my colleagues. Because most of the time the other cadres are not there throughout the shifts. Availability.
G49: When staff are working with a less intense patient group/ sub-unit (C) colleagues will assume they are less busy (M) and will preferentially approach them for support if required (O).
(Resident) By doing so, you can call anyone again that is not that busy, and then tell them, "I need this ABCD to be done while I'm doing fixing this ABCD for this patient, at this certain patient." Yes. So that's why we call upon whoever is available. If it's emergency we call for, shout for help and intervene, the other person does ABCD when you're doing this ABCD.
(Nurse) Sometimes it's the workload they have. You cannot go to NICU one to ask for someone to assist you, and there's someone in the lighter room who can do it.
(Nurse) Another one, I'll choose the one who is not so busy. If I see you are having light work. I request the person to assist me if possible.
G50: When staff are perceived to be busy (C) colleagues will seek support elsewhere (O) as they do not want to disturb (M).
(Nurse) aah, basically, we never used to interact that much... coz they had a lot of workload.
(Nurse) So, like in [subunit X] if the nurse is busy doing some procedure, I would request maybe the nurse in [subunit Y] to assist or I can give the one who is not busy to insert the tube and if all of them are busy I can insert the tube.
(Nurse) Also, you see you also have to look at the attitude and the environment, how busy the place is coz you might be skilled you have the information but you're held up, maybe you're attending to an emergency so I'll have to...to look to another person. So you also look at the environment how it is if it's busy or not. And also...
G51: When staff are seen to do their work efficiently/ well (C) their efforts will make the work of others run smoothly (M) and they will be popular (O).
(Resident) Those that you can work with. The person you see you know what this person is reliable, reliability. One, if this person you give them a certain task, they don't leave that task unattended, they make sure that they do it up to the latter, yes. So mostly I like to work with people who are hardworking, people who are task oriented, people who are like, "You know what? We're going in and but you have to finish than we don't leave anyone behind." Even if they finish on their side, they will come and assist the other person, yes....Yes, a people work most of the time a team-oriented people. I don't like working with lazy people, yes....
(Nurse) I just like how they work. Some are perfectionist, you see when in when they're in the room, taking care of the babies, you just see everything is smooth. ...Yeah. And they're responsible for everything that is happening.
(Senior Nurse) You can find an MO you are this... I find a certain doctor on duty at least you are relaxed. A certain nurse, at least when you leave as a manager you leave as a leader you leave the ward you know at least it will be done.... They are willing, they are always flexible and positive about everything.... Yes and also knowledgeable. Knowledge also matters a lot... Yes. Because anything happens they are ready to handle they can handle it.
(Nurse) ..yes very much like today I am comfortable I know my shift is fine....You know there is that...what can I say? There is that determination of doing... you have come to work for the sake... not like you have just come... to your time... you know you have just come to work and you have team work, teamwork, good communication skills. You see?
G52: When advice is based on shared decision making (C) it has more weight (O) as there is collective buy-in (M).
(Nurse) ...are we having a barrier? Mmmh, I think mostly it will go to, communication concerning maybe care of a neonate, care of a baby, from maybe the medical team to the nursing team.... I think sometimes, they, they give orders, with no reasons. You know, if you tell me, do this, put this baby on CPAP, I think you should tell me with reasons... not just, 'put this baby on'....., and its final. You see?.... so, I think, I think, communication between maybe, medical team and nursing team. Mostly that's where barrier is. I think so... but with the nursing team, I think we are good... yeah, I think we are good because if I want something from someone, I'll just call them.
(Nurse) Yes. I have, first of all, it was in, in a patient medication. So the doctor gave a certain dose and I had to call another nurse, so that we discussed, do you think this is the dose we are supposed to give? Because I felt it was an overdose. And now we, we had a discussion, the three of us, the nurse, the doctor, the two of us, nurses and the doctor. And now the doctor was, was able to say, let me call the consultant to confirm. So it was an easy way of making decisions because we, we took it, like I, I approached it in a nice

	manner, not telling the doctor, no, change this. I told, I was telling him, now I feel it is on a higher, the higher side as compared to the weight of the baby. And I feel like decision, making decisions or having that, having that, like not being on the same page in taking care of the patient, it is being taken positively and people are able to discuss it, and come to a conclusion
	(Nurse) Now since many people are able to voice their what? Their feelings or the...their view I see like it's usually... it...it affects positively because once a number of people have talked about an issue and then it is discussed upon you will get the best out... the best answer or the...the best way to do things. So even the one who had not talked will benefit from there.
	G53: When individuals are afraid of feeling humiliated (C) they will not consult colleagues outside their own peer group for advice (O) as they do not want to expose weakness (M).
	(Nurse) What I can say about difficulty in communication with others is that there is that difference in seniority. Others feel that they are too senior to consult the juniors. So like, they feel like if you know something, they feel like if you ask you they are demeaning themselves. A superiority complex. And it does happen mostly with the ICU trained nurses. We have the critical care nurses here. Yes. Yeah. Most of them would not like to consult you in case they are stuck here. Oh yeah. So they feel like.....I can't say they like they want to maintain their positions, but it feels like they want to not be known that they don't know. That's the feeling.
	(Student Nurse) But you see here most of our doctors are a bit reluctant to be helped. You see someone standing with something that you can do in seconds. When you tell them that want to help them it is like you undermining them. So, you give them a face and let them try and try and when you see, they are not able to do it when you step in. you can see they do not know what they are doing.
	(Student Nurse) For example, there was a scenario, the doctor wanted to, they were doing surfactant. But before they do that, they had to, to insert the tube. But then she didn't position the client well. So she was there struggling, struggling and the situation was getting worse. So I was like, "Just ensure you, you reposition the client well before you, you start that procedure." So we were there like 10 minutes, she was still struggling until a fellow doctor came and told her.... For that procedure, it's solely meant for the doctors, like for the surfactant. So I was just giving advice, "Kindly ensure the client is in a good position so that you, you continue with the procedure." But she could not buy my advice until a fellow doctor came in, told her the same thing and she responded. And do you know what, within one minute, the tube was inside, was inserted inside..... She was like, "Okay, I was, I was sorry, (own name)."... Actually, she acknowledged that I was very right, yeah.
	G54: If a colleague is felt not share own knowledge with others (C) colleagues will identify them as not having a collaborative attitude (M) and will not approach them for help (O).
	(Student Nurse) Personal factors, there are those who are willing to help. You know, there are people who can have the knowledge, but they are not willing to help you. So, yes, you will find someone who is ready and willing to help you.
	(Student Nurse) Yeah, yeah. The major issue is that these people, know something, but they do not want to share it with you... Yeah, they seem like we are studying to come and take their jobs. So, they give very minimal information. You can even ask for a cannula and they refuse to give you
	(Student Nurse) Let's say, there is a certain nurse we used to be allocated with, like when she sees you, she just tells you to leave, go outside the ...Now even if we had been placed with her in that shift, she would come and tell us, if there is nothing you are doing, leave. So, we were wondering, why is she telling us that.....Yes, you'll approach her and tell her, I have been placed with you, you know there is that time, you don't know where to start, let's say for example I have been put in this placement, I'm not sure what I'm supposed to do, isn't she the one who is supposed to tell me, take this take the vitals, get this do this or that, right. She doesn't do that. You come in, and she tells you, if there is nothing you're doing, leave. So, you know, as a student, I take it that she doesn't want help maybe. So, I go to another place where I know I will learn or a place I know I will do 1, 2, 3
	G55: When a member of staff does not take their fair share of the work, e.g. handing over everything to incoming staff, doing bare minimum, being absent from unit when on shift (C) colleagues will consider them unreliable and a cause of their own overwhelm (M) and so will feel angry, not want to be on shift with them, and they will develop a bad reputation (O).

(Senior Nurse) They, again, they always don't like taking responsibilities, they don't go a mile on their management, their work is just to feed babies, take OBS (vital observations) and document. Anything, a mother asking is that, 'I don't know, ask the doctor, ask the team leader in the office'. So they don't take responsibilities.
(Resident) Characters that they don't care, those that don't actually care and bother. They just bring, "Okay, you know what, I came, I've done whatever I came to do for it, I don't care about whether there's someone else following it up, I don't care about whether there is pending things, let the other person who's coming next solve the issue," those kinds of people, uh-uh [No].
(Nurse) ... heh, me seeing someone sitting down, (laughs), that thing irritates me.... you just come to work and then you just sit, a whole 6 hours, now what are you doing?
(Medical Officer Intern) .. they don't like working. you can have up to six admissions and someone doesn't want to admit a child, you can be called for 5 reviews and they.... but they are not willing to... to work, to move around, so, some days you find yourself placed with someone and things are moving really smoothly, like we have reviews in theatre, in labour ward, one of us goes to labour ward, the other one goes to theatre. If we have six admissions, you take three, I take three, but then there are days you'll find yourself going to labour ward five times, going to theatre twice, referring 4 children, you are still opening files for I don't know how many, you are drawing samples, you are doing cannulation, you are still the only one running to the lab, yeah, so there are days you are placed with someone you know this person today is going to be an easier day than...
(Nurse) ... mmmh, I think now, that pulling of the leg down is like too slow to accomplish things that needs to be done faster.... mmmh. like you're supposed to do a CPAP, someone wants to buy time until they want to handover to the next shift....you do a sugar, you don't want to put fluids, you know that kind of a thing?
(Nurse) Me I don't like late coming..... Late coming, punctuality and laziness. ..Yes. And then somebody who needs like to be told what you're supposed to do. ... To be reminded let's do this, let's do this... me I don't like that one..... Yeah. I like somebody who knows what to do. ... You know because if I'll be doing this one, you be doing the other thing.
G56: When students/ staff observe a colleague displaying esteemed qualities (e.g. friendly, patient-centred, good work ethic, collaborative, qualified) (C), they will be encouraged and want to be like them (M) so will try to emulate the qualities (O).
(Nurse) About her, it's the way she does her work and the way she's patient. Because with our work here in the unit, you can be impatient at times. But she's patient. The way she takes you through how to do something, I'm saying that because she's the one I feel who mentored me. The first time I came in the unit, I was very green, and she was the one who was told to take me through. And with that, even as she can't even remember [laugh], and with that, I see how she works, and I, I emulate.
(Student Nurse) For the doctors, despite your position, like for instance, inside here, the doctors are the most, I can say they are the most superior, if I'm not wrong, but they were willing to give information. They were willing to come to our level and we reason together. So I think that's something I would also want to, I admire that
(Medical Officer Intern) ...she is very keen on patient care,I: okay.R: patient care affects her directly on a very personal level. When we lose a child, she, you can actually see she has personally lost something, you know...yeah. It's not just doctor-patient relationship, she.... yeah, she is really invested in what is going on in the unit, she really wants to make things better, she really wants to make things work, she really likes seeing babies come up, yeah, she is very passionate about whatever she does.....mmh, mmh, coz I've learnt, from her I've learnt that aah, uuhm, I don't know the words to use, but I've seen what a good mentor is...
G57: When students/staff observe the behaviours of a colleague, particularly senior (C) these will appear socially accepted (M) and will be imitated (O).
(Nurse) I'll say the seniors, and those you, you communicate to mostly. Those who feel free with mostly. So if seniors are doing things a certain way, you will feel the need to follow in their way, if they're reluctant you'll be reluctant. Cause if maybe you may feel they are, they know something that you don't, they may have experienced something in the past, you know they've been here for long. They may have certain experiences with certain ways of doing things. So you do not want to start doing things extra [laugh]. And they have been here, they have seen maybe they, things have come and gone and they are still here. So you may feel now the seniors, they do really affect what we do. So if they are quick in doing things, you'll also, follow in their footsteps, if they are reluctant, cause they're not doing it out of, they have been in the field for long. They're not doing it, they don't want to harm anybody, but maybe they have an experience in the way things work. Something may start with so much pace, and then it slows down. So they have that experience. You may also talk to them and find out what they are...
(Nurse) .. yes. I keep on telling these students, okay but am like what about the qualified staff? We sit we take tea when the round is going on.... what would you say about now, us, who are qualified? Leave alone students.. us, we've shown an example. You sit there, you take tea, the round is going on, you don't even know what was said, you come in

the afternoon shift, someone is supposed to hand over to you, they don't even know what was said in the round. ...some babies have been put on phototherapy, others are discharges, and nobody knows.
(Nurse) yeah, there is something someone will do, and you're like, this is not the right way,... and when you ask, they'll be like, 'no, in here, we don't have enough facilities to do such and such',... 'or we don't have such and such to perform the intended right way'..... So it trickles down to the students, we end up doing that coz....yeah
G58: If students feel judged/ othered/ dismissed by staff based on their student status (C) they will disengage (O) as they feel discouraged, do not feel a sense of belonging and fear making contributions (M).
(Student Nurse) Then, the, there was this, this nurse that, she was on our toes, like student from (name of school), student from (name of school), students, [laugh]. So I feel like, ah, why don't we leave the rest they do, the other students, you know there were many students here. So, I didn't like it..... we're not, eh, we're not making a lot of mistakes. Even if we were making mistakes, not that much..... I don't, or maybe, like today we come in late, we find the meeting has started, she'd be on our neck, student you are late.
(Student Nurse) Others are very... what do I say? Others would look down upon us as students. So when you face... even there is a time they... they didn't know that I'm a student. So it was among them I was wearing a what? a scrub, so she didn't know that I'm a student and whatever she spoke about students I could not even imagine. In fact, when I tried to talk later on, she could not even listen to me but there are those who listened and one of them called me and said don't... don't worry because you know, she generalised us? ... You see; one makes a mistake you generalise all of those people it... it's a challenge.
(Student Nurse) Okay well I'm a student and there's a way seniors always treat students, so when you find that trait in nurses... it becomes like difficult to associate with them. So if I come on duty and I find somebody who whenever I ask them to show me something they don't or they judge me instead of helping me ...I am usually not comfortable in that shift.
(Student Nurse) I think you think its attitude towards to students. Yes, it is just attitude towards student in the sense that students are meant to do research, they should study, they should know the information themselves, they should not be asking too much. Yes.....Yeah, because I can see sometimes, they would even challenge us with questions that are obvious, obvious questions. So it was very hard to get information from them.
G59: When students feel more comfortable with one another than with staff (C) they may rely on one another for knowledge (M) limiting learning experience (O).
(Nurse) ...supervision wasn't really that tight... so, I think we were given, we were given, let's say if you're an older student, you were given newer students to supervise or, oversee over them, when they were doing something... so, from the seniors, there was less supervision..
(Nurse) You know, there is a lot of calculations and in class we're not like being taught how to calculate. You get, you're being taught like these are antibiotics, these are types of that way.... Yeah. Like at a specific dosage, you know? But here, like, you know, it is, it's the actual thing. You, you, you work according to the baby kgs, that way. So we were doing a lot of interaction within ourselves, mostly on the drug part.
(Student Nurse) Yeah, for emotional control, most of the time, I used to go to the students. By the way, sometimes it was traumatizing. You come, maybe in the night shift, you work well, you do medical management to a specific baby, but when you come maybe in the next shift, you find she's no more or he's no more. So, it was a very traumatizing experience. So most of the time, we used to console as students.
(Student Nurse) More observation and skills, we see there are skills that you have to observe so that you can also do it, most of the skills that we learn, we learn from our fellow students, but I wish it was the other way around.
(Resident) Basically, we just remind each other about the protocols because we are still learning the place, so we remind each other about the protocols, we give each other a lot of support when we are learning new skills because we're doing this for the first time. So, they will be the first ones to approach, you know, when I'm asking them a question about, that I think is simple...The third years, most of the time after, if I've asked a fellow first year and they're not sure about it, then we'll approach a third year to assist us with it, or if it's the first time we're doing a particular procedure, then we can just ask them to be there with us, even as we're doing it just to observe, to confirm we are doing the right...

	G60: When students are studying different qualifications (diploma vs. BSN) (C) this may trigger judgements from staff (M) leading to friction (O).
	(Nurse) The ones from (name of school) you find them they get things very fast whatever you tell them they pick very fast, when it comes to assessment the theory they know so much but when it comes to the procedure...the practical... okay, they...they, they know the science behind it but the real thing they are not very good at it.
	(Nurse) there are those people who are willing to learn and they are dedicated and there are those people that they'll observe you as if they are managers. They just stand, they watch you not knowing that tomorrow they are the ones who will be allocated in the same room but there are those who are willing to learn and there are those that even when they are doing something..... In diploma... okay that one... to me in diploma they...they have work at their hands.... Yeah, their hands are they...they are ready to work and they are ready to learn, when we come to degree most of them it's like that is not their work, they are more of management than on the bedside.
	(Nurse) Students, a lot has changed. But not even the students who have changed, everything has changed. Even the upbringing of our children is different. The children they have, I don't know what perspective they have. It's like those who are being articulated. They presume when they are training they are going out to become managers.
	G61: When staff are patient with students (C) students feel more secure/safe (O) because their needs are understood (M).
	(Student Nurse) She was nice. She was nice. She like, she would plan a time table, not time table, duty roster for students. So, like, like where you could feel, here, you could just go and explain to her and there was a way she would sort you, there is no way, you would leave there when you are like, you see?
	(Student Nurse) Most of the time you would find and you would consult them they would show you repeatedly without getting any... or without being annoyed... and the express themselves more and they give you the room to ask more questions more frequently.... Yeah, patient is the word.
	(Student Nurse) She is very patient... she can teach you, repeat 1001 times until you understand.
	G62: If students are shouted at or feel humiliated by staff (C) their confidence will be lowered (O) due to fear (M).
	(Student Nurse) When it comes to mentorship...Assuming I am a student nurse, I am asking something from you. There is a way you are going to deliver that message to me. Maybe I have a procedure to do... how do you deliver this? Whenever I am inquiring, how are you giving me feedback. There is someone you just go to and the way they handle you... say maybe rude, or anything... seems harsh and there is a way probably I have done something, and the way, you are correcting me. .. The manner in which you are correcting me.....yeah, also...if I have to go for someone for my career progression and anything now... for now, I'm doing my neonatal nursing and I'll focus on the nurses who have done neonatal. because they are rude to you and I will be like, I have asked you a question, probably I am a student, but I am also a qualified nurse so... I have come up with this... that am a qualified nurse. so, they expected me to know it. So, the manner in which you are going to approach like maybe I am having like sister...Let me say a name X, there is this and this... how do I go about it? There is a way that you just tell me to either wait or like. Maybe I will explain it. I will show you how to go about it in a procedural way. But there are times in a way you ask someone something and they are like ...you do not know how to deal with that. As much as I would like to undermine you. Or to judge you, maybe... Sometimes. Maybe judging like they do not understand. It is something like basically the supposed to understand, which is assuming that you are supposed to know, and you do not know
	(Student Nurse) I think it's the first impression I got when we first interacted... Harsh. ...uh Like how somebody communicates to you... ..depending on...okay there is... I can come and ask you maybe what... maybe like something simple or I was doing something ...instead of coming and telling me you do it like this you are doing it the wrong way, when you start shouting at me...I won't come to you next time.
	(Student Nurse) IPax: When you are being shouted at.KWTRP: When you are being shouted at.IPax: Yes, you'll have low self-esteem and you'll find that nobody even maybe believe that you can do so maybe you are doing something and someone, that's not done that's not done that way, so you will just develop the fear and you will just like doing things when somebody is not watching you. KWTRP: Oh, Okay. Does it mean you lose confidence when somebody shouts at you? IPax: Yeah.
	G63: When students are from a certain institution (C) staff may refer to institutional reputation (M) and make assumptions about likely student attitude and competencies (O).
	(Student Nurse) Then, the, there was this, this nurse that, she was on our toes, like student from (name of school), student from (name of school), students, [laugh]. So I feel like,

ah, why don't we leave the rest they do, the other students, you know there were many students here. So, I didn't like it..... Yeah. Students from (name of school), like it was a must for her to say, students from (name of school). ... No, we're not, eh, we're not making a lot of mistakes. Even if we were making mistakes, not that much.... I don't, or maybe, like today we come in late, we find the meeting has started, she'd be on our neck, student you are late.
(Nurse) But it depends on the, on the area of, as in where, there institution, where they were trained. Yeah. They are just ones who are like (school X). They're very good. Yeah. But you can get a group like (school Y) who are very slippery. Yeah. So, it depends.
(Nurse) Let me tell you....For students It depends, students from (school X) are good. You see I personally love (school X) students. Number one, they will not run away, and then then they... OK, not all of them... Some have eagerness... But if you compare (school Y) students, I think they have the mentality that... they will not do bedside nursing... They'll just be in the office. So, it's difficult for me, OK, maybe the ones that have been allocated, they're difficult, especially the (school Y). Let's say you tell them to do this. Then they do. After that, they've not told you I'm going for a tea break. I've gone. They just disappear.
(Nurse) Yeah, some when they come to work, they you can see it again at (school X) you leave there the person needs little supervision. Degree, sometimes is good also depending on the university, so others somehow need time to adjust because some, maybe you have not seen the things in the university. Yeah, like that.
G64: When students fear approaching a staff member/ senior (C) they will consult one other (M) leading to poor learning experience (O).
(Student Nurse) The feelings and emotions we discuss among ourselves, and among the students. ... I would fill by sharing my emotions today with the qualified, let me call them the qualified. We are exposing our weaknesses and so much as well. .. Yeah, but we feel like it is better we discuss among ourselves. Unless something is so emotional that will require us to talk to our clinical instructor.
(Nurse) Yeah. It largely, it, it affects. Cause you just imagine you do you, you're not familiar with something, and you are just quiet you don't want to ask. You'll end up doing the wrong thing. And that will affect the delivery of care to the patient.
G65: When digressive behaviour is witnessed by students and not dealt with appropriately/ normalised by staff (C) students may not know who to turn to for support (O) as they will be confused about staff values and who to trust (M).
([removed]) ...yes, coz they approached me about it, and they were really disturbed about it, but, unfortunately even I, I told them that is what happened, and I explained that maybe that's how it's been normalized, and he was like, if, if I...., she was so appalled by it, she was nauseated with everything. And I was just like, I don't know what we are supposed to do! Cause like the people that we would have approached, you know, with this behaviour, are the ones who are present when these behaviours are happening. When these words are being said, they're present in there, and they are like, and they just laugh it out. So, you are like, okay. I guess that's the new normal, and you just move on.
(Student Nurse) ...nobody shares that with you, like, you're not told on the first day that if you have this and this, this is the channel, you can talk to this person, this person. I've never heard that.... so, you get so stressed, you don't know who to talk to... you don't know whether to continue with doing things as they, okay, you know they normally say, there is this quote 'kwa ground vitu ni different' (reality on the ground is different). .. what you learn verses what is being practiced are totally different things....
G66: When staff correct colleagues in a positive and respectful manner (C) advice will be more accepted (M) and behaviour will change (O).
(Nurse) Yeah, they do. Of course, we just discuss, I don't just, you know there is a way of discussing a procedure and giving the information the right way. You know, I find them accepting because it comes slowly and we discuss this the way we should go about it and they accept it.
(Nurse) You tell you don't just come and shout. You are supposed to do this like this, but you take a lead. You show them what they are supposed to do. Oh, okay. Yeah.
(Student Nurse) Yeah, so even if I'm... I've seen a mistake I usually don't approach it in a way that I know it all... Yeah. I usually tell them so when you do it like this is better than that way. ... So we tend to appreciate more than... more than if...
G67: If staff resist correction (C) colleagues may disengage (O) to avoid confrontation or because efforts are considered futile (M).

	(Nurse) In terms of communication, there is not that mutual respect one nurse for them. If you find you like to correct someone, then someone is answering in a rude manner, it's that communication issue. ...Yes, they do not acknowledge that they need correction.
	(Nurse) Yeah, when you ask I can offer it but when you don't ask, you know, there's someone who, okay, it, also, you look at the person. There's someone who you can just tell, it's not a must for the person to ask you, you can just tell the person, but there's someone else you cannot tell. You know even the age that people are in labor ward, you've noticed we are all young so all we tend to know everything. So it looks, it depends with how approachable.... Yeah, the person is because there's someone you can tell and get the person angry but there's someone else who'll just take it positive, the person won't take it negatively.
	(Nurse) So you tried to tell them, no hapa sioni kama tunafanya vile inafaa [I don't think we are doing the right thing] If I was... if I was asked I could have done it differently this and that. So maybe some people saw it like mimi ni yule mtu na, like nakaa kama naeza [I look like I can] intimidate or anything but, Mtu anakuambia like, wewe wewe hiyo... hiyo nini tulia usiambie mtu flani kama hivi coz maybe hataitake... ataitake [someone tells you like, that thing don't tell so and so about this because they might take it] personal or something and like maybe mimi mwenyewe nilikua nadhani [I was thinking] like whatever I'm doing, I'm doing it out of bila [without] any...anything personal. So akinambia hivi naacha tu nasema anyway kama hivyo ndio inafaa [when they tell me this I just leave it and say, anyway if that's how it's supposed to be] let me just..... Go slow on this..... if it's something that it's going to help the baby well we are on the same... we'll read from the same page but if it will impact negativity on the care of the baby or the outcome of the baby then no, we'll agree to disagree
	G68: If staff are deemed to have a superiority complex (C) colleagues may disengage (O) as they perceive them to be resistant to change (M).
	(Student Nurse) I think it just comes with the fear...the fear of how it will be perceived. Okay, you know, I don't know If you've experienced it but there's something about somebody who's above you..... There is that I don't know how I can describe it. If somebody is above you they'll always want to show you they are above you.: So there's no way you'll correct them at that point. Yeah, unless you use somebody else who you're comfortable with to talk to them. Yeah. If somebody is doing something and I think it's...it's not right and if I don't speak of course it has affected the care that person would have received.
	(Nurse) It depends on who, yeah coz definitely not everyone that you can offer advice to, yeah coz you see in terms of experience and age there is that person who you may think now huyu ananiambia nini [what is this one telling me] we have been here for so many years. So at the end of the day you look at who...who you're talking to.... I'll al... I'll always choose to tell that person you know that will listen to you and will take it positive, yeah coz irregardless whether you are young or old there is that person that you can tell something and they take it serious. ...Yeah, and there is that person you will tell and take it negatively, yeah.
	(Student Nurse) But you see here most of our doctors are a bit reluctant to be helped. You see someone standing with something that you can do in seconds. When you tell them that want to help them it is like you undermining them. So, you give them a face and let them try and try and when you see, they are not able to do it when you step in.
	G69: When a staff member adopts an encouraging/ polite/ lovely way of correcting colleagues (C) colleagues will not fear them (M) and are more likely to accept correction/guidance and improve (O).
	(Nurse) You tell you don't just come and shout. You are supposed to do this like this, but you take a lead. You show them what they are supposed to do. Oh, okay. Yeah.... It cuts across the doctors
	(Nurse) You see now, when I'm on duty, like now I'm working with somebody who is somehow lazy. That day, that person will work hard because he doesn't want to me to see he's lazy. So, I have influenced that person to work hard that day especially when I'm on it because they say, "Today you are with someone who is lazy. This day you are going to be working alone, almost." But when I arrive, there is a way I can talk to that person. So, I have arrived on night duty, there's a way I can talk to that person and we can work very much. That night we can do a lot of job, now the laziness now is gone. Unlike scolding somebody, there life both of them are just there, they can't work hard.....Yeah, very much because I know how the way I can talk to that person and the way I can work can't sit down now, this person is working hard. So, I can join. So, we work the whole night, we work.
	(Nurse) Well, this one is an intervention that I take one on one, because you don't make it a general comment, you take one person whom you see has got a weakness or a problem about handling certain issues. You take time, when you are free, you sit and discuss it slowly by slowly and then you make somebody understand. So that is the only

	way but if you bring it generally, within the setup, somebody might feel you are undermining them in the process of their work. Yeah. (Nurse) We had one who was in management of patients. Sometimes when you are giving a report she could discuss other things, and mothers are around. Okay. So I just talked to the person that is not good to give reports when mothers are around but there are some confidential messages about patients that we should just discuss among ourselves because if you discuss a patient and the mother is around and that's not the mother of that patient, this mother can pass the information to other people. And then she will. G70: If a leader/ staff member feels a member of staff is 'rigid to change' (C) they will feel their efforts are likely to be futile (M) so will be discouraged to give directive to the individual (O). (Nurse) I think I give msomo (lecture or reprimand), (both laugh)....if people don't do the right thing, I just have to say it.... not a lecture anyway, but I'll correct what is wrong... aaah, initially I used to do it quite often, heh?.... coz of the new nurses we have in the department.... but then I realized eeeh, mmmmh, I stopped... because if people, I realize people look at me like am trying to be too tough on them... so, I let it go.... say, the T-sheets are not signed, they are not signed. I won't ask.... I won't press anyone.... but initially I would do that. I would correct. you must sign this, if you give this, you must sign. but then I let go.... (Senior Nurse) Mm... I have not had an experience those who are difficult but yes they might not be so much difficult but there are some who are not flexible..... Because for us they believe if it is this way it is this way. When I want to do it when I don't want to do it so..... Yeah. Maybe there is something you want to discuss about maybe a management. You see they tell you this is why I cannot do this because of this. So once even you discuss they still remain rigid..... They don't they don't see the need of maybe whatever you are doing.... Yeah they just feel it's not of any importance to them. G71: When staff are identified as reliable (C) they will attract allocations (O) as leaders will be confident the work will be completed (M). (Senior Nurse) Neutralize yes [by pairing up with other staff]. You know when you neutralize them you will not even notice this rigidity. At least they will find out oh whoever is working also I'll have to do it. At least you try to motivate them to do it. Maybe they fear that what I told you lack of knowledge or experience they are not competent.....Yeah so they can try to work. (Nurse) It could be the juniors or even there are some seniors but most of the time is the juniors, utaona(you will see) 'Mum can I set up your trolley what do you want me to do for you', you send them to get something there are even seniors who can go, but it depends on people. (Nurse) OK. When we have new Staff, there are people nominated to mentor that person, but supervision is mostly done by the team leaders. In every shift we have team Leaders on the ground, and for example, if today I am allocated in the (HDU). With a new staff, then it is automatic that I am the one who is going to mentor that new staff. So during allocation, they normally look for a number of things, their experience and their level of education. For them to balance. The allocation.

Access to knowledge, skills, experience	G72: If a colleague's scope of practice is most aligned to query (C) staff will seek their advice (O) because they are most likely to have relevant knowledge/ skills (O).
	(Nurse) Like the doctors, the doctors, well, I speak to them like for example, let's say I'm in a room, the doctor who is in that room, I'll constantly speak to the doctor because I'll need, because you see we are... Yeah, we are collaborating on the care of the babies. So if for example you, if I have IV lines, if I have a very sick baby, you see we would constantly talk with the doctor then I'll see the plans that he has for the babies on that particular day.
	(Nurse) I also speak to the cadre, I speak to everyone, but now, depending on now what I want to ask. If it is something concerning the equipment, there's X to ask, to assist in preparation and also to help in making me understand more on how it works because we have so many equipment's in the unit.
	(Nurse) Usually we communicate to our doctors in case there is a problem, ...OK, you are in a room... something has happened to a baby. Like you need a doctor... Maybe you are resuscitating, and you need the doctor to come and help in the resuscitation, that is when you call them. ... For the nutritionist maybe, maybe there is a baby who has been prescribed nutrition...some fluids or feeds for nutrition, usually they are usually with us, so you inform them like today this baby has been put on Iv fluids/feeds please calculate for us because they are the ones who know how to calculate. The doctors only will prescribe but the nutritionist will now calculate according to how I think the calories, then she will write on another form, then we will, us, we will now follow what the nutritionist says, we put the fluids according to how they have been prescribed by the nutritionist
	G73: When a member of staff is deemed to have the most 'finger-tip' knowledge about a patient or the ward, e.g. nurse, COI/MOI (C) this will be valued by other staff for decision making (M) and so the member of staff will be sought for this information(O).
	(Nutritionist) It depends on what advice I want about the patient, because the first person who'd engage is the, the primary nurse in that room of the patient and the, the other person is the primary doctor of the patient. He or she can also, depending on what question I have, because with the doctor, I would want to know what is the plan for the baby with regard to maybe fluid intake or what has changed, because now this baby's behaving this way. And for the nurse, maybe I would want to know whether the mother has shown up or if there is, if she has, she would also be telling me that this mother doesn't have enough milk. So it gives me a head start of my work. When the mother's come in, I know that I need to prioritize so and so, or she'll tell me, this mother has a challenge with positioning the baby in the breast like that. So that is how I choose. I can also choose to look for the in charge of the unit. If I feel it is something the primary nurses cannot answer.
	(Consultant) Ward manager to report on clinical issues or any other, my 2 MOs, primarily the one on call, we speak a lot during the day and night, mostly for consultation purposes and for the running of the unit because they are there a lot longer I am and they are more immediate to the interns and the students. The others not daily, but frequent enough. These others are my colleague ... not daily, because we work on different duties and different times, so I speak with her to consult or discuss on specific issues, so not daily. The others are social workers on issues around abandoned children, psychosocial issues, counsellor, nutritionists
	(Senior nurse) Mostly first we ask whoever has been managing, like I'll ask the night staff, how has this patient been? Because maybe this, the staff will say this baby has been having dyspnoea while on oxygen or not, it's still dyspnoeic. Then you also, okay, discuss with the day staff, the ones that have also managed this patient, how do you see this patient? Then we also, now after we get our, okay, the basis, now we discuss with the MO and we, and we can also escalate to the, to the supervisors of the MO, is the consultants.
	G74: When a senior person gives advice (C) it has weight (O) due to status and authority (M).
	(Student Nurse) The one which I'll give a lot of weight, it's maybe, let me say for the nursing, eh, the, the nurse in charge, for example, she is the overall boss and knows of everything that is going about, so that coming to a specific decision, it has taken a lot of consultation, now it will have much weight than a nurse who is communicating about something. Yeah. So for the nurse in charge and the people who have, the higher administrative, I can take much consideration.
	(Student Nurse) I think the neonatologist.... whatever she'd say, I would take it to be the gospel truth... she was very knowledgeable.... like she can teach. Like she teaches, and repeats, she's patient.... very patient. She understands that you're a patient and you need to learn, and she will repeat as much as possible... until you get it.

(Nurse) If the consultant says do this, you don't have to question, (laughs)
(Medical Officer Intern) aah, if it came from the consultant, I will not question. I do not...we don't question consultants. We do what they say.....it doesn't matter...I will do what the consultant has said.
(Nutrition Intern) I'll probably believe if to be the gospel truth [if information comes from senior]. Because then, I don't, like I don't, this is probably something that I don't know how it's done. You know... if say, they told me, babies under say 1 week, are supposed to be on this type of feed,... if I've never heard of the feed, this is my first time am interacting with this baby, I'll take that information to be the gospel truth, because anyway, they've been practicing longer, but if it's something that I've interacted with before, or I've seen them do before, and they tell me to, I'll be like okay, but why did, you know, and then I'll inquire from someone else. I'll go like, I've seen person A do this, how would you approach the same situation? coz I think different.. and then I'll gauge the 2.
G75: Staff/ students will seek advice (O) from one within their own cadre who is seen as more knowledgeable, more specialist, or more senior (C) as they have expertise but are also approachable (M).
(Resident) Yes, for the part threes, also it was, we were, we were communicating well, because we also felt like they were our colleagues. So anything, any questions we had, we were asking them, and it was better because they already, they already had experience in NBU. So they were able to guide us better. Yeah, the part threes were really good. They were really good.
(Nurse) Well, I would... it depends on the work I want to be assisted with. So I will look at the nurses and see who can be able to assist in that. Like if I'm in ICU with ventilated babies, the babies on ventilators and I see I need assistance, maybe the baby has removed the tube... ..I will look at among them who is an equal nurse, who is a specialist nurse and that is the person I will call.
(Nurse) It depends with the team that we're working with. So, if we are many, I'll find that I'm talking to the most experienced more than the less experienced based on the condition of the case we are dealing with.
G76: If staff have specialist qualifications (C) they will be sought for advice (O) due to their superior knowledge (M).
(Nurse) Yeah, within the nursing team, there are people who are the special, specialized in certain areas, so we must also listen to, to them. We have neonatal nurses, critical care nurses, there are physiotherapist and occupational therapists. So we have to get that advice and take in what is right for the situation we are in. And in the nursing profession, we are different cadres. So we have to listen to one another for us to perform our duties well.
(Nurse) Yeah, because these two are what we call ETAT trainers. So, they know more. So, they've done they've gone through this training, they are also specialized neonatal nurses. They know more. They have more knowledge.
(Nurse) Well, it will depend with, if work related issue, it will depend with what, what kind of help am I seeking? If it's something that is critical, for example, if it's a baby on CPAP or mechanical ventilation, I'll approach someone who has done neonatal nursing... The common task, now I can approach anyone.
G77: An individual with relevant experience/ training/ done same course (C) will be sought for career advice (O) as they have relevant and valuable insights (M).
(Nurse) So you look at maybe how they work, their seniority, how many years they have worked what different places they have worked except the NBU. And maybe your... Yeah. Exposure. Cause you may talk to somebody who has just done neonatal nursing, has never worked anywhere else. So maybe they'll encourage you to be in neonatal nursing. But if you talk to somebody who has maybe started as a general nurse, did a diploma, later did a degree. You may find a different reasoning from somebody who was, who just did neonatal nursing and has not done a degree, or somebody who did a degree without doing neonatal nursing or a higher diploma. So when you talk to somebody who has an exposure, you, you're able to make your decision well.
(Nurse) .. mmmh, I think most of the times, okay, I've talked to people about that, but I think what I considered is because this person has done this course... so, how do you feel about it? is it a challenge? The time? The timeframe?... and how can I manage between my work, and that course and, yeah... the person has already gone through the course, coz they've done that.

(Senior Nurse) So what we normally... what I normally...what I do, whenever I want to do something also carry... you always look for that person who has a qualification or a personal experience. At least seek, ask them how it is because I cannot ask somebody who doesn't know what it is. .. Yes at least you search... look for somebody who at least has knowledge about that whatever you want to do.
G78: When an individual displays skills and knowledge through their actions (C) others will go to them for information and advice (O) because they have demonstrated genuine quality in their practice and are therefore trusted (M).
(Nurse) At times, it's how also people work. How somebody works. You're able to know, this person knows how to prepare something. This person knows how to deal with something. Now, with that, it cuts across, I can go to anyone. Cause they're those seniors who don't know how to do something things, they come to the junior. So working is easier because we are able to know this person, it's, it's somehow in a, now in our, in our unit now there are people who we know they're good at something.
(Nurse) The competence, competence, how competent they are, because for example, if it's IV line, it's not everyone who is good at inserting IV lines. Yes.
(Nurse) competency, competency... mostly, through observation.... their standard policy of procedures. If it's followed or not...for instance, drug administration... there's a way you administer drug like dilution,.. safety, safety to ensure nini (whatever), all the rights of drug administration are followed... whenever someone is eeh, you can just judge.. by observation. Does he follow the procedure or not?... yeah, and the way she..., maybe you're, just aah, on a normal chat, as students pose a question to a colleague, but the colleague has no capacity to answer, he or she refers the students to you... mmh. That's when you can gauge competency
G79: If staff have worked on the unit for a long time, or are usually allocated to a specific sub-unit (C) others will assume they have experienced similar patient/ward scenarios before (M) and will go to them for advice (O).
(Nurse) Because if maybe if I have something like it's a resuscitation he's somebody that will respond very well, and he's somebody that you can talk to and for sure she...she is a senior in a way that she...she has been in the NBU for a long time, so if you want something that she explain to you and she will even show you.
(Student Nurse) Yes. Older nurses, the reason these people have worked there for more than 10 years, 20 years, they have seen a lot. When you are met with a challenge you ask them first, but since they have the old knowledge, you get that fast. And then you look for your colleague. You feel when you feel they are going the same route, you know you value both. The most people to value are the old nurses.
(Senior Nurse) There are those nurses who have worked in the unit for long maybe there is something you need they want to know about NBU you find out from them. Me personally I find out from them what they used to do or what they do about it.
(Nurse) Conversant with that room. Maybe I've been allocated NICU one, and I'm usually not allocated there. I will go to the, the neonatal nurse, those who are usually allocated there to consult.
G80: When staff in other departments perceive neonatal unit staff as having knowledge and experience (C) they will value the advice of current and former neonatal unit staff (O) because they assume competency (M).
(Nurse) From staffs from NBU [neonatal unit] mostly because they have experience on the babies...Yeah and maternity... ..Even the, the doctor in the ward, I will not take their solutions until I consult the guys in NBU...Yeah because they have much experience with them... Yes, because they handle most cases.
(Nurse) Yes, I can go for a second opinion. And also, I will still say it also depends with who gives the, the information that looks contradictory. You say like, for example, if I have a colleague come from the New-Born Unit and you see these are guys who really a hands on with the newborns, as compared for with us who most of the times you conduct a successful delivery, your time will be quite limited as compared to them, then they tell you maybe we have a new protocol or this procedure. So, I might consider someone from a New-Born Unit giving me a piece of advice on a special or a respective procedure that I'm performing. So, I will consider a second opinion but also based on from which source.
(Nurse) Okay, in this eh, situation, assuming it's a baby, we have nurses who have been in that new born unit and they are very good in resuscitation, they always want to, I always consult them, and they are very good in what they do. But eh, even in the management of a patient, okay, I can say we still consult each other among ourselves. Sometimes not really specific person, like if I do a VE and I find that what I'm feeling is not what is, exactly what I, I'm not sure, I'll call the next person who is just there, come and confirm for me this VE, I'm not sure what I felt is...so the one available.

	G81: If a member of staff is felt to have poor skills (C) others will not go to them for help/ advice (O) because they feel the member of staff can't help them, and their approach conflicts with own knowledge of good practice (M). (Student Nurse) .. but the ones I interacted with I felt like, this is my own feeling, I felt that they were not that knowledgeable... so, (laughs), like they were making some funny, they were even giving some diagnosis you question like, heh! Okay, I am a nurse, but I don't think I would do this (Nurse) ...because, sometimes you find, you find someone, you feel the skills someone has, you have more better skills, so, it's like you're downgrading yourself like, you're already sure, hah! hawezi nisaidia, unaona (s/he can't help me, you see)? (Nutrition Intern) ..probably from the output I've seen, with the work that the've done, I'll be like, aaah, eeeh, you know?.. from what've seen, output, like the output I've seen them give at work, how they do their things. You know taking advice from them, would majorly really depend on how I've seen it work here, but what others have said will influence how I will interact with them....

EMPOWERING

Facilitative hierarchy	EM1: When there is a hierarchical hospital management structure (C), senior leaders will receive formal information (M) to disseminate down their professional silos (O).
	(Nurse) Through the in charge or through the team leaders. As in they start hierarchy, for example, if our in charge receives any information from the senior (Nurse), then she conveys the, the information to us. We have a WhatsApp group or even during the CME days; the weekly meetings.
	(Nurse) ... aaah, I think the, like a unit, the, let's say the (consultant).... comes and talks to the in-charge, then the in-charge talks to the nurses and the nurses to the students.... it trickles down again....
	(Resident) From the consultant to us directly, sometimes from the fellows to us.
	EM2: When there is a hierarchical structure (C) juniors and students will identify their leader as gatekeeper (M) and will depend on them for information (O).
	(Student Nurse) The information comes from the... from the nursing in charge of the ward... then it goes to the assistant. Then from the assistant in charge we have the team leader... then from the team leaders the information now is everybody gets the information from the team leader. And for example, when the team leader is not there... when during the ward, time when working, if you want something you inquire first from the team leader. ... If the team leader is not in the capability to do that you go to the assistant, if the assistant is not able you go to the nursing in charge. ... But overall information just comes from the nursing in charge.
	(Resident) Through our Chief registrar. So, the chief registrar will tell us whatever the admin wants us to do. They want us to cover a particular area.
	(Student Nurse) I think it is systematic, because it would be wrong for me to go directly to the in charge by passing my student instructor. So I first go to the student instructor before I go to the in charge.
	EM3: When a leader recognises their role as gatekeeper (C) they can intentionally manage information transfer for team benefit (M) leading to more effective communication throughout team (O).
	(Student Nurse) If there's information concerning the student, we used to receive it from the instructor to the team leader, the student team leader. Like I was the team leader. So sometimes (student mentor) would call me, or what would WhatsApp me about something going on, or what we are required to do and then I, I disseminate it to the students.
	(Resident) We would receive through the, our rep, our representative. So, they'd communicate to her then she posts in the group. Like, "This is what has been happening this week, or this is what's going to happen next week, this is how we're going to do it."
	(Nurse) So, we normally have circulars. So if a circular is written, it is directed to the ward in-charge. So the ward in-charge has the responsibility to disseminate information to the people on the ground the nurses in the unit. Obviously, it comes up to down. The same way if you have an issue in the unit, you have to relay to the ward in-charge the ward in-charge relays to the senior assistant chief nurse is the one who is covering the department from here it goes to the one who is covering the post as director of nursing services.
	EM4: When there is a functioning hierarchical structure (C) there is clarity about information flows and processes (M) which can assist oversight and communication (O).
	(Nurse) Well, I will communicate more with the... you see the in charge as long as I've gotten the report from the room, if I find there is something that she needs to know about I will communicate with her because there are things that the in charge... the in charge will care to know. If I am the team leader, and something crops up, even when she's at home and I feel she requires to know, because there are things that can happen that she will require to know, she will be even be contacted from above...
	(Clinical Officer Intern) You can call our consultants direct... Yes. So if there is any issue and no change has been done, you can still consult them...It makes you feel good. You can feel comfortable doing your work... because you know in case of anything, I am free to call anyone.
	(Nurse) ... there is two pathways. One is for the case of nurses information will flow from in charge to the team leader... to the primary nurses... Yeah for the case of the doctors from consultant maybe to the team leading doctor then to the other doctors... Then information from us to the doctors... we interact at the ground level... from the nurse to the

doctor, maybe there is something you discussed in a meeting so you...you just go and inform the doctor and...and also the team leader can inform the other team leader of the doctors so that they are also aware that's maybe the... maybe I would say the structure.
(Nurse) My immediate supervisor is the in-charge. And also in every shift, there is a team leader. So, those supervisors, they supervise, if there is anything, we consult them because they are the immediate supervisors.
EM5: When staff follow the instruction/ leadership of their siloed cadre-specific hierarchy (C) leadership consensus/ collaboration (M) is required for unit-level change (O).
(Consultant) So, One, for instance the WhatsApp group was to improve inter-cadre communication because that has been solely lacking, that you know every group just does their thing and yet patient care is not in silos. So that has tried to some extent! Two, ummm, I would like for us to have more common meetings...so the current challenges are 1) space for meetings, we meet in the unit where patient care is ongoing...our last 2 meetings have been very chaotic, so we need to find a more defined space where you can have a more meaningful, dignified meeting. Then, the other is just on consensus building, you know, agreeing among us, do we need to do this? What is the aim of this? Do they buy in? because if you push as an individual, you are bound to lose out. So, convincing the rest of the team that this is important, coz communication is 2-way, it can't be 1-way.
(Consultant) It is frustrating...because the cadre lines are very clearly drawn in our public facilities, so I have to take it with caution. It is very difficult for me to discipline a nurse regardless of, you know, of the occurrence. I have to go through their ranks. So, I'll discuss with their in-charge, I'll give her a chance to institute whatever measures she feels are appropriate...and if does doesn't happen, I will still communicate my displeasure that whatever concerns I had, have not been addressed. And then, my second line of escalation is a more senior manager, so this would be in the form of either the reproductive health coordinator (the County Nurse in charge of maternity and newborn care) or the nursing officer in-charge of the hospital...and there are a few times when I have done that....
EM6: Medical doctors (C) are deemed to have relative authority over patient care decisions (M) and are therefore sought for patient care advice (O).
(Nurse) Definitely if it's coming from a consultant, I'll give it more weight. If it's coming from the MO, I'll also give it more weight.
(Nurse) I think I'll have to ask now the senior most first, not first, but I'll have to seek opinion now from the, maybe from the doctors now.
(Nurse) Because the Doctor is the one seeing the baby, the doctors are the one who reviews the patient, so you talk to the doctor who is allocated in that room and if you feel the doctor has made a decision that is not so adequate, maybe you can talk to the consultant first you have to talk to the doctor in that room then you tell them you are not happy with the decision you are making or we can look for more other decision so you can call on the consultants we discuss together.
EM7: When hierarchy is clear (C) knowledge of etiquettes and brokers, including who they cannot approach (M) will be used by staff in selecting who to go to for advice (O).
(Student Nurse) Being a student you go to the primary Nurse who you are working with. When you notice a dose is high or low, you inform her and tell him or her if you do not mind, you can involve the doctor. If you see she is also resistant, you go to the team leader, and the team leader will intervene. Yes, you have to follow that chain.
(Student Nurse) So the first person that I normally go to is my colleague, the one that I'm working with, a fellow nurse. That is where I start from. If they are unable to sort it out, I move a notch higher, consult the doctor who is on call at that moment if unable to, I also make my own judgement. I can still upscale to the fellow on call if he or she is not around. Yeah, if the fellow on call is unable to handle, we escalate to the consultant..... It's vertical. We start with the nearest.
(Medical Officer Intern) .. like when you are deciding on admitting, whether to admit a child, okay sometimes you can decide on your own but then at other instances, there are situations that are grey, you don't know whether to admit or not. So, in such a situation, the person you call is the MO. ... Then when you are not sure whether the patient can be managed within our facility or cannot be managed here, the person you call is the consultant..... eer, coz you know in a day you admit like, you can admit up to 8 babies. I don't (laughter). I wouldn't try to call the consultant 8 times a day.... coz we have MOs, we have MOs. I will talk to my MO first before I talk to the consultant.
EM8: When hierarchy dictates that nurses should approach the most junior medical staff first even when they feel this is inappropriate (C) they may feel undermined and frustrated (M) leading to either circumvention to consultant, or tension between cadres (O).
(Nurse) That one I think it's based many times with the issue... it's just some not all, but when you reason together you you come to an agreement. It's about like if I'm

communicating an information like as a nurse to an MO he would ask like you're not supposed to talk to me directly. Is there an MO intern on the ground? Are you seeing.....You know at times maybe I have something which needs to be done. Maybe the MO on the ground is busy or we are not reasoning together. So like I feel like can we... I talk to the higher level. So somebody will know let the MO on the ground call me you see?.... So that is a barrier. ... Hierarchy of communication now.
(Nurse) Mm, Yeah. Not much but, maybe the communication between like the consultants and the nurses. Yeah. Should improve. Should improve, because sometimes you have some MOs you cannot approach. Yeah. You call an MO, she tells you, have you talked to the intern? So you see. Yeah. And you know, intern is a student. ... So my feeling is I wish, I wish we could be on the same page when discussing a patient and not to tell me I talk to the intern, and I'm qualified nurse. I've worked here for five years and an intern is just here for 12 weeks.
EM9: If a nurse feels a patient life is in danger due to the decision of a junior doctor (C) she may attempt to override the decision to save the life (M) and may speak directly to the consultant (O).
(Nurse) There are others that you can just let it slide but if it endangers the life of the mother we override them and we go to the consultant.
(Nurse) Because the Doctor is the one seeing the baby, the doctors are the one who reviews the patient, so you talk to the doctor who is allocated in that room and if you feel the doctor has made a decision that is not so adequate, maybe you can talk to the consultant first you have to talk to the doctor in that room then you tell them you are not happy with the decision you are making or we can look for more other decision so you can call on the consultants we discuss together.
EM10: When staff of the same cadre form a WhatsApp group (C) this allows immediate and complete dissemination of information and notices within the group (M) making them a crucial source for awareness and belonging/ identity (O).
(Student Nurse) KWTRP: Oh, okay. Did you have like a special [WhatsApp] wall for students rotating in the NBU? IPax: Yeah, we had. KWTRP: We had, you had?IPax: Yeah.KWTRP: Would you, did the nurses have access to your wall? IPax: No.
(Nurse) And also we have a group, a social group, whereby we communicate. In NBU social group, we communicate. Yes, the WhatsApp. If there is anything, any minute, any time, any change, we communicate. For everybody in NBU, we are there. Just nurses.
(Nurse) Not all staffs. Like ours is for only the nurses that we are there... Yeah. It's nursing related.
(Clinical Officer Intern) ...not as per the departments, the Med sup will go through our coordinator then she will communicate to us. We normally have a WhatsApp group for all the COIs.
EM11: When WhatsApp is used to share administrative updates (C) access is easy and transparent (M) and dissemination is effective and equitable (O).
(Student Nurse) If there is a proper coordination so that the information can reach all the people, maybe it can be maybe via texts. Common message or via WhatsApp group, so the each and every person can get the information.
(Student Nurse) We have the WhatsApp group.
(Senior Nurse) The...they always write a memo... The hospital writes a memo and then its posted it is distributed in every department but what we also do is done even via WhatsApp.... So when it comes we have a forum for the whole hospital nurses though there are some who are not in but still every department I think has a WhatsApp group. So whenever that day comes you take a photo and post everybody to see.
EM12: When senior staff respond quickly on WhatsApp (C) it may be an effective way of gaining expert advice (M) so staff may use it to aid decision-making in patient care (O).
(Nutritionist) aaah, okay, if there is, let's say for example, something to do with feeding tolerance... she can scan a bit of the guideline, then she send to me.. share to me, so that I can roll it down to the, to the mothers and agree on a common ground....a WhatsApp. ... yeah. We have an NBU whatsapp group.I... for (name) Hospital, yeah... we, we just communicate it eeh... and people give their feedback... then, eeeh, by the end of the day, there is a common agreement,... maybe from our boss [consultant]. ...on the way forward

Constructive centrality	(Clinical Officer Intern) Yes, we do. We have the pediatric WhatsApp group.... All the MO, the MOIs, all the COIs, all the MO qualified.. And consultants..... You can share...It is immediate. Yeah, it doesn't take long because mostly you find that the qualified people, most of them they're online.... Maybe [you receive an answer] after like 30 minutes or 20 minutes. But if it's urgent, you post then you make a call.... For example, you're sending an, an x-ray, or you're sending a lab result and you need it to be interpreted, you just send then you call.
	EM13: When there is a group/ team leader (C) they can be a gatekeeper for communication (M) disseminating administrative updates (O).
	(Resident) Yeah, she's a part three team leader, so she's also team leader for the whole of NBU
	(Student Nurse) Most of the time you were called by the, what's she called? Student leader (referring to student mentor). If there is something she wants to communicate, she calls all of us..... Yes. She would call us together and tells us. Or she tells our team leader (our student team leader), she calls them and tells the student team leader to pass this information. Then he would pass it to us via the WhatsApp group or sometimes if he gets us at school, he tells us.
	(Student Nurse) So from the in charge the communication is given during the morning reports from the in charge but maybe some information can be passed from the admin, to the school, then the school can reach us.... We have the WhatsApp group.... Noticeboard, the canteen, memo.
	(Resident) Through our Chief registrar. So, the chief registrar will tell us whatever the admin wants us to do. They want us to cover a particular area.
	EM14: If a nurse is self-confident and feels they are acting in the interests of the baby (C) they may ignore the directive of a doctor if they oppose it (O) as they feel justified (M). (less strong)
	(Nurse) ...They went to the office, to our office now, the nursing office, they say that they don't want one, two, three, ... they want us to be transferred because now we know a lot, we are directing them. Yeah, yeah, yeah, we are directing them on what to do, because their word is final, they believe. Yeah, they believe they are the final people, us we can't say anything, we have to follow instructions. So, now, that's another thing.
	(Nurse) I was told to write a statement. Of which I declined.
	EM15: If a member of staff has a diverse scope of work, e.g. nurse in charge (C) they will have broad responsibilities (M) and therefore will communicate with colleagues across the healthcare workforce (O).
	(Nurse) Well, it depends on where I am because if I'm with the team leader I will communicate... I find myself communicated... communicating more with all the nurses in all the rooms not any specific one. But depending on the situation maybe the nurse who needs assistance I will communicate with them more. Then when I'm in the room I will... I will be communicating more with the... with the mothers, when the mothers are there of my patients who are babies and also when the mothers are not there I am in the room and the doctor is doing a round we'll be... I will be communicating with the doctor when doing the ward round and all that. Like I said, I'm also sometimes tasked with the students, so when I'm with the students I will be talking more with the students, so it depends. If I'm... maybe I'm the team lead another person I'll communicate with is the... is my boss, my immediate in charge. In case I need to inquire more from her and she's giving me maybe some report some things that I need to do. So it all depends on who... where I am.
	(Nurse) Okay, I speak more to nurses and medical officer interns because I interact more with the nurses. So, whoever we are on duty with, I must talk to them, because they need something clarified or we need to collaborate on what to do in our jobs. In case in the management of patience, we do work as a team. So, I speak more with them, MO interns are the ones on the ground, so I must talk to them for every case that I get. So, I speak more to them than the MOs.
	(Clinical Officer Intern) you know like in a day you can find that you have interacted with almost everyone. Every shift you interact with the ones who are there also the ones who are leaving. I used to interact with everybody there is nobody I was not interacting with.
	EM16: When staff have a clear supportive role on the unit, e.g. team leader, in charge (C) they will be a reliable approachable source of information and help for diverse staff (O) because of the responsibilities and authority associated with their role (M).
	(Nurse) thankfully, you always have team leaders in every shift. I'd approach the one who's currently present just to, to hear their views. And then I'll be like explain how this is

done, even if I know, and there is that person who mentioned how it's supposed to be done, so that I can have clear information on how I should be going about the filing of that document.
(Nurse) Mostly you, you, you ask the team leader. ...Yeah. The team leader. Anyone who is senior. The ones who have the, the ones who have stayed there for long. Mostly they're the ones who know more about the, how the hospital works, how the, how to manage the babies. Yeah.
(Nurse) ...for instance, our in-charge, our in-charge plays administrative role. Of which, what she..., her input will have more weight, than the rest of us. Because of the administrative powers she has.
EM17: Junior doctors have a broad scope of work and are under the consultant (C) so are approached by all cadres for patient care decisions (O) because they have 'custodian status' of medical decision-making authority (M).
(Medical Officer) So, it depends on what it is. For example, if it's like decision making.....then it's my fellow MOs. ... coz now we'd first of all like we're the ones on the ground and like if I leave maybe somebody is on call they are the ones who are taking over in the evening... So like we communicate with each other about patients. ... If it's medications.....for example, we talk to the nurse giving the medication.... So actually, we review all T-sheets on a daily basis. So if we see a medication is missed we actually tell the people giving the medication why is this not given. Then there is feedback either there is no line or stuff like that. ...So, whoever is on the ground on that day giving the medication we talked to them... If it's now further consultation where we don't... we don't know what to do or we are stuck then we call the consultant. .. Then if it's like other issues like management things ...or we have a lot of babies right now like who are abandoned.... So depending on that, we can talk...we talk to social workers as well. ...Yeah, those technical things we talk to nurse manager...
Observations - strong
EM18: If a member of staff is shy, or worried about possible consequences (C) they will not speak out and may quietly implement their own plan (O) as they will try to avoid conflict and assume someone else will speak out (M).
(Nutritionist.) A little I can't say one hundred percent. I can't say a hundred percent. Maybe I'm the one who's scared to speak out, especially when something is going bad.....Because you see maybe whatever you are going to say is going to affect someone else's job.
(Nurse.) Yeah, it is individual but now, you see when somebody is at the wrong, we are very many here, someone else will see and report to the, to the team leader and then from the team leader to the in charge.
(Nurse) ...you know sometimes, sometimes, sometimes you value that co-existence, more than arguing..... I think that is the thing. Because, if we start arguing, ... then we are not proving each other right or wrong. We're just arguing, you see?
EM19: When staff prefer to work alone or avoid communication with colleagues (C) the enjoyment of work perceived by their colleagues will be reduced (M) so colleagues will not want to work with them (O).
(Student Nurse) you know I like the place I'm in to feel as if you, you are wanted there? ...Yeah. That you belong, not that you're just somewhere, like you're on to your own thing, they are to their own thing, when you ask something it's like they are not interested in answering you
(Nutritionist) As in someone who's uninteractive, you talk to them, they don't want to respond. Their mind is somewhere else or, yeah, such. Yeah.
(Nurse) Yeah, because there are those I can say it's like it's their nature, they don't talk much. For example, if it's the team leader, you see team leaders, they are the ones who write the report. Maybe than one she will just sit at the desk or she's on calls, the telephone calls and write report. There are those, but it's like the nature of someone, and there are those who are not so social.... Yeah, quiet person.
(Nurse) One, they're not team players. How, like you cannot organize like you know, when you, you enter a shift to make work easier... you all organize yourselves...So you might find him or her excluding herself, she or he doesn't want to play together along, she's doing her things alone.... You say you first start with this, if it's seeing patients in the ward, you triage, you know, when you go together it's easier... You finish with one bunch; you go to the next but this one is just not a team player... And then two, sometimes there is a

	situation where like here in the labor ward, mother is calling for help, you also have another patient, she has sat doing nothing, she's just on the phone. That mother is calling for help and that person is just busy like you're not hearing that mother. So it's also you again, you have to stand up and go so when you go that's when that person says, oh.
	EM20: If certain cadres/ students are not members of a WhatsApp group (C) they will feel excluded from other members of the team (M) and miss out on information dissemination and this form of participation (O).
	(Nutritionist) ...If the, at times we do feel like, you see the NBU team, they have a common WhatsApp group... For the nurses, and sometimes even for the doctors, they are both, they are both there both of them. But for us, we've not been added so far, so most of the time we find our communication through another party.
	(Clinical Officer intern) The [WhatsApp] groups that I am in...they are not...have no newborn issues ...its quite quite... they just talk generally other things medicine.....The new born I mean specifically on new born no but concerning the other departments yeah
	EM21: When the unit has a WhatsApp group (C) contributions may be skewed to certain staff (M) leading to dominance of some and disengagement of others (O).
	(Nurse) And also, some things were, someone may shy away from mentioning in the groups. Cause there are, there are people who may see something very alarming and mention it in the groups, just to alert everyone. ... In the WhatsApp group. Some, maybe you just come and find much later, much later when probably the information would've been handed. Probably they're just those [referring to other people] silent readers..... Yeah. If it's something that would affect us and the patient care, it's, it's important to always mention.
	(Nurse) Well, you see if, for example, like when you post something on WhatsApp, do you know not everyone will read, some people will just pass the information. It's not like comparing like when someone goes there and they are taught in person.
	(Nurse) .. They do more, though most of them are mute, most of them even if they are asked questions, especially most of the time we use WhatsApp, our WhatsApp group, you find that any matter arising whenever we discuss, some just don't answer. They don't contribute anything yet when you check, everybody is seeing whatever you're talking but somebody just decides not to, to contribute.... Well, you get to understand because you never know why somebody is not answering, maybe, maybe they, maybe she has had an experience before of the same problem and it was not tackled. Yeah, and some maybe they fear to share out to their opinions because they don't know how it will be handled.
	EM22: If staff do not feel a sense of belonging (C) they will tend to work independently from others (M) increasing personal control over their work, but further isolating themselves (O).
	(Nurse) I don't bother now..... I do my shift, I do the best I can do, I go home.
	(Resident) Okay, for the nurses, content basically was just maybe supplies. Maybe, "I can't find this in my room. Can I get this? Or maybe if the patients," you know, maybe I want to communicate to the mother, "Help me this." It was mostly ward-work based? I don't think we ever went extra with the nurses. Yeah, it was just patient centred.
	(Nurse) I don't know why I think like everything I try to propose to some people,... it can't work so that you don't look like you're trying to, to lead the way or something... that's my feeling
	EM23: When staff are not included due to other, e.g. lower social status (based on cadre, junior role etc.) (C) they may feel a sense of reduced belonging and may disengage (M) and give limited contributions to care, with lower satisfaction (O).
	(Student Nurse) With the doctors, I was feeling free to ask, especially the two I've mentioned, but this one also comes with the doctors, because I realized there were certain procedures that we could help. Actually, we could perform well than even the doctors, but they're afraid to approach the students. Like the, all they wanted was like, is there a nurse? Are you with the nurse there? Who are you with? You get?
	(Consultant) I think it is culture. I sometimes feel we don't engage them enough in the ward-round, to feel useful. For instance, in my ideal world, I would like to see a baby, listen to the presentation (from the interns) and listen from the nurse...like actually hear from the nurse: What is your feel managing this baby? Many times, the nurse is the silent bystander... and within 15 mins they (nurses) disappear on to do other things where they feel more visible. So that is my feeling, because I compare this with...and I have the privilege to work in other settings where the nurse is very central to care, and I feel that we don't give voice enough to our nurses.....We don't empower our nurses; I dare

	say this! Uumm, We just don't give them much meaning, and it is a shame. I really try to give them a voice. I realise the resistance many times, but I also see them loosen over time when they realise that they can trust you that their voice matters.
	(Nutritionist) Sometimes if you are invited, but sometimes you see their meetings are for nurses
	(Student Nurse) I feel ward rounds now there have been left for doctors in the hospitals. And I feel they have left one part of two people who are very important. They have left out the nutrition, they left out anything about nutrition and we have left the out nurses, this nurse has stayed with this patient for 24 hours. You have to come there for 15 minutes. I think it is good to ask me how your patient was before even going to hand it over to a registrar who came in the morning, did the ABGA very fast and sat down to write the summary. They have not even checked on the patient, but that nurse has a lot of information about the patient, but she will keep quiet because she is not asked.
	EM24: When specific cadres/ students not invited or invited too late to CMEs or are excluded from communication (C) there will be reduced sense of belonging (O) as they have missed out on interactions and information (M).
	(Student Nurse) okay, there are normally CMEs but I don't know why, I've never seen students going.... I've never seen students going as opposed to other hospitals where I've been, these CMEs, was mandatory
	(Nutritionist) I've only attended two CMEs, that we were invited to attend...Sometimes you don't know even.
	(Nurse)..... Late communication, is always communicated like, you'll find that we have a CME tomorrow, so to factor in in my plans is sometimes difficult. It's always like impromptu. It's not something that is planned like next week on this this day we'll have a CME on this and this topic. So, if I'm just told there is this CME and you don't even know the topic, yeah, it becomes difficult even to plan for it.
	(Nurse) I have never attended. You see we usually, we are usually, it's the in charge who releases people.
	(Senior Nurse) And when seminars come you allow, you don't repeat the same people.... You don't repeat the same. So they get motivated at least, a certain person went, another one has gone, and another, unlike a situation whereby it's certain people who go. So, that one also motivates them. I think it's that.
	EM25: When individuals are unable to attend CMEs, due to workload of poor administration of meetings (C) updates will not be effectively disseminated (M) leading to lack of continuity and reduced sense of belonging (O).
	(Nurse) Late communication, is always communicated like, you'll find that we have a CME tomorrow, so to factor in in my plans is sometimes difficult. It's always like impromptu. It's not something that is planned like next week on this this day we'll have a CME on this and this topic. So, if I'm just told there is this CME and you don't even know the topic, yeah, it becomes difficult even to plan for it.
	(Nurse) Mostly Wednesdays as from 12:30 to around 2:00.... But according to our shifts, maybe sometimes on Wednesday you're on off duty so sacrificing coming for the CMA it's hard... Yeah. So if you're around you attend, if you're not around it passes.....And also most of the time, most of the time, that time at around 12:30, you're handing over....So after handing over it's around 1:30. So if you go to the CME, maybe they are halfway or also you feel, I'm hungry let me just go home, I'm tired also.
	(Nurse) Will you see like, if they are organizing any let's say CMEs, and you find yourself you are few in that unit, most of the time it's postponed. So, we end up not attending. If not postponed now because you are, if we are few, of course, we'll not attend, we will not attend. So, most of the time we don't get it.... We miss out, yeah

Roles clear and aligned	EM26: When staff are clearly delegated specific roles (C) they will be able to build communication ties with necessary colleagues (including external staff) for their role (O) because they have the delegated authority to do so (M).
	(Senior Nurse) Supervision, eh, it's a responsibility of all of us, and far more the team leader or the ward manager. And you see, you can't be able to supervise alone or to manage alone. So I have identified mostly senior nurses who have experience in the unit. And have delegated. Delegated, because since I can't be able to do, yes, I have delegated some of them. I tell you, you are going to be in charge of consumables. Ensure when they come from the store, you check the (ordering form), confirm. Ensure they have put well, and they will be entered in their consumable book. And ensure, be checking sensitize people, when somebody picks things from the store, has to document somewhere. Then I, I delegate somebody. Your work, you will be going able to check whether vital observations are being done. So it's like targets have given people.
	(Nurse) So, we normally have circulars. So if a circular is written, it is directed to the ward in-charge. So the ward in-charge has the responsibility to disseminate information to the people on the ground the nurses in the unit. Obviously, it comes up to down. The same way if you have an issue in the unit, you have to relay to the ward in-charge the ward in-charge relays to the senior assistant chief nurse is the one who is covering the department from here it goes to the one who is covering the post as director of nursing services. So something emanates from the nurses it goes to the team leader. So if the team leader is unable to handle, transfers to the ward in-charge, so from the ward in-charge, the same channel, to the senior assistant nurse who is covering the department. The senior assistant nurse now relays to the main nurse.
	EM27: When individual roles are clear (C) others will more readily identify go-to people (M) leading to more effective communication (O).
	(Nurse) Yeah, something like that. That one is also applicable. Maybe I feel like I, I need some time off to do my other things, maybe I have an exam and I need some time. I'll go directly to the in charge and explain to her my situation, and how she, how she, how she may help me.
	(Nutritionist) Okay, it will depend with the situation I am in. So like, if a baby doesn't have a feeding tube, the first person I look for is a nurse. Yeah, that is the first person I'll run to. I'll let her know, the baby is supposed to feed but doesn't have a tube, so she can fix, he or she can fix it. And if we've calculated a parenteral nutrition and a baby doesn't have a line, I'll look for the doctor who is in that room, so that she or he can assist to fix the line so that the baby can receive the parental nutrition now.
	EM28: When staff are allocated (by others or self-allocation) to certain specific tasks on the unit, e.g. equipment, medication (C) this can become their bounded scope of work, as seen by self and others (O) as they increase skills in this task and deskill in more general nursing (O).
	(Student Nurse) Another person I would prefer to be on duty with X because you see without sufficient functioning of these equipment, it might be very difficult for you to operate. For example, just take an example of the SPO2 machine. You know, sometimes it, we used to take vital signs hourly. So after every hour, you go, go around, you take the vital signs of all the babies. But you see, it depends with the efficiency of this SPO2 machine. So, I could see X every morning, he would service them, he would clean them like every morning, every day. So you see is like what he's doing he's helping us also do our work efficiently. Yes.... Things move smoothly, very quickly. Yeah. Especially during weekend, sometimes he doesn't report during weekends, but I can remember there's a time we were looking for an incubator. Yes. So it took us a lot of time to assemble the staff, sijui [I don't know] you wash, you get?
	(Nurse) Well, I communicate with almost all professionals within our unit especially the nurses, the support staff, the biomed technicians and engineers, doctors, mortuary attendants and many, many other people because of the issue of equipment, it touches around almost every corner. The content of my communication with them is based on effective use of the machines, care of them, preparations and disinfection of all those machine parts. So, until they are made available for the next use, if you use one you have to clean it, you disinfect it and then you prepare it for autoclaving and then that would make it available for next use. The doctors the same because at any given time they would request for a machine, let's say a ventilator or a CPAP or a suction or a monitor, all these machines that we are having in the unit; they make request for, yes. So, at any given time when they have any request, they have to come over to me and, therefore, we have to communicate almost on daily basis..... Yes. In our setup, you may prepare a machine and when you are preparing it, you must calibrate it to ensure it is ready for use. But in case there is failure of calibration, the next person, if you notice there is any fault that has been detected, then immediate person I will call in to sort out the problem is the biomed technician. Yes
	(Nurse) Well, I do get to, get assignments outside the equipment area, because within the nursing profession, I'm also qualified to do all this that other nurses do. So in case there is a shortage and I'm available, I can step in the places where there are people who are not present or there is a shortage. Somebody might have fallen ill or has been taken

off because of some reason, so I may swap places at any given time.
EM29: When staff have a clear role but fail to perform their role adequately (C) others will feel aggrieved (O) because they are not contributing sufficiently to overall function and performance of the unit (M).
(Nurse) Behaviour let me start with the negative one that is influencing them negatively.... Is when there is lack of coordination from let me be specific ... the MOs who are on the ground.... Yes that one really impacts negativity, because you can't be talking like... you there is urgency we said it's about seeing and acting there.... ..immediately. If you're not acting there, then you will end up having a bad outcome. So there are some people who take to...to delay by time like no, let's do this when you know it's not supposed to be...like that way. So you keep on arguing arguing for the sake of the patient and at the end of it you feel like ...what are we doing here?
(Nurse) Mostly they are these interns, the MO interns, they're very green, so you will find that as much as you're with them on duty, you are the one doing most of their jobs. You are the one, in case of an emergency, you are resuscitating, you're putting the lines, you're putting the IV fluids. So, you find at the end of the shift, you are so fatigued. And we have some that in case you are resuscitating, you can tell him or her, "You can continue resuscitating, let me do something else," yeah, then the shift goes easily.
(Nurse) and I know my in-charge can't listen to me on any issue.... yes, there's always like a kasmall fight.I.... I can't, I wouldn't insubordinate my in-charge.... yes. Or it has to be through her.... yeah. so, I stopped. I don't say nothing.
EM30: If a staff member considers a task should be undertaken by a different cadre (C) they may refuse to do it (O) as they consider it not to be their role (M).
(Senior Nurse) Yes might not be willing because some...there are some procedures somebody feels this is not mine.... You know there as a nurse you can even do extended work. You can do some work for the doctors so some feel this is not my part... it's for the other person so they are not willing to do it.
(Nurse) And they're supposed to deliver because, okay. Some of the complications in labour ward, like maybe shoulder dystocia or they are supposed to, like if we, they go into ward and the nurses are there and the nurses are not able to do like the delivery of bridge or shoulder dystocia, they're supposed to chip in because they're the senior....Most time they see a bridge, they disappear.... Yeah. Even during the resuscitation of the baby, it's always the nurses who does that....Probably lack of confidence. Yeah. And, Okay, another thing is I think they have this mentality that delivery belongs to the nurses.
(Nurse) Maybe when I am a team leader. When you tell someone to do something... like Maybe you can ask them can you please go to the pharmacy?... maybe it was my work to go to the pharmacy but I feel I'm overwhelmed with my work so I request somebody ...can you please go for the drugs. You see they will be like that's your work..... Yes...but not all they are few, in fact, most of them agree and they don't refuse.
EM31: When a staff member prefers a specific type of role (e.g. practical vs documentation) (C) they may informally assign less desirable roles to colleagues (M) leading to piecemeal (and gendered?) delivery of care, poor quality documentation, and deskilling (O).
(Nurse) There are people here who don't like writing, like for men, men don't like sitting down and writing..... So when you know you are, you are having a man, that man will tend to do most of the manual works, deliveries, what, and you will be the one to be writing.... So it's easier for me that way, when I work it that way. When I enter I know, this one loves this and this but doesn't like this part of work, so I will go do the part that she or he doesn't love and the person works where she or he likes. So it's easier, so you don't even disturb each other.
(Nurse) So, okay, me I'm, me personally, I'm a kind of person that loves to manually do things.... Yeah, hands on.... Yeah. So even if I'm doing a procedure, most of the time someone will tell me, (name omitted), I'm tired of writing, come and write also, then I tell the person, you just continue writing. So, I don't prefer writing so much, I prefer working. Then if do, you write, if I do, you write... I can say, I can say, I can say they, most of them have interpreted whereby I don't like writing. They will even tell you, (name omitted) doesn't like writing. Yeah, but I just write but it's not my fun. So I think like I said, when you go to work and see a certain person doesn't like a certain thing, you see... You see like when the, when there's a mother who has come, this mother needs to be admitted, I'll, I will tend to assess this mother, I'll do the manual things like fixing the line, putting on the fluids, listening to the foetal heart, putting the mother on the bed, such, then this one will take the file for documentation now. She or he will do the documentation part of which I'm the one who will give him or her my findings then the person will write.....Mostly you know females here are many, so most of the females'

love writing, they don't take it so... [laughter]... For the men. Most men love task, they don't like writing.
(Senior Nurse) Okay. Let's say now like right now we have, our numbers have gone up, maybe, like yesterday we had seven turns, you have somebody who just comes how, he wants only to do, to do documentation and not hands on. Just to sit down and document. Maybe now as a X you have to do other managerial work. Maybe let me say that very day the in charge is not around or she's gone for meetings, and you're alone there with the same staff who like sitting.... She doesn't know many procedures. Now you have to do all those things, before you start managerial work maybe it will be around three, you leave here at six or seven-ish?
EM32: When a member of staff with a specific role is absent (C) work will be difficult for the wider team (O) if there is nobody else who can perform that role (M).
(Nurse) So maybe, you know, there's, there's a specific person dealing with specific things. And they're not around. They don't do not want to disturb them when they're away. So such time is you may miss the information.... They could, there could be somebody, but they also don't have the, the, the whole, the whole information. There's something missing.... Sometimes there are bacteria filter missing.... Yeah. And there's somebody who really needs.... Yeah. So you may ask and you look for it, you can't find it. And maybe somebody knows, maybe they're aware they're not in supply in the hospital, or they are they are placed somewhere maybe where we don't know. So sometimes you can miss such kind of information. On the clinical area, you may be needing maybe, there's a way we prepare dextrose from maybe 10% to 5% maybe 12 point something percent. You may ask somebody, they, they know the, they know the formula, but not a hundred percent. And somebody who knows maybe where the chart is or where the file is kept, it has been misplaced. So you may get, sometimes you may get something missing.
(Nurse) For example, now we are with the MO we are doing night, decision making, this neonate you need to do this and this, even me now I'm stuck. So now, that's when now you call the MO maybe the MO is not taking your calls, you see now you are stuck.... You just leave it till the morning, yeah.
(Student Nurse) For the doctors, they don't pick calls. And by just displaying who is, who is on call can also help. Sometimes it's hard to look for them, the hardcopy stuff; sometimes they don't pin them, you have to do request, "Who is on call," vitu kama hizo [things like that], yeah.
EM33: If staff feel underutilised in their skillset (C) they will feel less satisfied and will deskill (O) as they cannot be their true self/ exercise their skills (M).
(Nurse) To some extent because I feel like I'm underutilized because I'm a critical care nurse, I need the skills, so I think I'm not satisfied with that.... Yeah, they are complaining because many have done some higher diplomas maybe in renal, this someone has done renal and then is taken to somewhere like casualty or MCH, that is not applicable. Yeah. So if you get somewhere where you can utilize your skills, you feel more satisfied with your work than, like for me in the postnatal I feel like being wasted because I'm not practicing my skills.
(Student Nurse) I am empowered to do something there. Probably now like there are procedures that I am empowered to do as a nurse. When you come to these institutions, they have their way of doing things. This should be done by only the consultant or the medical team.... So, you cannot do it. Yes. You have the skill and the knowledge to do it... But despite having the skill and the knowledge you are limited.
EM34: When a member of staff with a clear role has too many completing tasks (C) they will adapt implementation of role based on prioritisation of tasks (M) leading to omission of less urgent tasks, e.g. attendance at ward round (O).
(Senior Nurse) Ward rounds are usually done on Tuesdays and Thursday, but sometimes it's a challenge for, for especially as team leaders to join. But I always encourage the primary nurse to ensure he or she joins the round. But me once, I'll just go attend maybe one or two babies. Because that is the time, you have other responsibility. You are expected to order to go orders, to prepare duties to go for the meeting. You are being called here and there. So I can't be able to attend all the rounds and, and those rounds, they are done in every nursery, they don't move from nursery to nursery. The doctors in those specific nursery. So that you get all the nurseries, the consultants are there and the rounds are going on at the same time. So you can't be able to attend all of them at the same time. I, I just decide today, Tuesday I'll go to X one, and join the round for at least two babies. Maybe on Thursday I go to Y or Z one to attend the rounds. But I can't make it as a team leader to join all this.
(Nurse)... Three would be enough because if you see right now, in X...X there are 14 babies at the moment. The nurse is one...the nurse is feeding half of the babies...nine babies. You, see? That same nurse is feeding those 9 babies. That same nurse will do vitals, that same nurse will write the kardex, that same nurse will attend the round.... That same

nurse will do top daily. Maybe that same nurse maybe the doctor will say, I want us to do this procedure... will do what?
(Senior Nurse) Okay, what I'll say, as per X, rarely do I perform those duties of X because most of the times I do hands on and in fact I don't, I rarely do managerial work [laughter].... Because now if, okay, if you say you do that, then other procedure for the patient will now not be done because of the numbers we have the, okay, staffing, we have very, a few staffs who cannot attend to those patients. Now you cannot just locate yourself that you are doing managerial work.
(senior Nurse) And in fact if you go there you will not, you will not imagine she's an in charge. You will find you imagine that is a, a, just a normal nurse because she does more of the care than the managerial work.
EM35: When individual roles are unclear (C) responsibility of individuals also becomes unclear (M) leading to evolution and duplication of roles, conflict, ineffective handovers, inappropriate delegation to students, non-completion of tasks and risk of patient harm (O).
(Nutrition Intern) so, I found this lady, out of her, out of her goodwill of her heart, she was helping feed the baby. But the way she was feeding, from a far, I was about to die coz I was like, that baby is just gonna aspirate. So, I just went to her, and, and, and, and told her, what she was doing was not correct, but thanks for helping either way, so, I did try to be as polite as I could, while still feeling very... yeah, as if I want to punch her.....oh she was like, oh, sikuwa najua (I didn't know) but now I know.
(Senior Nurse) Even nurse X. nurse Y and, nurse Y and nurse X and Nutritionist, they even do the work that is not, okay, they even cross the board because they, okay, they'll even do cannulations. ... Yes, they do more than nursing.... Because you will find Nutritionist is a nutritionist but you will, you will think even that he is a clinical officer.
EM36: When a role is perceived to be unfilled in the unit (even if someone formally has the responsibility for the role) (C) others may step in to informally fill the role (O) due to personal interest/ambition/attitude (M1) or sense of duty (M2).
(Nurse) Mostly they are these interns, the MO interns, they're very green, so you will find that as much as you're with them on duty, you are the one doing most of their jobs. You are the one, in case of an emergency, you are resuscitating, you're putting the lines, you're putting the IV fluids. So, you find at the end of the shift, you are so fatigued. And we have some that in case you are resuscitating, you can tell him or her, "You can continue resuscitating, let me do something else," yeah, then the shift goes easily.
(Senior Nurse) Okay. Let's say now like right now we have, our numbers have gone up, maybe, like yesterday we had seven turns, you have somebody who just comes how, he wants only to do, to do documentation and not hands on. Just to sit down and document. Maybe now as X you have to do other managerial work. Maybe let me say that very day the in charge is not around or she's gone for meetings, and you're alone there with the same staff who like sitting.... She doesn't know many procedures. Now you have to do all those things, before you start managerial work maybe it will be around three, you leave here at six or seven-ish?.. And you know you, you cannot be telling an adult to do this and she knows what she's supposed to do.. And she doesn't want also to know... So it becomes difficult.
(Medical Officer) ...he assists us like he doesn't take it like oh I'm just a nutritionist I'm not going to. He helps us with lines (cannulation)... He helps us talk to mothers who we can't sometimes get through to.... So like I said, it's like teamwork..... So actually he's one of the people we... him plus his team. So if he's not there the nutrition team.... So the nutrition team also is part of now the NBU team.
EM37: When uniforms are consistent, e.g. same cadre in same uniform (C) it is easier to identify staff by professional role (M) improving role clarity as well as security (O).
Observations
EM38: When uniforms and ID badges are not worn consistently by staff (C) it is difficult to identify people on the unit (M) and incorrect assumptions may be made (e.g. male nurses in white dust coats) and risk of non-identification of strangers (O).
Observations
EM39: When clinical staff are not formally/ clearly delegated a teaching role (C) they will not see this as part of their job (M) leading to poor student and staff experience (O).
(Nurse) Those ones now, mostly what, what I've seen, what I've seen in the department, most of the staffs they are not conversant, they can't teach them. You see, they say, "Us we are missing, you're supposed to be taught by your, your student mentor?" So, that's what I've seen mostly happening, and that one mostly happening during daytime.

	They're supposed to be taught by the student mentor.... These are, she has some office, she updates students when they come new, she updates students to the wards, specific wards. So, they claim, they start claim that they're supposed to be taught by, by the student, by the student mentor. So, that now you find there are very few people who can teach those students, like X nurse now. So now, X nurse can teach especially. Yes. Once it's daytime, she can teach these students, they are supposed to be learning. But others they say, it's not their work. They are supposed to be taught by the mentor, because this student mentor is being paid some money from those schools. Yeah, that's the thing now. So, some people say, "Me I can't teach because nobody's going to pay me." Now, you see.[Laughter]....That's what is happening here. But if you, you can teach if you feel like.
	(Nurse) you know the whole hospital, it's only one person who's selected to mentor all these students in this unit.. in all this unit and yeah. So, you can imagine...the, I don't know whether it's the work of X and Y to mentor these students,... I think we just do it out of, out of love and out of, you see?. out of just helping. Because I don't think that is, that is their work.... because I know there's a student mentor who is supposed to come and mentor those students, every day, on what we are doing. But we teach them!..we just teach them. Yeah, we mentor them.....regardless.
	(Nurse) ideally, the students are supposed to be mentored by the clinical instructor appointed by the hospital..... but on our setup, mostly they are just deployed to the unit, so it takes an individual interest, either to share, if you want to share knowledge with the student so that whenever they qualify... atleast they are competent enough to, to also discharge care coz, we always try, we put ourselves like heh, in the next three years... you can be, you can also be admitted, and the same same person, you didn't mentor, is the one taking care of you... that's why we tend to just share information and try to mentor them.
	EM40: Allied health professionals may selectively attend the WR (O) due to competing pressures (C) and prioritisation of tasks (M).
	(Nutritionist) Yes, I do. Not all of them, because they're usually they can all run parallel at the same time. So what you do, you just time the baby that you have interest in, that's when you keep dashing into either round.
	(Nutritionist) Every ward round if it's there, mostly on Tuesdays and Thursdays..... No, I attend for the premature babies.... Yeah. Then my colleague, which is (name withheld) now, she attends for the NICU.
	EM41: Where nurse workload is overwhelming (C) they will not attend the WR (O) as they fear abandoning the babies (M).
	(Nurse) It could be the workload. There could be alone like in our HDU. Sometimes you find one nurse with even 20-25 babies. It is sometimes impossible to attend ward rounds, depending on the workload that you have.
	(Nurse) Yeah. But let's say not often because of the workload. You find you are in a third-room; you are the only nurse. You are nursing 10 and more babies who need a lot from you. So, you don't abandon the baby to attend that round. You just work with the doctors because the care of these babies will be compromised. That's why sometimes if you have more or less, you can follow them and attend. Sometimes you are in the room, they are doing their... they are talking, you are listening. So, you are attending to this patient but you are also listening what they are doing.
	(Nurse) Yes, we are supposed to attend but it is a different situation. Like if it started and maybe the procedure that you are doing, like you are putting up IV fluids. You know there are things which you cannot postpone to go for the ward round, I'm going to put this baby on IV fluids, I'm going to put the baby on IV fluids, then by then we finish the ward round, the baby has dehydration. So you wait as your room, as they call you in your room. If you are not busy, you show up.
	EM42: If a member of staff does not wish to expose incompetence (C) they may alter their work (O) to avoid the specific procedure, for example (M).
	(Student Nurse) Any other thing, most of the time they are... they use... they criticise you like why don't you know and you are in third year?... I'm like wah, that one it's a discouragement on its own so, yeah and also most of... most of the time they live you with the work..... Not all the work but... like when you are doing the work and you find you don't know you fear asking, the fear so you just think or you just walk away slowly and ask another person then you come and do it.

	(Senior Nurse) ...Yeah. Towards work towards some specific I mean you know there is Somebody everybody has a weakness somewhere. so maybe I don't know, like setting a CPAP somebody tells you, no this one maybe doesn't need CPAP because he or she is trying to avoid it.... Maybe trying to avoid it you can also know whether she knows or she...she doesn't have knowledge about setting the CPAP for example or they don't want to put it.....Lack of knowledge also... So you know you try and avoid it.

LEADING	
Setting positive values tone	LD1: When leaders set a positive ‘values-tone’ on the unit, e.g. listening to juniors, kindness, civility, good leadership practices, praise (C) staff are encouraged to ‘follow-suit’ (M) leading to a more organised, positive and respectful place to work (O).
	(Nurse) Yeah, if you find leaders who are really guided by the values, it'll really impact on what you do. So maybe you find leaders who embrace teamwork. You will also follow in the same line. Teamwork.
	(Student Nurse) Yes. But another thing that came very clear was the leadership, the in charge. The leadership sometimes, very early in the morning, she's there, you come and you find her and you're like, then tomorrow I have to... I have to come a bit earlier so that she finds me here. And then the in charge, you'd, you'd, you'd, you'd, you'd hear like give information to the nurses, more information, in a very polite manner. Yeah, the one that everybody agrees with. And she would also inquire from different people and then decides on just one thing to be to be done and everybody picks it. So... The leadership style of the in charge is also, is also nice, yeah.
	(Nurse) I, okay. The, I can say their leadership skills to me, to me, they were good. As in, they were role models to me. Yes. The way they handled things, the way they brought people together. The way they worked with people, some of them even challenged us to, to further our studies. Yes.
	(Resident) I think people, yes. The workers, the in charges, they have done so many work that so that NBU can be organized and NBU can be a better place.... I think yes, the leadership, yes.
	LD2: When leaders display admirable characteristics, e.g. further study, good work ethic, patient-centredness, collaboration, professional behaviour/ attitudes, mastery of clinical work (C) staff will emulate these (O) as they are encouraged/ feel empowered when these qualities are shown by someone in a senior position/ leader who they respect (M).
	(Medical Officer Intern) patient care affects her directly on a very personal level. When we lose a child, she, you can actually see she has personally lost something, you know... yeah. It's not just doctor-patient relationship, she.... yeah, she is really invested in what is going on in the unit, she really wants to make things better, she really wants to make things work, she really likes seeing babies come up, yeah, she is very passionate about whatever she does.
	(Nurse) The senior, the senior colleagues. You find that someone handles the, if, if a case comes, someone handles it perfectly. So maybe if I'm improve on my knowledge or I improve on my studies I think may, I may be somewhere.
	(Clinical Officer Intern) She was very dedicated...she would come even during the weekends even during the odd hours. And then the way we interacted it was not like boss-servant...
	LD3: When leaders display an open attitude to learning (C) staff will feel able to correct a leader (O) because they feel empowered by the leader to do this (M).
	(Nurse) Yes, because somebody can tell you, you should have done it like this or this like maybe they tell you we need to have two nurses on this one can work on the patients with X and the other will work on the patients who are not X...it changes me because I have to look for an extra nurse to work in that room at least I have seen now it is giving an impact.
	(Nurse) MBT: Yeah, very much. There is. Like now there is a time the MO can hold her, the patient needs a CPAP, you can just go there and access with her or him and you can change everything and you can listen, she can listen and change. Or concerning medication, cannot one tell you, tell her, "I see this one is supposed to be one, two, three. She can change.
	(Nurse) Maybe now you know something and you are sure you know, but here comes your senior, like the MOs and the whatever, the consultants, you try to tell them these things is supposed to be like but they think that they know much better and they don't believe that you know. So, they can say, "No, that thing is done like this and this." So, maybe you're not given chance to apply. So, that's the thing.
	LD4: When leaders set a negative ‘values-tone’ on the unit, e.g. blame, incivility, overwhelm (C) staff will lack an authoritative positive example (M) leading to normalisation of undesirable staff behaviours (O).

	(Nurse) It's not bad. Okay, depending on which, which if it's my immediate supervisor, she's normally patient so she's advising or supervising us there, but sometimes when overwhelmed (laughs), you can really be a dictator, she can be, she can be harsh. Of course, you have to understand because there are some matters which have to be, to be attended to and there's expectations on the course and I take them positively, I take them positively.... Outside the unit, the supervision is okay though sometimes you feel like you're intimidated, you are over, you are over, over what? You are overrated or over judged. You are judged (Consultant) .. I think it is culture. I sometimes feel we don't engage them enough in the ward-round, to feel useful. For instance, in my ideal world, I would like to see a baby, listen to the presentation (from the interns) and listen from the nurse...like actually hear from the nurse: What is your feel managing this baby? Many times, the nurse is the silent bystander... and within 15 mins they (nurses) disappear on to do other things where they feel more visible. So that is my feeling, because I compare this with...and I have the privilege to work in other settings where the nurse is very central to care, and I feel that we don't give voice enough to our nurses..... We the team leaders in the ward round. I don't actually let them speak up and tell me that, 'you know, doc, I stopped feeding this baby, because of ABCD'. In fact, many times they will not tell you that they stopped feeding, for fear of backlash. So, they will keep quiet until the mother tells you, 'baby was not fed', then I will go, OK...could I hear more about this...then I actually call the nurse and she will tell you 'We didn't feed, and saying that very carefully, studying your face, because once the creased lines appear, she will not give you the details..... That you are going to disapprove of what they did. We don't empower our nurses; I dare say this! Uumm, We just don't give them much meaning, and it is a shame. I really try to give them a voice. I realise the resistance many times, but I also see them loosen over time when they realise that they can trust you that their voice matters. (Senior Nurse) Mmh. Some of them have changed, some of them there is a resistance there is a resistance.... There is resistance. Some you keep pushing them for long yes yes yes for example if there is something new we have to do in the unit a change is not easy people really resist.... You keep on you take action. Sometimes you have to be harsh on them and tough on them because you warn them if you don't do it you have to document why you have not done it. So you yes the first thing of course the first thing I we do at least I teach them the importance of this thing. they should know first.... The benefits of doing whatever they are supposed to do they should be knowledgeable and know why we are doing it that is the ideal. because somebody cannot do something that he or she doesn't know why we doing it.... If you've told them they have known the importance now let them implement. ...If they don't do it I will do a follow up... Sometimes you become answerable if you don't do if it's your shift and you don't have what is supposed to be done you have to explain. LD5: When staff are not supervised by leaders (C) they will feel unsupported (M) leading to reduced satisfaction (O). (Nurse) from the nursing service manager, we've got unit-in-charge. So, the unit-in-charge is the one who has been mandated with the supervisory role, in that, mostly... it's not on patient care, it's just on reporting.... as in reporting is, have you come on duty or not?... it ends there, it's just limited to whether you've come or not...but going down to either you're doing the right thing, what I can say, there's no supervision.... it's more about, like, your presence at work.... support, there's no support... (Nurse) I... to be supervised, I don't think (Nurse) Supervision, it's a long time since I saw it. Isn't it about the seniors coming?.. It has been long since I saw it here... It has been long. LD6: When leaders are blaming, policing, unappreciative, humiliation in front of mothers, demoralising (C) staff/ students feel discouraged/ fearful/ aggrieved (M) leading to erosion of self-confidence and 'othering' (O). (Nurse) So the support will involve, maybe the team leader will, avail supplies for you. So your work is to stock the rooms and make sure everything is available. But the, definitely there are challenges, but that's one of the supportive one. The other one is maybe somebody sees you've done something that's not supposed to be done on, or in a way that's not supposed to be done. So instead of waiting, maybe it's feeding time, mothers are feeding they'll come and talk it out too loud, and everybody's around. So it's, you feel as if they are already underpinning you.... So sometimes it'll should be maybe yes, I've seen you've done something wrong, if it's something that will harm the patient, it's good you intervene immediately, but not in a way that makes the other person feel as if they are so junior. So maybe you can show me how to do it, and when the mothers have left, or we are the two of us, and you know, show me, tell me if you, you feel like I was ignorant, you can now really talk to me when we are two of us. You feel like, now you, you feel the need to change. But you now you've seen me doing something and you just bring it out so loudly in front of everybody....

	(Nurse) Hmm. I don't feel it's supportive supervision. I feel it's policing supervision. Policing supervision is like, don't do this, don't do this. The don'ts, are many than what you should be doing, and what you are being told, I feel if you don't have this, do this, if you have this, I feel you should add on to this, but it's like, don't do this, don't do this. So you are working like, as if you are, you are afraid what happens. Will it be now, if something happens, it'll be me. I'm the one who's, who's accountable. I feel like it should be all of us now be because we are going through the same thing. If the team leader is there, and I've told them, I've told her that, him or her, that this is what I'm going through in my room. So what happens now always becomes you, you, you. So it's policing.
	(Senior Nurse) Yes negative one is when you've done something and people don't see.... yes, you are not appreciated... Lack of appreciation and then.... Everywhere all over from even the mother it can come from the client, the staff, the administration. ...all directions because maybe you've tried your best anyway then somebody comes and says you know you have messed up you could have done this this the baby could have survived this you know, and if personally... your best, you tried your best. So that is what demotivates.
	LD7: When leaders display norms of practice (C) others will follow (O) as they respect their judgement and position of authority (M).
	(Resident) Mostly once you check in with the fellow, she'll be able to guide you and tell you, "This is the practice that we use, or this was what was used zamani [long ago], we don't use it anymore," you know?
	(Nurse) I'll say the seniors, and those you, you communicate to mostly. Those who feel free with mostly. So if seniors are doing things a certain way, you will feel the need to follow in their way, if they're reluctant you'll be reluctant. Cause if maybe you may feel they are, they know something that you don't, they may have experienced something in the past, you know they've been here for long. They may have certain experiences with certain ways of doing things. So you do not want to start doing things extra [laugh]. And they have been here, they have seen maybe they, things have come and gone and they are still here. So you may feel now the seniors, they do really affect what we do. So if they are quick in doing things, you'll also, follow in their footsteps, if they are reluctant, cause they're not doing it out of, they have been in the field for long. They're not doing it, they don't want to harm anybody, but maybe they have an experience in the way things work. Something may start with so much pace, and then it slows down. So they have that experience. You may also talk to them and find out what they are...
	LD8: When errors/omissions are immediately taken up with an individual (C) this issue can be quickly resolved and learning gained (M) leading to better care and improved team working (O).
	(Nurse) If you say what is right at the right time, it will help so that the mistakes should not be repeated or the procedure should not be repeated. You correct it and you do the right way and it will help the patient not to long stay in the hospital
	(Senior Nurse) Those ones, I handle them now individual, because during those audits, they are names that come up. But me, I don't use again those names they've given me. I do now observation. If they say nurse, so and so, or whoever was on duty on this day is the same one who was on duty on this day and is not able, is not performing well. For me, I take the responsibility of observing myself. And now when I get it, I get hold of the person plus the mess or the document. We come and sit here and ask, this is what is happening today that this is what happened, the other day when you were there, is there a problem? And most of the time you'll get them, eh, asking for forgiveness and promising not to repeat..... And I still do the monitoring and I always after if they improve I always even at the desk say, so and so has really improved. Let's clap for that person.
	(Nurse) You see, what there is, when you understand someone as an individual, you don't generalize people and me, people know I don't keep something. When you make a mistake, I'm straightforward. I'm straightforward. I'll come to you as a person, not talking behind your back. Okay. You know what you're doing is wrong. Either you feel offended, but are corrected. I tell you, if I'm working on the bedside and something you have, maybe I'm coming out it's something you have done not the right way. Me, I don't want to report to the office. Okay. I tell you as a person you have done this and this, it's alright. Next time, do better. And I'll tell you how to do it. I'm not going to tell you to do better, if I'm not telling you the right way to do it. I tell them, if I've done something which is not right, even if I'm your senior, tell me. Don't fear and say this is my senior. No, we work for the betterment of our outcome, of our patients. If we are shying off each other, then we don't expect a good outcome for our patients.

	LD9: When a leader communicates clear consistent expectations for staff behaviours on the unit, e.g. punctuality, attendance at handover (C) these are more likely to be upheld (O) as all staff are aware of expectations and will fear consequences of deviance (M). (Consultant) Yeah, there is this baby who is dirty. I will say it twice. If you're not going to clean, I'm going to clean myself..... Then you will see the outcome. So the next time you see the baby is dirty. You probably do it coz you know if you don't do it, I will do it.....So, I am not going to order you around, but don't push it. Monday, Tuesday you have not washed the incubators, on Wednesday I will remove the incubators and wash them myself.....So, you will be the one who would be answering as to why your consultant is washing incubators. (Nurse) People come here ready to work. You see, it's not like you know other wards I... where I've worked in ward where by you go, you receive a general report ...and then you wait to be allocated..... Here we come when we are already allocated and you go and you start your work then there is so much routine here, mothers coming every 3 hours it keeps us on our toes.... I must have done this before they come. (Student Nurse) We would be called in a room, if it specifically for the students... Yes, we are called in a room and we are given the advice and the motivation. We are told first you did this and you are supposed to be doing this. Then after that you are told... LD10: When there is a legacy of poor reinforcement of standards by a leader (+/- no processes for reporting) (C) digressive behaviour will be normalised (M) leading to a poor working environment for all, sense of futility for leader, and frustration by others who do not have necessary power to intervene (O). (Senior Nurse) Okay. Let's say now like right now we have, our numbers have gone up, maybe, like yesterday we had seven turns, you have somebody who just comes how, he wants only to do, to do documentation and not hands on. Just to sit down and document. Maybe now as a [senior nurse] you have to do other managerial work. Maybe let me say that very day the in charge is not around or she's gone for meetings, and you're alone there with the same staff who like sitting..... She doesn't know many procedures. Now you have to do all those things, before you start managerial work maybe it will be around three, you leave here at six or seven-ish?.....And you know you, you cannot be telling an adult to do this and she knows what she's supposed to do.... And she doesn't want also to know..... So it becomes difficult..... And they're rigid to change.....And they're just timely. Somebody just want to, okay, maybe now you, she reported in the morning and is supposed to leave at 12:30, once 12:30 reaches, she doesn't know the procedures. [laughter]. Where the, where she had reached for document, that's where she will stop.....Yeah. You know now this nursing whoever said is handing over is, because now somebody says, I now want to handle over all the procedures I had not done, but she was just sitting. (Student Nurse) Yeah. You're forwarded to the, to the, it's called what? To the sixth floor, the nursing standards..... She was, okay... the, the reason to that she was giving excuses. Sometimes they weren't making sense, but, to some extent they were being believed. [Laugh]. Yeah.Let me say, it was just luck. ([removed]) mmmh, (Pause). Why does that one person keep coming into my head? Like I said, they are very chauvinistic, ...yes, it's the same person I described. I feel like, their people skills, you know, how they interact with people is, really missing.....it's in absentia, it's absent. Out of.... it's not, coz like I felt very...., it's so sad coz it's just didn't happen to me, it happened to another colleague of mine.....so it happened to someone else again. This same person also again made these sexual comments, and I feel like their colleagues have normalized this so much, with this particular person, that it feels normal..... like, uuhm, say am a nurse... and I've worked with person A for... 3 years. So am just gonna normalize his sexual, his sexualizing behaviour because am like, ah, "huyu anakuwanga hivyo plus ni mwanaume, mweleweni" (he is always like that, plus he is a man, understand him) you know.... so, I feel like it's, it's been normalized, in that he does all that so that those of us who are not used to it, it hits us hard..... I was so grateful. That was my last week in NBU, and I told myself I don't wanna see that face again. And truthfully, I've never seen that face again. (Laughter). For some reason, I've just never met with the guy again.....and I explained that maybe that's how it's been normalized, and he was like, if, if I....., she was so appalled by it, she was nauseated with everything. And I was just like, I don't know what we are supposed to do! Cause like the people that we would have approached, you know, with this behaviour, are the ones who are present when these behaviours are happening. When these words are being said, they're present in there, and they are like, and they just laugh it out. So, you are like, okay. I guess that's the new normal, and you just move on..... LD11: When a grievance is met with perceived inaction (C) futility and lack of trust (M) will lead to frustrated staff and workarounds (O).

	(Nurse) I don't know. Because nobody will listen to me. Am not the in-charge, right?...so, I have to raise any issue through my in-charge.I... and I know my in-charge can't listen to me on any issue.... yes, there's always like a kasmall fight..... I can't, I wouldn't insubordinate my in-charge..... yeah. so, I stopped. I don't say nothing....I felt bad those initial days, but I got used to it... I don't bother now... I do my shift, I do the best I can do, I go home.
	(Nurse) ... It did not happen. So, now you just put them in the photo, you do everything and just keep quiet.... And just, we just pin them there and there in the morning or in the evening when I'm coming for night, "You didn't do that and that because of that, that one has happened. So, you see
	(Nurse) I don't think it is well received by top managers..... It does not really affect me personally. But when you look at the goal, the ultimate goal or the broad objective, it somehow affects us because you see that there are so much that is limited, there resources are limited, you are understaffed and when you communicate, that is not taken care of. So, I think it can improve. If there were listening to what we say or our opinions, I think that can improve the quality of care and it can even do much better.
	LD12: When handover/ ward meeting has clear expectations and is respected by staff (C) it enhances belonging, freedom, collaboration, flattening of hierarchy, and sense of community (O) due to inclusion of staff in a reliable common forum with opportunity to contribute, raise any issues, and be updated (M).
	(Nurse) Handover meetings. OK, the same meetings. We normally have a handover and then we have other things in the meetings after the handover meetings. So, it is a mixture of everything, as in, you can hand over, you can share information, you can teach during the same meeting
	(Nurse) Okay meetings so if we have a topic that we have to sensitize others, so we talk the person who has information prepares and comes to give us the information like CME. But if there is a letter from the administration or management somebody comes and reads the letter the way it is at the meeting so sensitization happens like CME alafu (OR) another type of communication is when one tries to raise something in the meeting like complaining or affirming, we will be told who wants to say something they pass the information... they give us.....WhatsApp we communicate..... Like people whose licenses have expired they are being told... if there is a letter that it has come to the office, we tell the people kwa WhatsApp yake (on their WhatsApp) generally we are informing people there is shortage of this drug please do not bother to check on it.....Supplies, if there is a meeting notifying people on the meeting like mortality meeting for CME WhatsApp is for informing...
	Observations
	LD13: Structured and respectful handovers (C) are respected by other cadres (O) as they recognise the value for patient care (M).
	Observations
	LD14: When leaders reinforce structured and respectful handover (C) latecomers will behave humbly (O) because their lapse has been noticed (M).
	Observation
	LD15: When there is clear expectation about the content and format of handover (C) staff will recognise it as an essential part of the job (M) and it will become the norm (O).
	(Nurse) Handovers. Starting off with definitely there is a, the way we do it. The way you mentioned the, the name, you confirm the name tag, the IP numbers, the condition of the baby and the current management so far. Let me mention on the most sick baby, probably the baby is on IV fluids, probably not feeding, you just go mentioning the, the details on the current plan recommended by the doctors. So that when that nurse comes and start the nursing care from where they, you stopped, it'll be easy for them too, to know what next, what to do. And most times if it's a very sick case, you'll find that it's easy even referring to the file. Cause you know, where that's where the doctor's notes are. So that you can see the current review and the current plan. And then from there, you are able to pick up, oh, okay, this this is what we are supposed to do, and how the baby is and then you carry on with the plan. Yes. Yes. On many, on so many occasions. On so, so many occasions, in that probably something that you, maybe, you know what you are used to, like, the management is like that, but probably you find there is an additional thing, you can do to better that care.
	(Nutritionist) When you are going for a break or, for leave, we have an official handing over form. Which is an evidence that you handed over to someone. The person signs and you write all the patients that you think need extra follow up.
	(Student Nurse) Knowledge? It's shared mostly in the, in the, in the giving the reports. They, they normally discuss about issues and upcoming trends and maybe things that they

	should adopt. It's during the handover. They usually meet on Monday, Wednesday and Friday, in the morning.... About maybe upcoming issues and also when new devices have been brought, like for the people of NEST, they only come and educate them. And also passing of information probably about the patient. The progress of the patient is given by via report. LD16: When a leader proactively manages the online WhatsApp space on the unit (C) content can be organised, informative and inclusive (M) and foster belonging and awareness of staff/ students (O). (Senior Nurse) WhatsApp we also share our duties after I've organized the duties, the duty rotor is ready. We take a copy of photos of the duty rotor, and send them on the WhatsApp, so that those ones who are off, they don't need to call or to come to check their duties. Eh, WhatsApp also is also a way of communication for issues of us in newborn unit. Like right now we have two of our colleagues who lost a, grandmother, who lost her sister who are the guardians. So such we communicate on the wall so that we get people to release. .. It's like a social welfare (Resident) We have a leader; we have a team leader, everyone has a team leader. There is a nurse in charge who is a team leader, there's a doctor who is a team leader at certain things, there is a WhatsApp groups. So the team leader, if the senior communicate to the team leader, a team leader now disseminate the information through the WhatsApp cause you can sometimes you can't find everyone at the same time. If there's a WhatsApp group, you just continue saying, "This and this and this is what is required, this is what we have tomorrow, this is the meeting you will have tomorrow; this is what we do. There is a change in something, now that we klebsiella outbreak there is this thing that you need to sensitize and this we need to insist," that's what happen." (Resident) ..The team leader always communicates. Every second they're like, "Oh, you know, this has been said, do this. The rota is here for this week, do, these are the people." So, it was a continuous communication, and we still are in the [WhatsApp] group. (Nurse) WhatsApp we communicate.... Like people whose licenses have expired they are being told... if there is a letter that it has come to the office, we tell the people kwa WhatsApp yake (on theirWhatsApp) generally we are informing people there is shortage of this drug please do not bother to check on it.... Supplies, if there is a meeting notifying people on the meeting like mortality meeting for CME WhatsApp is for informing LD17: When the use of WhatsApp is widespread on the unit and within different subgroups (C) its role and administration/ governance may become fluid (M) potentially leading to safety issues (O). (Medical Officer Intern) you post to the whatsapp group. ... you give a brief history, if you need to attach images of whatever the problem is, you attach images. If you need to attach results, or radio x-rays, or ultrasounds, whatever it is you attach and wait for your colleagues' responses. There is always someone who knows something.... very useful...once in a while, like once in a month... I'll start with the unit's colleagues, I'll also consult the MOs, if am seeing it's like no one has a clear picture of what is going on, you just post it there (Nurse) ...we have a nurses worldwide, where people pose questions.... it can accommodate, let me confirm for you,I: is it nurses from all over the world?R: yeah, they are nurses from different countries..... so it has, it has a lot of people... it has 250.....yeah, 250 members.... (Senior Nurse) ...they are always there you can even ask you can even just within the environment but even you can go as far as we have a forum. So sometimes even ask there who knows somebody who can advise for this? You get even..... Not (name of hospital)... there is (name of hospital) nurses there is a what is it called? The ... county... X county nurses..... yeah we have group forums there. So people express there like for example those who want to go further for further what is it called?...Abroad further studies ...people ask there and you are referred to so many. LD18: When staff supervision focuses on clinical care, and is timely and supportive (C) it can improve staff belonging and patient care on the unit (O) because good practice is consistently championed (M). LD19: When staff supervision does not focus on clinical care or is not timely/supportive (C) staff will feel unsupported in their practice (M) and delivery of care will not be consistent (O). (Nurse) ... aaah, actually, it exists in indirect form. What I can say.... mostly, from the, from the organogram, of the institution,...from the nursing service manager, we've got

Respected, self-confident	unit-in-charge. So, the unit-in-charge is the one who has been mandated with the supervisory role, in that, mostly.... it's not on patient care, it's just on reporting.... as in reporting is, have you come on duty or not?... it ends there, it's just limited to whether you've come or not.... but going down to either you're doing the right thing, what I can say, there's no supervision. (Quite True)!: there's no supervision on clinical care.... it's more about, like, your presence at work.
	(Nurse) ...to be supervised, I don't think.... I don't think there is any.
	(Nurse) Supervision, it's a long time since I saw it. Isn't it about the seniors coming? It has been long since I saw it here.... It has been long.
	LD20: When learning is valued/considered continuous (C) staff will feel freer to express and discuss and be open to correction (M) leading to better collaboration and teamwork, and changes to practice (O).
	(Student Nurse) Actually, it a lot, it does a lot. Cause it matters in the attitude and how you're performing some tasks, if you are told, okay, this is not correct, you have to change and you must receive positively so that next time you can be corrected when you're doing something wrong. So, to me, I take it personal, I take it positively.
	(Resident) Yes. So the advice is sometimes is you may be doing what you call under dosing a patient or not giving the correct dosage, or maybe you have written a correct dose but you have not posted it in the treatment sheet. Now someone tells you, "You tend to forget to write on the, on the, on the work plan, but you have not transferred the information to the, to the treatment sheet, kindly do that. Don't forget it, just do it." Yes, you just take the advice, you put it the correct way.
	(Nurse) So, I remember, you've seen this senior nurse who has come here, (X), she told me, "(Own name), don't be stacking them together because when you stack them together, you will not decontaminate. So now you have to separate them." ...It was not even in my mind that I have cleaned...
	(Nurse) Yes, I have that freedom. Because if something goes the wrong way, actually I don't hesitate, I measure it. And I don't... Especially in the meetings, you find something is going wrong and it involves everybody. In the meetings, you come and I have an issue and you correct it and they take it positively.
	(Clinical Officer Intern) So that's why they used to correct me a lot because I was a bit green.... So there was nothing... I used to take it positively... ..I have landed in the NBU there is the standard of doing things there..... There is no way I have never said, no this way I take it negatively I always take it positively at the end of the day I was learning.
	LD21: When a leader has self- confidence in undertaking their role (C) they will be more effective (O) as they will feel comfortable carrying and using their authority (M).
	(Senior Nurse) ...Eh, because me having have worked in this unity for a longer time of almost 25 years in newborn unit, I know what goes on the ground. I know the staffs, eh, I can be able to tell you, this one is moody, this one is okay, this takes the responsibilities or the correction positively. So having known what goes on the ground, having known the staffs that I have, I'm able to stand, and say, this is what I want. This is what we should stop doing. And those sensitive things that I know how they react, those are the things I throw back to them and ask them, how better do you think, we can do so that themselves, they come up with the solutions. So to me, I have no issues of standing and saying, this is what we need to do or this is what we should do.
	LD22: When a leader is respected by staff/students (C) they will be able to perform their role more effectively (O) as staff will make effort to support them/ follow their leadership/ show their respect (M).
	(Student Nurse) A lot of weight. Okay. The one which I'll give a lot of weight, it's maybe, let me say for the nursing, eh, the, the nurse in charge, for example, she is the overall boss and knows of everything that is going about, so that coming to a specific decision, it has taken a lot of consultation, now it will have much weight than a nurse who is communicating about something. Yeah. So for the nurse in charge and the people who have, the higher administrative, I can take much consideration.
	(Nurse) Okay, most of the time like advice from my in-charges, yeah. Whenever they give directives or advice, and then you follow them accurately, it helps a lot. Yeah, it has helped me even improve my, my working.
	LD23: When a leader feels undermined and lacks self-confidence (C) they may become disengaged (M1) and feel overwhelmed (M2) leading to a perceived leadership vacuum and associated degradation in respect from staff (O1), which will further demoralise the leader/ reduce self-confidence (O2).
	(Senior Nurse) Yes. They prevent me if they don't cooperate.... Maybe it's something that needs teamwork... If they don't cooperate....You become demoralised

(Senior Nurse) And you know you, you cannot be telling an adult to do this and she knows what she's supposed to do....And she doesn't want also to know... So it becomes difficult.
(Nurse) ... I don't know why I think like everything I try to propose to some people... it can't work so that you don't look like you're trying to, to lead the way or something... that's my feeling
LD24: When a leader is not respected by staff (C) they will lack social authority (M) so they will be unable to perform their role effectively/ staff will not value /will resist their inputs (O).
(Senior Nurse) Yes, its not easy. You have to handle so many things at a go. Its not easy because you meet people of different types, different characters... so it's not easy.
(Nurse) .. for me, I will not escalate. Personally, because, ... I know, nobody will listen to me.... I don't know. Because nobody will listen to me. Am not the in-charge, right?... so, I have to raise any issue through my in-charge.... and I know my in-charge can't listen to me on any issue.... yes, there's always like a kasmall fight.
(Nurse) It, it affects because you see like when you put a consultant, you see consultant is the final decision. When the consultant makes that decision, may be even his or her decision is wrong, most of the people tend to side with him or her.... And you maybe you can remain there alone. So you see, the consultants, those MOs, when they make the decision, it doesn't matter to them whether it's right or wrong. What matters to them is that I am senior, I have made a decision, and so you have to follow it. Unless you find someone else, you now go to another consultant who will override that decision.
(Nurse) yesterday we celebrated a cake on the best NBU, but, for me given a chance, I would say we're not best... I've not seen, I've not seen that, I don't know, hoping my expectations are not so high... I don't think they're best..
LD25: When staff respect their leader as insightful, showing concern for wellbeing, approachable, and working for their good (C) they will bring difficulties to them (O) as they feel safe (M).
(Nurse) That is one. And in any case that you may find that you are stuck somewhere suppose either administrative issue or maybe you have an issue with a mother here, when they're team leading, you can comfortably approach them, and they're ready to assist. Are ready to assist in the sense that they offer, they're able to come up with a problem solving solutions that are going to, to steer you to, to make a shift smooth. And also to help in terms of even maybe you have lacked something, supplies. They make connections here and there. Maybe call different departments should you lack something. And majorly another thing is probably should get a, a, a procedure that you need two nurses, cause one in particular, I know there is actually the first time I worked in ICU, I was with (first female name above), and I cannot forget that day because, you know, it's a place that you have not been so well acquainted with and especially in NICU, where the neonates are. It was a very easy shift for me. Cause at least she would tell me this is what we do, 1, 2, 3. Even if it was just a half shift, but at least I was able to be oriented within the, those six hours. So you find it at least it was, you'd able to maneuver.
(Nurse) The support. The support from the management. At least if you have something that needs to be corrected, they take it up and they also pack it, they pack up on you. They echo the same sentiment on what is supposed to be done right.... Yes, the in-charge. If you have identified something that needs to be corrected and bring it out, she takes it up. She makes sure that it is well articulated and well corrected. Also, the support from the consultants and also the support from the doctors and registrars.
(Nurse) Yeah, also from the leadership there is. Because. when you go to the office (in charge's office) and you want something from there, yeah you receive support cause let's say you are on duty, let's say tomorrow you are on duty and something just came up, an emergency which is unavoidable. So, if you just approach the office. They'll just give you an OFF. Then they will know how to compensate for that day you were supposed to be on duty, they know. And then another thing, there is support, cause If apart from that, you can... apart from even going to the office, you can get from one another, you can share that tomorrow, there's something... there's something I have to do. Let's just cover for me, then I'll cover for you such and such a time. So, it's there....OK, like the team leader just says, like the shift boss. So, if you need anything, if you need support, or where you're stuck, you can always approach the team leader.
(Nurse) Like, let's say if somebody has a social problem, yeah, you find that many times they, they have no one to turn to. And so, it affects their performance. Like, for example, coming late and nobody bothers to ask you why you are late. Why do you how come you are an habitual late comer? You know, there must be something. Yeah. But you see, nobody asks or nobody cares and therefore, this colleague feels like, "I'm not cared for," and therefore it affects their performance

Inclusive, collaborative	LD26: When leaders are supported in undertaking their role (C) they will have greater capacity (M) and be more effective (O).
	(Senior Nurse) Whereby there, I need more. I need more support staffs who can also work on the equipment. So that one is about shortage. Supplies. We need more machines. The machines we have, they are not, if I talk of machines, general, the equipment's they are short. So we need more supplies.
	(Nutritionist) It depends, with what the, sometimes their hands are tied because they are, the, the problem lies within another unit or the hospital, like finance or supplies. So if there's some things are missing and they're making your work, not move well. Then I always tell them, and now, when they get to their end, now they'll tell you now the far we've tried now the ball is in this court, so, it means there are things that are beyond them.
	(Nurse) And out of those maybe you have around 5, 8 about the... maybe you have oxygen they are about 5 you have machine, CPAP they are about 3. ... you see now this one you feel like now you just call the management to come and see what I'm supposed to do and what I'm not supposed to do. But you see with that you also have that gap that what if they come and they are like... you see now you get..... Fear, fear, fear there is that fear that what will happen..... And you see by the end of the day you need this job; you need these babies, so..... You feel intimidated, you feel so down and you feel you're not complete, that means you have not done your best to the babies.... And that one sometimes even it overwhelms you when even you go to at home, you find yourself even calling asking baby so and so ako aje? [how are they] how is that baby? Because you feel maybe that baby succumbed... because you were not in a position to look for... to do blood sugar you see? And you tried to prioritise everything but it was not easy.... So to you like you can even you are so stressed up until you feel you maybe you get an information that now the babies were okay and we managed?
	LD27: When a leader is inclusive and collaborative in their approach (C) diverse staff will feel encouraged to engage in unit discourse (M) leading to improved awareness, staff satisfaction/ sense of belonging, and investment in team rather than over-reliance on individuals (O).
	(Senior Nurse) The knowledge in newborn unity is quite a lot. And especially for somebody like me who, who, who is a pediatric trained nurse, first we share mostly about on patient care. Sometimes we can get a condition, and you find that the, this patient is not being managed, the nursing part is not being managed well. So in such a situation, I even organized for CME at the desk and I talk about that condition on the management, on the nursing part of it. So we let each one of us at the nurses' desk to share and put the..., come up with the inputs on how better we can manage and especially like now when we have this issue of X, you cannot manage alone, it's teamwork. You have to involve other staffs, but us nurses, what are we not doing?
	(Nurse) Like now, because we have another in charge....Now a change of management... Some depending on what demotivated them what could motivate them this time you could see people started to become free to intermingle and have that motivation of working hard... with the new leadership, I have seen as if people have changed and have become positive... That is my opinion, but I don't know. But I could see people that there is no pressure. I think it's because of communication. Maybe people sometimes when you communicate with people, and give them information about what is happening. Yeah. And then you do CMEs every time some people pick some information and utilize so like. I think communication, I don't know, but I feel people are better now than sometimes and because like it is like maybe the in charge is listening to them, you know, when you listen to them, even if you don't give somebody something, sometimes they feel motivated.
	(Nurse) Like the CS mothers maybe a patient has a, an infection on the wound. Recently we have been having mothers going home then coming back for readmission because of infection, I think some contamination in the theatre, so they have been in the ward for, for long periods, going back to theatre for secondary suturing, so the doctor can come and ask you, nurse so and so, what is the problem? Why are the mothers coming back with the infection or which medication can we use? Even if they do the investigations in the lab, maybe the swabs, but they need to get some experience we've been having these cases now and then, so you can advise them on the medication to use, how to dress the wound, the antiseptic to use on the wound and also how to handle the whole issue about the mother. Yeah.
	LD28: When leaders encourage staff (C) staff confidence and competence improve (O) due to sense of teamwork, belonging and able to be themselves (M).
	(Nurse) she's one person I would say mentored us so much. Taught us to be fearless. To share to, to not feel like your pressed down or something. Cause even in my, in my first times the time I was in admission room, she used to come and support us. And she was such an encourager in that she would just tell you, and, by the way, in fact, I remember one day I was so overwhelmed, she came and started assisting me and I hadn't asked her, but she's saw there is so much activity, she just came in and asked me,

	what have you not done? I told her that baby just came in. She just got a feeding chart to aid the baby, blah, blah, blah. As I was settling the others.
	(Resident) We are being supervised by our seniors. Most of the time the fellows, the consultant, yes. Let's say a more of a mentorship kind of a program, yes, and that's observation with, yes. So that is the main thing, yes. And most of the time you the, the fellows and the consultants, so they will mentor us, they will teachers, they guide us, yes, kind of a family.
	(Nurse) Honestly speaking, my, the current in-charges also motivates me in a way. They really support me, they supported me so many times. So, I feel that they, they also motivate me in a way to work in this department because I've been here for quite some time now and I feel that them plus other colleagues also motivate me in a way to be here. And that aspect of me being able to make a decision. You see some departments you cannot do a lot without the influence of a consultant or an MO, but here you can do so much before even a consultant comes to see that patient. So, that motivates me, that freedom to manage patients. The ability to deal with that case and manage such that when a consultant is coming, he's just repeating what you have already said or done.
	LD29: When leaders have established a regular forum for open staff discussion (C) it can be used to correct practice and educate (M) leading to whole team learning (O).
	(Nurse) It, it gives, it gives people a more sense of responsibility. Responsibility in the sense that you find some things other people overlook, but at the end of the day, you feel like, no, it should not, it should not have happened the way it did. So people raise it, they discuss, and then at the end of the day, it's basically just trying to enlighten us that you should be more careful in maybe carrying out a certain procedure or handling babies in a specific way. Yeah. It goes a long way.
	(Senior Nurse) Eh, when they come up with those recommendations during our meeting at the desk, I now just go through to such a thing from whatever we've identified. I talk about it, generally, I don't pinpoint even a specific nursery. But I talk about the unit. Then sometimes I even welcome them to give their feedback on the audit that they did, and the recommendations. Then from there we pick up and we do a follow up. Now I do a physical follow up. If there was issue with the documentation in X one, now I have to really, it is now on the spot check. Almost every day I'll have to pass there and see what is really being done. So that we are able to improve.....Those ones, I handle them now individual, because during those audits, they are names that come up. But me, I don't use again those names they've given me. I do now observation. If they say nurse, so and so, or whoever was on duty on this day is the same one who was on duty on this day and is not able, is not performing well. For me, I take the responsibility of observing myself. And now when I get it, I get hold of the person plus the mess or the document. We come and sit here and ask, this is what is happening today that this is what happened, the other day when you were there, is there a problem? And most of the time you'll get them, eh, asking for forgiveness and promising not to repeat. ... And I still do the monitoring and I always after if they improve I always even at the desk say, so and so has really improved. Let's clap for that person.
	(Nurse) Now...now that one is something that is communicated in meetings and people are told like irregardless of how busy you are this is what is supposed to be done. So maybe she'll also tell you personally.....that there is a gap here, there is an omission that you need to correct.
	LD30: When leaders integrate invited participation and open floor opportunities into meetings (C) belonging will be enhanced (M) and teamworking improved (O).
	(Nurse).... with the new leadership, I have seen as if people have changed and have become positive...That is my opinion, but I don't know. But I could see people that there is no pressure. I think it's because of communication. Maybe people sometimes when you communicate with people, and give them information about what is happening. Yeah. And then you do CMEs every time some people pick some information and utilize so like. I think communication, I don't know, but I feel people are better now than sometimes and because like it is like maybe the in charge is listening to them, you know, when you listen to them, even if you don't give somebody something, sometimes they feel motivated.
	(Senior Nurse) Yes. Because to me, I allow anybody and everybody to express freedom of expression. And that is why at the desk during the meeting, we create time for AOB, who has something they feel they could share or talk about or any experience that you have, you let the people open up on the issues they have or in case they have. So to me, I feel they have freedom of airing out what they feel and when they air it out, I take it positively.
	(Nurse) By encouraging, encouraging one another, encouraging one another to bring, to air out their views, to feel free to communicate, and whenever there is a problem one should, should be, should be free, you know, to say it and see if we can we can, we can, we can come in and, let's behave like a family the way a real family normally behave. I think with those ones, some of those who normally confined or mute themselves, can be able to open up.... Encouraging communication, that's it.... Well, whenever you ask

them questions or whenever you want to, you want to get something out of them, just do it by writing. Because whatever, whatever their, whatever they were to talk it, if when, whether they were to, whether they were to air it verbally, of course, it's inside them. So, when you ask them by writing something, obvious, they'll have to respond, you inbox them.
LD31: When the unit has an inclusive WhatsApp group (C) contributions are theoretically open to all (M) which may contribute to discussions and consensus building (O).
(Nurse) Mm. Sometimes occasionally you may find some webinars, maybe somebody shares in the group. There is this and this webinar on this and this training.... Yeah, you can send maybe the document or the link. If somebody's interested, they can check.
(Nurse) Yeah and most of the times even we have it on the... we have maybe like on the WhatsApp, we have a thing that we keep on updating ourselves what is happening and even the conditions, like for example, we have a new condition in the... in the unit we'll keep on being updated. So the flow of the information is good.
(Nurse) Like, information like us here, we have our WhatsApp group whereby if I have educative material I just send it on the wall and ask people to go through it. Also we normally have CMEs. The CMEs we have them where we are in different target groups. Every group has its own target, which is supposed to be done every financial year. So if you are in a particular target group, there are those things we normally sensitize people on what we are dealing with and we do audits. Like if maybe you are doing an audit on vital signs, you have sensitized people on the importance of taking vital signs and recording, you do a follow up. You do an audit, people doing vital signs the way it is required, the way it is being recorded, are people taking action after maybe a recorded vital sign which is beyond the normal levels. Yeah, so we do CMEs. Then we have a webinar which is normally between Kenyatta and the University of Nairobi. They normally have those teachings, different conditions, different patterns. It's normally done...They normally do a schedule, then they send the link... Mostly they are normally at 2 to 3pm. For this year I told you I have studied because I have not seen it in my whole emailing. If you have joined the email, the email is sent to those particular training on individual emails.
(Nutritionist) the whatsapp, the, the meetings, aah, I think it brings people on board and actually have that kind of discussions, yeah.... which makes people free,... free to talk, they feel motivated at long last,... to give their best.
(Nurse) Mostly, mostly you'll find that maybe there's a condition which has come up, a mother has come with it, so mostly that is when we will look at it, we all just look at it, we discuss it or there is an information. A condition has come up and if you're not in the shift then someone can post it and we start discussing it on the[WhatsApp] group, about that condition
LD32: When an online platform is used for meetings, (C) diverse staff can theoretically join, (M) creating opportunity for collaborative working/ learning (O).
(Nurse) No, we have only one [WhatsApp group] in the unit for nurses, but I don't know if the doctors have their own..... The common platform it's during this Zoom meeting, that's where we [nurses and doctors] meet.
(Resident) So mostly CMEs, you can join from, okay, you can join even from outside. Like, maybe a ward is presenting on a case and you join, it doesn't have to be just NBU.... Yeah, there are online, all these CMEs are online. So, you can join and then you get more perspective from a case.
(Resident) They were online.
LD33: When staff and students are included in meetings (C) they will feel a sense of belonging (O) due to their share in collective awareness (M).
(Resident) Face to face during ward rounds. Then we also had the continuous medical [inaudible 26:04], the seminars and the meetings we used to have..... They were online... I don't know which day is which day, but we usually have one on Monday and one on Wednesday, and then we also have a mortality audit once a month.... So one day is for the whole paediatrics, the other day is for the neonatal, I can't remember which day, one day is for the neonatal.
(Nurse) ...and also other carders but CMEs mostly we are nursing...we are nurses there. Yeah.
(Nurse) Yes, I have that freedom. Because if something goes the wrong way, actually I don't hesitate, I measure it. And I don't... Especially in the meetings, you find something is going wrong and it involves everybody. In the meetings, you come and I have an issue and you correct it and they take it positively. ... I can say not everybody, but most of us,

Situational awareness	most of us, we have that freedom to share what is happening.... Yes, it improves the care. Because, especially like, for example, last week something was going wrong about lines, IV lines. Okay. You find a line has tissue, has blocked and the doctor comes and fixes another one and does remove the blocked one. So, once I saw it was happening, I just shouted and I brought it forward and I think it improved very well. And even the doctors also, they came to the knowledge it's not good to leave what is not good. You put another one, you don't remove this one. So, the impact was taken very nicely. Actually, I found it was well taken.
	LD34: When educational meetings are tagged onto handover meetings (C) staff are already assembled (M) so will enhance inclusive/ equitable teaching and learning (O).
	(Nurse) At the nurses' desk station. Every morning. Those three days. Morning hours.... Yes, at the front site. We usually meet there early in the morning from 7.30 to 8.30....Even the CME, that's where if you have a CME, you give it there. On those specific meetings. ... We have meetings and within that day of meeting, we also give CMEs. ... We discuss about the management of patients, the newborn unit, if there is any introduction like, caffeine management, administration and care of a patient on caffeine administration. And how to manage those patients. We have procedures like NCPAPS, the giving patients oxygen through NCPAPS.
	(Nurse) Yeah, they are. But I've said you utilize those meetings in the morning like we yeah, the CMEs here during such moments, we asked for any issues that members could be having. So we utilize such moments to get feedbacks and maybe we don't have enough time. We plan for a CME for that particular thing that has been raised.
	LD35: If ward rounds are not inclusive, e.g. favouritism, fear (C) a clique evolves and some staff are excluded from problem solving work (M) with reduced ability for learning and collaborative decision making (O).
	(Student Nurse) I feel ward rounds now there have been left for doctors in the hospitals. And I feel they have left one part of two people who are very important. They have left out the nutrition, they left out anything about nutrition and we have left the out nurses, this nurse has stayed with this patient for 24 hours. You have to come there for 15 minutes. I think it is good to ask me how your patient was before even going to hand it over to a registrar who came in the morning, did the ABGA very fast and sat down to write the summary. They have not even checked on the patient, but that nurse has a lot of information about the patient, but she will keep quiet because she is not asked.
	(Student Nurse) Mostly the doctors communicate during ward rounds. And then they are giving orders for the care of the patients that are supposed to be given.
	(Consultant) I think it is culture. I sometimes feel we don't engage them enough in the ward-round, to feel useful. For instance, in my ideal world, I would like to see a baby, listen to the presentation (from the interns) and listen from the nurse...like actually hear from the nurse: What is your feel managing this baby? Many times, the nurse is the silent bystander... and within 15 mins they (nurses) disappear on to do other things where they feel more visible. So that is my feeling, because I compare this with...and I have the privilege to work in other settings where the nurse is very central to care, and I feel that we don't give voice enough to our nurses.
	LD36: When a leader is proactive in gaining situational awareness, e.g. attentive listening during handover, present on unit, intentional, interest (C) she will better understand the needs of the staff, patients and the unit/ have oversight (M) and will be able to identify and mitigate gaps (O).
	(Consultant) Yes. Newborn care is very dynamic, so dynamic that 6 hours makes a lot of things, so that is why when I come in in the morning, I tend to just first know what transpired. And the best person to give me a summary of that is usually the in-charge because she has a sort of real-time access on the nurses on the shift. Sometimes I may want to unpack that with the specific nurses, but she usually she has an overview of the goings on in the unit..... So she gives me a report of all that. And then There are times she has had challenges working with specific individuals and we have had to discuss to see how to deal with that, students and different qualified staff. So, that usually revolves around that. Usually, we do not dwell on specific patient issues except for a few select ones who are of interest but otherwise specific patients I would usually hear from the nurse taking care of the child. Yes
	(Senior Nurse) Eh, sometimes in the morning, in the morning I enter inside the nurseries, during report handing over so that I'm able to listen on how the report is being handed over. And to know the patients to understand the patients that I have and in case there are any issues, so that we are able, administratively we are able to handle. So I get that information and still where we get that they are shortcomings, we again, discuss it, during our meetings.
	(Nurse) First of all, we have the in charge, when she comes in the morning, before she received the report at the nurse's station, she... she goes round the unit and this also

	should happen if like if I'm the one who is in the office,... The one standing in for the in charge, so the in charge goes round the rooms and checks on literally checking on spot checking on let's say where we write our reports, cardexes whether they are properly written.... Yes, today she went and did that... Then whether the...the observations are properly... the observation charts, monitoring charts they are properly put with all the data, biodata of the patients and all that. So in other words, the in charge does a sport check on all the rooms.
	LD37: When a leader has gained a good understanding of the needs of her team, e.g. skills mix, availability of consumables, professional requirements (C) she will be able to provide effective and timely support, e.g. supplies, allocations, supervision, tailored reminders (M) making the working shift much easier for staff and more enjoyable (O).
	(Nurse) That is one. And in any case that you may find that you are stuck somewhere suppose either administrative issue or maybe you have an issue with a mother here, when they're team leading, you can comfortably approach them, and they're ready to assist. Are ready to assist in the sense that they offer, they're able to come up with a problem solving solutions that are going to, to steer you to, to make a shift smooth. And also to help in terms of even maybe you have lacked something, supplies. They make connections here and there. Maybe call different departments should you lack something. And majorly another thing is probably should get a, a, a procedure that you need two nurses, cause one in particular, I know there is actually the first time I worked in ICU, I was with (first female name above), and I cannot forget that day because, you know, it's a place that you have not been so well acquainted with and especially in NICU, where the neonates are. It was a very easy shift for me. Cause at least she would tell me this is what we do, 1, 2, 3. Even if it was just a half shift, but at least I was able to be oriented within the, those six hours. So you find it at least it was, you'd able to maneuver.
	(Nurse) Well, because there are those who are ready to help, let's say like they are the team leaders, you'll not, you'll not be stuck. You'll approach them freely. Let's say you're in a busy room, you're giving medication, you have IV fluids, you have transfusions, they will be there to help you. They'll even come asking how they're doing in your room. So when you are in shift with them, you feel you will not, you will not get burn out because they will be there to help you.
	(Nutritionist) I think good teamwork and as a leader, the leader of the unit should be very wise on how to handle her staff.... Wise means that you should learn your staff, all of them. You know that this one is like this, like that. And then even as you plan duties, you try to balance those equations. So that, you know, even with this duty, you have a strong point person, in case of anything.
	LD38: When a leader has active situational awareness (C) she will more readily identify lapses on the unit (M) enabling her to offer 1:1 correction and support to staff (O).
	(Senior Nurse) I think I've done quite... if I identify, sometimes mothers can come and talk. Sometimes you just observe yourself as you go around. So, such staffs, I always call them in the office. I sit them down, ask them in case they, how is, how are they fairing on? Do they have issues in the unit? Do they have issues about themselves first? So after establishing that automatically, some will say yes, some will say no. Then now I asked and deliberate towards, I narrow towards the problem. So maybe I just ask now, 'how is the nursery you are working on? How is work? How are the patient, how are the mothers?' Then I ask the person, now 'this day I observed, or today I've observed, whatever you've talked, or when you talked this and this, it wasn't right, was there a problem?' Or 'the mothers have just told me there was, there is an issue, is their problem?' So I talk to them. Then after I've established that actually they have a problem, we talk and see how to help one another. Some of them would say, 'me I am overwhelmed at home, I don't have a house girl, I'm really struggling'. So such a person, you ask the person, 'how do you want me to help you?' Sometimes they say 'me, my, I need my offs owing to sort out my issues.' And if my ratios are okay, I give them those PHs owing or offs owing for them to sort out. And they are those ones who say they want leaves, for those ones who want leave, I just direct them to talk to their other friends so that they can exchange, swap the months.
	(Nurse) Supervision, so she gets first-hand information, she supervises by correcting. [interruption] by supervision, when she listen to the report she can tell where there are gaps and she is able to ask why they are happening and to teach and...and... let people give direction on some issues. Then officially yeah mostly it's going and yeah.
	(Nurse) In terms of supervision, the supervision is usually done by the in charges but not always.... Most of the times they come in the room and see how maybe you have worked, there are things that were supposed to be done and they are not done, maybe they'll have to ask you... if maybe you're in a room where vital observations were not done, they'll...they'll have to be concerned about it.
	LD39: When staff recognise the value of an overseeing leader (C) they will proactively share relevant information with the leader (O) as they expect support for themselves or their colleagues as a result of the oversight (M).

	(Nurse) thankfully, you always have team leaders in every shift. I'd approach the one who's currently present just to, to hear their views. And then I'll be like explain how this is done, even if I know, and there is that person who mentioned how it's supposed to be done, so that I can have clear information on how I should be going about the filing of that document.
	(Nurse) And also now our in charge is in the office 24/7 for the day. She, she rarely leaves. And that's where also if you want to make a decision in your room, that's where you go. And also her she's able to communicate with us, one-on-one in the rooms. So I feel communication has really improved even in the care of the patients.
	(Nurse_) So the team leader's responsibility is that everything is running smoothly in the unit. If there is anything that needs to be sorted, any communication issues. In terms of resources, we have enough resources in our particular nurseries. Ensuring that she answers calls, ensures that the issues of the family centred care issues, if the mother has any concerns, that is her responsibility. Something that cannot be handled within the particular nurseries. So that is her responsibility to ensure that she oversees that everything is running smoothly.
	LD40: When a leader is proactive in information sharing with other cadres (C) this will improve situational awareness and continuity/ consistency across the whole team (O) because shared understanding has been gained (M).
	(Senior Nurse) So the spirit of teamwork, it's very good. And I think that one is motivating staffs. The way we are also working with the doctors. The doctors we have, they are good doctors, you approach them and give suggestion, you just talk and agree, there is not this one is learned, this one is not, we are all working as a team. What else can I say a motivator? I think I can say basically teamwork.
	(Nurse) Even on patient management you can be told like this baby should be... like if we have an infection, these babies are supposed to move to this room then another one says no this one, so at that point exactly where do we stand, so you get that from the consultant and the in charge so that we are at par and from there now you can also tell people it is this way and everyone it can be put on the wall, this is what we are doing.
	(Resident) Yes, or even the doctors that you're within the same cube, they can tell you or the seniors will tell you, "This and this is going on, this is what we do." Otherwise the, the other information is normally receiving from the seniors and also the team leader, then the team leader also will share with the, with the larger group.
	LD41: When staff are confident that their leader has taken responsibility for effective oversight of the unit (C) they will feel able to focus on and be effective in their allocated role (O) because they will know that the leader has allocated remaining roles and tasks to others, so that the overall goal of patient care delivery will be achieved by the team (M).
	(Nurse) Supervision. It's good. It's good. Thankfully you find even when okay, let's start with the team leaders, because those are the main, the main icons in the supervision. At least they go around the rooms just to find out if everything is okay, make sure supplies are there, contact the necessary offices. Should someone need help outside, outside...i would say it is cool, it's say, it's up to, they're up to task.
	(Nurse) Support... Especially, you are in a room and your supervisor is there. Maybe you needed to order a drug and you are to order some medicine or drugs for this patient. They have been ordered by the doctor and you don't have that time. Your supervisor is there to assist you and once you approach them, they do it and they order online and it comes to the patient. Also... You can miss something like tubes, like feeding tubes in the room. They are somewhere in the store and you don't know where they are. So, your supervisor should provide that. Once you consult them, they assist.
	(Student Nurse) So, I noticed for the nurses when they have any information, they give to, they give it to the team leader. We have respective team leaders of various shift. So, they would give information to the team leader and then the team leader will relay that information to the in charge, so that the following morning when, when, when, when we come, it is now the in charge who would tell us what happened; like a brief, a brief information of what transpired and the way forward.

Appropriate delegation	LD42: When staff are allocated to patients in teams (C) skills mix can be tailored to need (e.g. neonatal nurse) (M) thereby improving supervision, learning and patient care (O).
	(Nurse) ...one sio [not] character wise, if I find I'm in a shift where I'm the only senior nurse that one I'm not happy because I know in case of anything I am the only one. So I would want someone... a shift where we are... we have... it is more what? No...not having one carder we are mixed.
	(Nurse) Fresh graduates, I can say they are also, they're real eager to catch up, with whatever is happening. So when somebody comes, they're mostly attached to a person who has been here for some time, to show them the way. So after, maybe ... Yeah, it's official. You, you mostly, you cannot come in and you are shown a room to work. You have to be attached to somebody who will maybe show you how things are done, around..... Then you cons, if you bring a neonatal nurse you, it's seniority, I think you cannot tell a person who has not specialized, to orientate or precept somebody who is specialized. Because the job description is different. So they do consider the, the cadre and maybe the, the shifts that the other person is working in.
	(Nurse) You know like here, they have...when they are students, there is a clinical instructor in this unit who is allocated to students, but that doesn't mean that it is the work of the clinical instructor only, because the clinical instructor will allocate those students, and will take them around the unit to show them about the unit. What happens in the unit? But after that allocate them in rooms. Now when we are in the rooms, that is when we mentor them, we tell them if it is this, it is done like this. If it is observation it is done like. It is making fluids you show them.
	LD43: When a leader/manager is clear about their role (C) they will be less overwhelmed (O) as they will be able to differentiate which tasks should be undertaken by them, and which should be delegated/ allocated to others whilst providing support (M).
	(Nurse) Okay as a, when you are a team leader one thing you when support you have to give to the staff if you don't then you are failing, ensure the consumables are within reach. There is really... it is really very bad when a...a nurse who is in NICU with ventilated very sick babies having to come for things in the store. I should be able to make them be near them.
	(Nurse) Supervision, it does. Because when somebody is put at a team leader, you're the supervisor for that to work. You're supposed to be going around the unit, what is lacking, what is needed, as a team leader. In terms of mentorship, any new staff coming to the unit is normally allocated somebody. We are giving that person a certain period to work together with that person. And that person is competent to work alone..... Students, when they come in, we have been having a student mentor who has been with the them, orients the students, allocates them.
	(Nurse) My juniors like today we need to intubate the baby in one of the rooms. So, if the nurse in the room needs some requirements like the baby needs a mechanical ventilator, she has to liaise with me to see that we have received the tubing's from x so the baby can be intubated, I liaise with the nurse in the room to make sure she continues to resuscitate the baby and I talk to the nurse who is preparing the equipment I send the messenger to get the tubing's from x, so I have to co-ordinate to make sure that everything is in place so they can set up the mechanical ventilator then we connect the baby.
	(Nurse) In terms of supervision, the supervision is usually done by the in charges but not always....Most of the times they come in the room and see how maybe you have worked, there are things that were supposed to be done and they are not done, maybe they'll have to ask you..... if maybe you're in a room where vital observations were not done, they'll...they'll have to be concerned about it.
	LD44: When leaders can differentiate nurses based on qualifications and/or seniority (C) skills mix can be tailored for each shift, improving staff satisfaction (O) as it is easier for leaders to identify the range of skills within the team (M).
	(Nurse) AHHHH...Yes, you can come to a shift, and then you ask ...these people did not see when they were making the roster? Because you are the only senior nursing officer or the rest are young, they are young, they are junior. So, you can see when you know you need some advice, maybe regarding... they have, maybe they have called, they want to admit a baby, you know there's something you need to communicate with somebody who is at your level or higher. Not really but sometimes you can find that in the unit, you are the only senior one. So, they need to balance to get people to balance. That's what I mean
	(Nurse) When you have new people who are fresh from, when you find it's only one or two people most of the time, one or two people. And I feel like we are able to take them

	through. First of all, when it comes to now, how we've been divided into groups, I feel they won't miss somebody who's they can approach and ask. And also when they come, they're attached to someone, who is able to take them through how we work here. So when they're on shift, they work with them in the same room. Yes. I feel with that it brings out ease, and confidence.
	(Nurse) I can say it's good because like when we have a new staff, they're usually put under someone for like a month, so you'll find you'll be doing the same duties. So if you're in this room, you will be there with that someone, you show them how a certain procedure is done. Yeah..... Like a month..... Yeah, the students when they come, they are all, they have their supervisor and then when you are allocated with them in a room, you are, you are supposed to show them. So, you delegate, for example, you can tell them, you show them how a certain procedure is done and then you let them do.
	LD45: When leaders are aware of skills within the team and delegate appropriately (C) staff satisfaction will improve and leaders will have greater capacity for management/ support (O) because of empowerment of others to undertake certain leadership functions (M).
	(Nurse) There is teamwork. And then there's also equality. I feel like we are being treated, or the work workload is being, being directed equally according to now the persons like the person, the qualifications. Like now you can't be put in, in ICU and you know nothing about ICU, which I feel is okay, to make everyone feel comfortable with that. There's teamwork, there is the equality.
	(Senior Nurse) Supervision, eh, it's a responsibility of all of us, and far more the team leader or the ward manager. And you see, you can't be able to supervise alone or to manage alone. So I have identified mostly senior nurses who have experience in the unit. And have delegated. Delegated, because since I can't be able to do, yes, I have delegated some of them . I tell you, you are going to be in charge of consumables. Ensure when they come from the store, you check the (ordering form), confirm. Ensure they have put well, and they will be entered in their consumable book. And ensure, be checking sensitize people, when somebody picks things from the store, has to document somewhere. Then I, I delegate somebody. Your work, you will be going able to check whether vital observations are being done. So it's like targets have given people.
	LD46: When a leader does not delegate appropriately to others in the team (C) staff satisfaction will reduce (O) because their skills are not being utilised/ they are not being trusted to engage in leadership (M).
	(Nurse) The other thing, recognition.... Yeah. Sometimes you're not recognized. You've gone for training, you've gone for those higher diploma but, maybe you've gone to degree but it is not recognized.... You go to the same place.... Where you came from, yeah, so there's no motivation. Okay, even if the NMS is not motivating you with promotion or salary increment, but at the facility you need to see some recognition.....Maybe you can be placed in a, in an area whether you have Yeah, that matches what you've learnt.... Mm-hmm. Even if you don't have an ICU unit you can, you can find a place where someone can feel a bit recognized. Yeah.
	(Nurse) coz now if you're the in-charge, and you ask a very junior nurse to work for you,... to take up your role. You don't come to work that day.... you ask someone very junior to work for you, who is still on probation. I mean, what is that?... you see now.... so, that's what I mean.... but to me, it's looks very unusual.... but to me I find it very unusual, to do that.
	LD47: When a leader does not adequately delegate to others in the team (C) the leader will be unable to perform their role effectively, leading to staff frustration (O) due to overwhelm and subsequent perceived inaction of leader (M).
	(Nurse) Yeah, it can be improved, let's say Nurse in charge is the only one there and the X, but I think if we can subdivide, let's say there's a, there's a, instead, instead of waiting for (name, in charge) to come in the morning or during the day, we can have some small groups, someone sort of maybe let's say team leader or certain, yeah, while when you're working you can, you can easily air out one, two, three out there so that, not that you are the one on duty and also the same person going to other departments looking for whatever that is not there.
	(Nurse) It's not bad. Okay, depending on which, which if it's my immediate supervisor, she's normally patient so she's advising or supervising us there, but sometimes when overwhelmed (laughs), you can really be a dictator, she can be, she can be harsh. Of course, you have to understand because there are some matters which have to be, to be attended to and there's expectations on the course and I take them positively, I take them positively.

(Nurse) So maybe, you know, there's, there's a specific person dealing with specific things. And they're not around. They don't do not want to disturb them when they're away. So such time is you may miss the information..... there could be somebody, but they also don't have the, the, the whole, the whole information. There's something missing.....Sometimes there are bacteria filter missing..... And there's somebody who really needs..... Yeah. So you may ask and you look for it, you can't find it. And maybe somebody knows, maybe they're aware they're not in supply in the hospital, or they are they are placed somewhere maybe where we don't know. So sometimes you can miss such kind of information. On the clinical area, you may be needing maybe, there's a way we prepare dextrose from maybe 10% to 5% maybe 12 point something percent. You may ask somebody, they, they know the, they know the formula, but not a hundred percent. And somebody who knows maybe where the chart is or where the file is kept, it has been misplaced. So you may get, sometimes you may get something missing.

LEARNING	
Structured learning on unit	LN1: When information/ clinical guidance is communicated through a formal meeting/ CME (C) it promotes common understanding of best practice within the team (O) because the information can be disseminated and legitimised (M).
	(Nurse) Well, in this situation, they are always offered opportunities during seminars to go to gain more knowledge. And during the continuous medical education, they are brought to the level where they should be able to understand what they didn't get clearly. Yeah, so continuous medical...
	(Senior Nurse) Then the CMEs that are held every Wednesday. Yeah, the new information is delivered there.
	(Nurse) Now...now that one is something that is communicated in meetings and people are told like irregardless of how busy you are this is what is supposed to be done. So maybe she'll also tell you personally... that there is a gap here, there is an omission that you need to correct.
	LN2: Where mentoring immediate juniors is an entrenched norm (e.g. medical team) (C) continued supportive relational structures (M) will lead to trust and enhanced learning (O).
	(Resident) We are being supervised by our seniors. Most of the time the fellows, the consultant, yes. Let's say a more of a mentorship kind of a program, yes, and that's observation with, yes. So that is the main thing, yes. And most of the time you the, the fellows and the consultants, so they will mentor us, they will teachers, they guide us, yes, kind of a family.
	(Medical Officer) So, for the MO interns we are supposed to mentor them anyway. So we kind of if they don't... we tell... like we do CMEs as well..... before they present they send us the presentation... correct them stuff like that.. then even among ourselves. Like maybe... maybe not just me we correct each other
	(Resident) When you're new, you are oriented for two weeks where you shadow the senior residents....You shadow, you shadow the senior residents for two weeks. So, you're not allocated any room alone, and you shadow. So I think that really helps in orientation. Every morning, there will be a ward round for the newborn ICU, for the NICU. So, there'll be a ward round which I think is good because you can get a lot of feedback on how you manage you manage you patients. Then twice a week, there's ward round for the other rooms. So, I think the supervision is pretty good. Then there are always fellows in the unit, so they also supervise you.
	LN3: When unit staff must assess students (C) teaching relationship will be influenced (O) as staff will require awareness of student competency, and students will recognise power/authority of staff (M).
	(Nutritionist) Yes, because at the end of the week, you're also supposed to do an assessment, to fill for them an assessment form regarding their performance. So, you should supervise everything that they're doing, if they're doing something wrong, you're supposed to be there to correct them.
	(Nurse) No, they are assessed now from the units. Say students are in this department, the in-charge now assesses them and gives the feedback to the student mentor.
	(Resident) There is a clear understanding that we're here for just a time and then we are being evaluated at the end of the rotation. So you also are very keen not to ruffle feathers, so you want to do your best and leave. Because every place has its own culture, there is a way people have been working before you came, there is a place they'll continue to work. So for the three months that we are there, you don't want to, yeah, you don't want to ruffle feathers too much. So, I would say no..... Like I told you with the other example that someone, someone would not, if I ask for some nursing assistant and the nurse is tired or doesn't want to do something, I will not push. Sometimes that can end up in a, in a mortality. But I'm here for three months and I'm here to get my marks and to go. So, I will not push, I will not fight because they are hired here, they are paid. I'm not paying, I'm just a student.
	(Resident) The consultants because they're the ones to sign me out and to give me marks.
	LN4: When there is no clear go-to person for students on the unit (C) they will be unable to share questions and concerns with staff (M) leading to stress and misunderstanding (O).
	(Nutrition Intern) ...yes, coz they approached me about it, and they were really disturbed about it, but, unfortunately even I, I told them that is what happened, and I explained

	that maybe that's how it's been normalized, and he was like, if, if I...., she was so appalled by it, she was nauseated with everything. And I was just like, I don't know what we are supposed to do! Cause like the people that we would have approached, you know, with this behaviour, are the ones who are present when these behaviours are happening. When these words are being said, they're present in there, and they are like, and they just laugh it out. So, you are like, okay. I guess that's the new normal, and you just move on.
	(Student Nurse) ...nobody shares that with you, like, you're not told on the first day that if you have this and this, this is the channel, you can talk to this person, this person. I've never heard that.... so, you get so stressed, you don't know who to talk to... you don't know whether to continue with doing things as they, okay, you know they normally say, there is this quote 'kwa ground vitu ni different' (reality on the ground is different). .. what you learn verses what is being practiced are totally different things....
	LN5: If students and new staff receive orientation by unit staff (C) expectations and support are clearer from the outset (M) leading to improved experience (O).
	(Nurse) When they come they are told how to be responsible staffs and also knowledgeable. They should work as per their objectives and they should be, what's the word? They should be somebody should be ever there at work place should not be somebody disappearing.
	(Nurse) ..mostly the students are, generally, orientation to the unit... reminding them on their objectivity, their roles... their scope, and supervision.... I always encourage them, unless you're sure, don't do anything that you ain't sure. At least you seek advice, or you can do under supervision... you can give it a shot under supervision if you're not sure.
	(Nurse) .. first of all, we should have a...., when maybe, maybe when we arrive, there is the whole orientation and so, we get this what, we get these papers from school, like what you should do in the ward,... like your goals in the ward. What you should do before the end of the rotation. I think people should go, step-by-step.... looking at those different, those different goals set by the school, to reach your, to reach your goal at the end of the rotation.... they don't even ask for the paper these days....
	LN6: If training institutions do not follow up students (C) students who have poor commitment (M) may have very poor learning (O).
	(Senior Nurse) But for those institution, like the (school X) staff, students who come with the clinical instructor, they know that here we must learn. So if students are followed from school, they will learn. If they are not followed from school attitude, attitude, that I'm just passing by. And especially for those ones who don't have exams. They know, I'm just passing by, if it's work, I'll do it once I qualify, here I'll just pass by. So you get that these students, sometimes they don't learn.
	Observations
	LN7: When there is poor collaboration between training facility and clinical unit (C) lack of clarity, oversight, delegations, and responsibilities (M) may lead to a chaotic learning environment, discord, and frustration of clinical staff (O).
	(Nurse) ...first of all, we should have a...., when maybe, maybe when we arrive, there is the whole orientation and so, we get this what, we get these papers from school, like what you should do in the ward.... like your goals in the ward. What you should do before the end of the rotation. I think people should go, step-by-step.... looking at those different, those different goals set by the school, to reach your, to reach your goal at the end of the rotation.... they don't even ask for the paper these days.
	(Nurse) What happens, I think there is a slight gap when it comes to updates that you receive in the hospitals and what is taught in the schools, because you'll find students, some students still have what was taught about three, five years ago as procedures. So, when they come here, they find it totally different with what they learnt in school. So, if I will say there is that gap between the training institutions on updating themselves on the current trends and events. Yeah..... you find even a tutor will come and as, as you go around with them, taking them through your procedures, they can even find that chart, maybe on whichever medical obstetric emergencies, they can find a chart that you have, and they look at it, and they be like, "When was this updated?" So, but at least we appreciate the attitude that when the find this thing is new, they will always document it, somebody will take a screenshot. They will want to go and update on their notes as they teach. Yeah.
	(Nurse) Some they know some they usually say that they are learning in the ward so I'm not very sure whether they do learn in the school, because you see even some of the procedures, even some of the things that they meet in the in the room it's like it's very new to them.
	LN8: the way in which CME is structured (C) sets the tone for learning on the unit (O) due to demonstration of values around sharing of knowledge and inclusion (M).

(Nurse) but we also have CME, also have CME's Mondays and Fridays where if you have something to share with the rest or a piece of new knowledge, then you can have the advantage of the congregation and share whatever you want to share
(Nurse) ... having I think, having time, maybe the CMEs can be held per unit for everybody to get the information.... yeah, everybody can be there... it should be per unit, maybe, let's say today it's the general ward, tomorrow NBU...so that...., you know every unit has different issues...so, I think that will be for the best.
(Student Nurse) Seminars we quite often get being done within the unit because of a number of conditions, especially the several outbreaks of infections, it makes us have a lot of teaching and researches being done and therefore, we have been having, almost every month, we get seminars being done within the hospital. Yes.
(Student Nurse) There are some that are organized by (hospital). Then there was the one by the Pediatric Protocol Update, then we have the one by the WHO.
(Student Nurse) There was, there was a seminar on CPAP though that day I was not in but there was.... students attended. Yes, it was done in the unit even
(Nurse) Ok, we have if somebody wants to share something, we have what we call continuous medical education, the CME. So, if somebody wants to share something...Because we normally, let's say we have our report..., which is the general report about the ward where everybody converges. That is Monday, Wednesday and Friday. So, if somebody wants to share knowledge or update people on something will take advantage of those three days. Yeah,
LN9: Convening of staff on a WR (C) can facilitate collaborative working (M) improving awareness, learning and a shared patient care plan (O).
(Nurse) They're also nice, in terms of sharing information about the patient, although I, sometimes it'll not be written in details, but there is some sense of knowledge sharing. Cause in case you do not understand anything you will consult the doctor who was concerned, what is this and what, what does it entail? And they will gladly share.
(Nurse) So they'll be like asking what, what has been done to the baby since maybe the last round. If something has been done, if it's not done, why it's not been done. And sometimes they'll now they'll explain to you, further, why something needs to be done. Like why you need to do sugars this oftenly, why you need this done and why you need it done promptly not to be delayed.
(Nutritionist) The experience in the ward round is good. It's very educative, in fact, for me, after I attend a ward round, I can document a file without making a lot of reference. Because I know that in that ward round the doctor gave a summary of that patient. It also, assuming I came from leave, I've not been around for like two weeks or more, it can bring me up to speed for what is being done for those children, without having to, to peruse through the file. So me I appreciate ward rounds and I feel bad that now I cannot be in all of them at the same time. ... Mostly I listen, but if there's an input I occasionally step in, or if I'm asked something.
(Nurse) Yes, yes. We usually get because most of the time you get the updates of the current management.... Yes, mostly from the doctors or you know, it's a lot of so many people that going for ward round...Yes. So if there is an update of something, somebody with update will just mention it and sana sana [mostly] even the doctors they usually have everything on the fingertips
(Nurse)... it does. It does because it's attended by different cadres. So, while you give information then there is a consultant there maybe to prove, to prove the information, then clarify on the same.
(Clinical Officer Intern) Learning there is any time during the ward rounds... yeah. Even after the ward rounds maybe maybe lets say there's condition maybe that is like a bit challenging to everyone... We share thoughts together... Yeah then you come up with one conclusion.
LN10: When a consultant/ senior doctor and staff are physically present together on a WR (C) there is an expectation that learning and teaching will occur (M) encouraging staff/ students (O).
(Student Nurse) Like her ward rounds were so thorough. A lot of information about the, the baby, the file, the investigations. As in she would not leave anything unturned.... A lot, even during the ward round times, even if I'm not in that, like if she is in NICU 1, I used to go and hear what she saying.
(Student Nurse) The experience with the ward round was kind of, well, because they could discuss the diseases at a much, at a much, broader view, on how the condition is being managed. And they could give an history on how the previous management have been and the impacts of the management to the new born..... You were free to ask a question.... And they could answer you.

(Resident) Ward rounds are mostly a learning experiences, so you would give, you've taken the history, you give your treatment plan, you've done your investigations. So now, the fellow, the consultant when they come in, they're able to add on. Yeah, and you're able to now do better next time when you meet the same patient. Now you won't forget what you forgot in the first patient. You'll be like, "Now I'll do all of them," you know.
(Student Nurse) So, information when we learn a new thing you know during ward rounds, when we have the consultants coming in, the professor coming in, you know there is something new that they will always say, something that you had not heard before or something that you are doing wrong then you correct. So there is always discussion about a particular patient on the management and yeah. So when we are having a discussion as students, you can chip in and say, today the doctor came, this and this was discussed.
(Clinical Officer Intern) During the ward rounds ...each...each condition that we are let's say presenting to the consultant, to the MOs... The aim was the consultant most likely consultant they go deep concerning that condition. So you get at least from that knowledge that we had.... ...you are added some more. Yeah because lets say if maybe me I was interested to doing this this way but consultant asks by the way currently the guidelines have changed they are being done this way. You see that even you, you will adjust from the norm that you had.... Yeah because it's everywhere from the students, the nurses, the nurses... during the ward round there are the interns... there are the students and the nurses.... Qualified yeah and the MO.... So when the consultant is like telling us concerning or learning teaching us more concerning anything that maybe right now is a bit shallow to us... she expound about it all of us we gain.
LN11: When new learning is effectively disseminated on the unit (C) all staff/students will benefit (M) and patient care will improve (O).
(Nurse) Yeah. That's why we have meetings, so, during the meetings is when they teach us.... Or maybe they post in the WhatsApp group. Maybe if there is a pdf, we go through a, we go through it. Yeah.
(Nurse) mmmh, (laughs), I think am one funny person, because aaah, we have a group, so, there is this time we went for, (smacks), for nini (that), for training. That NEST training... and I found the information was very good.... and it was really needed in our unit, so, I just took all the material and I shared it on the whatsapp group.... so, I won't choose, because I know, you know, even this person who you don't feel like working with.. in one day or a time you'll find yourself together.... unaona (you see)? so, you have to equip him or her with this skill because you don't want every time to be, 'what do we do this? How do we do?', yeah.
(Nurse) Yeah. There's also management of bleeding, prevention of bleeding in post-delivery, I went for a training, came back and shared that information which has changed like almost, though we went like five of us, we shared the information at different locations, and it has really proved. That is what we practice right now.
(Nurse) Like I said like those training we go, maybe people did not have an opportunity to go, so not everybody goes. So those few who have gone will share knowledge. Mostly it's like that ...somebody will stand and say I went to such and such a seminar and this is what we were taught. You will share at the desk (nurses' desk), yeah.
LN12: When impact of implementation is tangible (e.g. reduced mortality) (C) staff will be encouraged (M) and implementation will continue (O).
(Nurse) coz for ETAT, whenever, even when you're alone, in case you're caught up in an emergency, you're good to go.... you just settle everything because you got the ETAT training with you.
(Nurse) Yeah, there are some times, someone comes to you and tells you it's not the way we do it these days, especially a demonstration, that is, we call it phototherapy. That is the treatment of jaundice. Before, we used to put so many babies in one place, in one photo box maybe three babies with one photo box. Later on, we came to learn, someone came to advise me, this is not the way we do it. Then I asked why. Because then, this person told me, according to the management, the latest, it is this way. If one baby, this baby will clear jaundice much faster than with the other. So I got it, I found it very positive, and I tried it and it worked very well. Although there are challenges, we have so many babies, you can't have every baby with one. Sometimes there are those challenges, but if you do the right way, especially the way I was advised, the baby improves within one to two days, the disease is clear. So I found it very positive.
(Nurse) There is improvement of care in the unit. There is reduced mortality rates.
LN13: If training and knowledge received is not disseminated on the unit (C) there will be a lack of awareness and consensus (M) leading to poor implementation (O).
(Nurse) Let's say on the side of implementation you can find that you're taken for training and the time that you've been taken for training maybe this nurse has not said that he

	or she is taking a transfer, she has kept quiet or you'll just be removed from that department and taken to another very different department, so you are not able to pass the information or whatever you learnt to the other staffs. Sometimes trainings it's very unfortunate, you know this is a big hospital, so when training comes its written administration first, so before the training gets to the department that is required, it is like 30%. So the administration person is the one who will go for that training and it's not easy for that person to come and give you that information.
	(Nurse) Because now that I have never gone and I've never been trained on anything, so I don't know. Because you see when you go, you'll learn as an individual and no one will come to tell you that this is what we learnt.
	(Nurse) Like, for example, if, if I'm right, if, for example, if you, you acquired a certain, certain information and you want to share it out to your colleagues, and then maybe you call them as in, "At this time, we're going to have a meeting, so we want to share whatever we've been taught and availability is a problem." Some now people start giving apologies, "I won't be I won't attend." Or even if it's just to discuss it through the WhatsApp, you find that now, people are not even contributing or even asking any questions. And you feel so discouraged
	LN14: When training is not specifically targeted or mandated (C) it may not be taken up by digressive individuals or people may consider allocation to be unfair (M) thereby wasting opportunity for correction and leading to disengagement (O).
	(Consultant) That is an area I am trying to figure out... am trying to have conversations on the side, and engaging individuals to see why, because for instance, as we speak, I can mention for you, maybe 2 or 3 people, who I find their skills quite lacking, their work quite unsatisfactory, and yet they don't come for trainings...I have discussed with the hospital nursing services manager and even the unit in-charge, and I told her that I would like to understand what their motivation is, you know...are there underlying issues, because sometimes you could be dealing with someone who is depressed... and you don't know. Are there underlying issues that we should look at to understand why: You wouldn't do the job right, you probably don't know how to, and you don't want to be helped! So that is being handled and I would like to understand more about it. The bulk of them are receptive, of course with a few challenges here and there...the bulk of them are receptive to acquiring new skills.
	(Senior Nurse) Yeah CMES we encourage people to attend the training like we do on job training like for example the CPAP setting the CPAP the doing all the machines the phototherapy. In fact we had a training we do it. Though they are not frequent but we try and we do on job training. Even when we are on duty you ask somebody if he or she is not familiar with whatever come, you encourage them while you are starting the machine or doing what you encourage them to participate at least they learn something. But still you will find those who still they are not interested, you know you cannot force them.
	(Nurse) Don't care attitude that I never went so I don't want to know about it. And number two I won't use it.... The selection may be unfair or maybe even the in charge may be seeing as if I can't, I'm not, I...I can't get anything from that, that education or that information. So it's like those who went let them do....They usually... Really they...they usually like now if you had gone for another training, the next one will come they will select other people, it's not necessarily that it's about the cadre or anything ...for them they are fair to me, to me I can say it's fair because even they are those who are going to be selected and say they say no. you'll just give out excuse and maybe you won't go but what we usually do is like there is this...this one like the one we...we just listened about caffeine is like everybody went apart from maybe you had some critical issues
	LN15: When the hospital is seen to support training (C) staff will have greater opportunities to gain new competencies (M) and will feel appreciative (O).
	(Senior Nurse) (hospital name) sponsors, me I have been sponsored all through. (hospital name) pays for you and releases you.... It pays for you and releases you. So they are those courses, even courses, seminars, training. Not all, you have, they are some (hospital name) pays for you, and releases you....Very relevant. I can't be who I am if it wasn't (hospital name). For my master's, (hospital name) released me and paid for me. If it didn't do that, I wouldn't be a master person because the money is too much. Or I might have had money, where do I get two years' release? So to me, I just appreciate (hospital name) for those release because without it.... it's too expensive, but (hospital name) releases and pays for staffs to go for the training, for one week, two weeks. So me, I can say (hospital name) is really doing good on the release.
	LN16: When posters/ protocols/ guidelines/ SOPs/ job aides are posted on the unit walls in strategic places (e.g. incubator guidelines on wall next to incubator) (C) they provide a trusted, clear, timely reference source and reminder of what should be done (M) and improve ease of work, continuity, and student and staff learning (O).

	(Nurse) Yeah, they are, there are work instructions in every room, they cover so many things. Maybe for example, let me start with the in brief three, the, the feeding, the feeding schedules that means the baby, those babies with tube feeding, cup feeding, breastfeeding. Okay. There is the kangaroo mother care, in the Bs, there is schedule on measuring or regulating humidity in the incubators. and there is a scope of, of things?
	(Nurse) For example like in every room, you find for example if it's incubator settings depending on the baby's weight, if it's how to do kangaroo mother care and the benefits of kangaroo mother care, if it's like neonatal resuscitation, the steps that you are supposed to follow.... Yeah, we have charts.
	(Nurse) I'm saying, like the work instructions, most of them are on the walls.... They are there in the walls. If it's doing a balance score, we have those charts on the walls. If it's doing the cooling therapy the charts will show you the minimum temperature. We have charts all over in the unit for different things.
	(Nurse) we have a, nini (whatever), charts, heh, on the walls,.... yeah. Only those charts, as well as we've got some guidelines in the unit.... yeah, MOH approve
	(Nurse) aah, the charts. We've got 'speaking walls'. I.. 'speaking wall'..... yeah. Those are the charts, the guidelines like standard management of neonatal pneumonia, neonatal sepsis,... charts on Apgar score, charts on fluid management,... yeah. Kangaroo care.
	(Nutrition Intern) there was, there was, there are this charts that are put in NBU. What was it grading? Is it the z-scores? There, there are just very interesting things in NBU... especially at the resuscitaer, there is something that they use to score, is it, something score, am forgetting the name of that founder, yeah, but there is that score that I found very fascinating and I just went to look it up like how do you assess this, how do you assess this, and, in fact the people in NBU there was a time we had a case that just came in and I just approached one MO and I was like, what do you mean when you people just calculate the z-score and go like, oh, this score was 8. Is 8 a bad thing or a good thing and how do you grade? How do you get to 8? And they were very open to teaching and they were like, so this is how we score, and we scored a baby together and I was like, that feels good...it actually feels good, but there was never group discussions
	LN17: When there is a lack of structure to meetings and other communication formats (C) information will not be shared effectively (M) leading to staff frustration and lack of unity (O).
	(Nurse) Late communication, is always communicated like, you'll find that we have a CME tomorrow, so to factor in in my plans is sometimes difficult. It's always like impromptu. It's not something that is planned like next week on this this day we'll have a CME on this and this topic. So, if I'm just told there is this CME and you don't even know the topic, yeah, it becomes difficult even to plan for it.
	(Nurse) I think if just proper channels like timely, timely time, timely kind of information. If a person goes for training for example, they give feedback immediately. So, I think that will improve the quality of care. And also, things like information from the top management to the department should also be done in a timely manner. So, timing is everything for me.....They are not adequate. Like we need to have more trainings, we need to have more CMEs because we only have a CME once in a week and sometimes you might not attend that CME, you are not at work, so you can't come from home to attend a CME, it's hard. And also, there should be like those many charts on information, charts and posters, such things can improve.
	LN18: When training is included in a CME (C) staff will consider the new information to be legitimate (O) because it has been validated by the hospital/ unit (M).
	(Student Nurse) Okay, if, if someone let's say finds something new, I can give for example, cooling therapy, they have to, they have to give a CME on the same CME
	(Student Nurse) Yeah I see... I usually hear people around CME sometimes you might not see people and then you hear they are on CME.

	(Nurse) The person who is ready for that, normally. There are some we say this thing, they have changed the protocol, but he's not getting what you're saying. So, there's is somebody who is very much, very much in need of that, you can share with that person. So, we can't just say it to anyone else, because some they don't want new things from you, they went to go to the CMEs so that they can get the knowledge. But something you have read it has changed, you say you have read the protocol, it has changed, this thing, they do this and this. He's not going to take that information because she or he can tell you, "Have they called CME to change that thing?"[Laughter].. We need a CME for that.... Yeah, yeah, they want to be called, to be told the protocol has changed, management of this has changed this, you see now?.... People prefer the CME more than just from the internet or such..... Just the culture I think, because they need CME. CME has to go round everybody to attend, that's what they want.
Allocation of learner to teacher	LN19: When staff deliver ad-hoc teaching to students/ juniors based on opportunity (C) practical on-the-job learning can occur (M) improving satisfaction of learners (O).
	(Nurse) I think uuhm, but it's not a routine, maybe once in a while, we get time where, an in-charge teaches students.... so, for those who are not there, we're told to pass the information.
	(Resident) Yeah. we used to also have some teachings in the newborn unit. So we'd have some skills teachings, some skills teaching like for intubation, giving surfactant... that would be given to us by the fellows or the consultants.
	(Student Nurse) So, for the doctors, most of it we were observing the procedures. Like for example, the intubation, the tracheal intubation process, we were also, sometimes you could go and check how they do surfactant; that, that is a procedure. So while they do, they explain to us, you learn and at the end of it, we again, we gain knowledge and experiences, yes.
	(Student Nurse) within the NBU. Like X was very willing to teach, even Y, Y would teach you, actually, ni vile tu (it's just that), delivery modes ndio ngumu (is hard) but she.... she would, actually, ukiwa (when you're in) shift with her, after doing the days or the shifts duties, she would sit you down and like tell you, today let us discuss this..... this condition or let us discuss this procedure.... call us as a group, yes. Actually, she's the only one who would take that initiative of calling all the students as a group. Like, today I want you to learn something... let us discuss CPAP or let us discuss phototherapy.
	LN20: When students/ junior staff are allocated to a specific staff/ senior staff (C) supervision is integrated into delivery of patient care (M) enhancing learning and sense of belonging (O).
	(Resident) Students, yeah, the students that I'm allocated with, because you see the students are usually very many and our unit is very busy. So the students that you are allocated with, obvious you will guide them, so you will be in constant communication with them.
	(Student Nurse) Then you'll tell the nurse maybe you are allocated together, the nurse you are with, this baby is not well maybe they could just increase she could... the baby to be put on the photo for some time because the jaundice is still there, and you'll find that the nurse will take your... will take into consideration and ensure that the baby was put on photo.
	(Nurse) We just engage the students in our work. We engage them. If you're doing something, you make sure that you, you, you involve them in your work. ...Like, if you are, if you are top tailing, you top tail with them, after finish, after doing it together, you assign them a baby to top tail, so that, to ensure that ... So that, to ensure that they've learned.
	(Nurse) when you are allocated student, you do communicate. Like you instruct them what's supposed to be done, how it's supposed to be done, and also you, you observe them on what they're doing. Try to correct. Try to encourage something they've done correctly.... We do delegate, maybe preparing of fluids, doing vitals. Yeah. Such things.
	(Student Nurse) So in in our case, we used to have a licensed, a registered nurse in this specific cube you are allocated to, so that will be our supervisor at that level.
	LN21: When students/ new staff are supported to undertake duties/ procedures relevant to level of training/cadre in psychologically safe environment, e.g. be "hands-on" through return demonstrations (C) they will gradually build their self-confidence through supervised practical learning/ exposure (M) and will become competent (O).
	(Student Nurse) The, the primary nurse, who you've been put up with, supervises you

(Student Nurse) I'm saying, if there's a procedure, a nurse can just begin the procedure as you observe, then if the next baby will need the same procedure, it will be a return demonstration.
(Student Nurse) first time I used to observe... The second time, we used to gather the things in the trolleys preparing the trolleys for the procedures to be done. .. Then after that I started now thinking I could do it and I tried first....Most of them I couldn't make but as time goes by I was good in it and I was okay.
LN22: When students/ new staff receive supportive supervision (C) fear of the intimidating/ unfamiliar clinical environment is mitigated, e.g. small babies (M) improving confidence and competency (O).
(Student Nurse) The fact that you were being, like, the fact that we used to do like hands on. That one, like it would, you know there was a time we were new in the unit, you could just see a small baby and you are like Lord! they are putting on her NG, but now after staying for a while, you are doing the NG, you doing the feeding, so, you are like, "So, I can do this." So, the confidence is build.
(Student Nurse) Yeah. I can say all of them, most of them, if not all, like they had to, they, they're the way they used to think about these small kids, that they're so fragile, they can't, as, you can't handle them like this, like they, right now I think they're more confident on taking care of these small, small babies.
(Student Nurse) Yes, That is something I can say, (name of hospital) is doing best is our student? To have confidence in themselves and that part I can give them 100%, you see we come here with fear but when you are exposed to the same situation in week one, week two, week three, this one is doing this, that persistence gives you confidence. So, when I leave here, I know I will be a more competent nurse than how I came here.
(Nurse) I can say, you see when, when, when people are new, when the students are usually here, they usually don't want to touch anything, not unless you show them because they are afraid maybe these babies are too little, they are fragile, and they don't want to mess. So, they usually ask first what, we show them. If it's like inserting a tube, they tell you, "Sister, show me how are we supposed to insert because we don't want to mess with the baby.
LN23: If staff are overworked (C) they may feel that students are a burden (M) and may not be able to adequately teach them (O).
(Nurse) Because now some of us we are busy. That one requires somebody who is just free to teach them on most of these things. Like our ward we're very busy, we just tell them one, two, three, we start medication, we start this and this, we don't have enough time to teach them. It requires a lot of time. By the time you're finishing your work, it's already 1:00pm. So, there's no enough time and that's why I said they need that mentor to come to the ground to teach them well, to demonstrate some of these things, it requires a lot. So, you are two of you on duty, you can't get enough time to teach these students, to support them.
(Nurse) ... aah, basically, we never used to interact that much... coz they had a lot of workload..... they had a lot.... they are either writing.. inserting IV lines...
(Nurse) heeeh! Sometimes it's hectic, let me say that... sometimes it's very hectic,... because, you see, when a, you're given like, 7 to 8 students, and they're green.. so, you have to teach them one by one. So, it means, that day, you're teaching,.. and you're giving care..... so, you're tired double.....yeah. Heh! It's hectic.
LN24: When there is inadequate clinical supervision (C) some students will practice beyond their competency (M) leading to poor learning, cover-ups, risk of patient harm, more work for staff, and student second victim (O).
(Nurse)... for the students, it's not that much, students are given like the leeway, as in, it's almost same as just staff, in that, in that the supervision is only to ensure that they've name tags, uniform, they report on time, they leave on time.. but, basically on a clinical aspect, there's no supervision that much.
(Student Nurse)... I think, the first week now was a bit shady shady.. coz we're not nini (what), we are not, you know what, we are not what? We're not yet knowledgeable.... in the routine. But once we got the hang of it, I would say, we improved the quality of care of those kids. Coz, you see we are many,... we are sure that each and every child is looked at, is taken care of, as opposed to like when they're alone, like, at night, it felt like maybe this azimio babies, these kids who are homeless.... nobody shughulikiad (took care of them) them, coz the nurse was one... mmmh, so I'd say, we improved quality of care.
(Student Nurse_NBU_H2) Delegate and go to the tea room. And once you just do something wrong, they'll come and reprimand you. And yet they are not around to guide you do these, these and this.

	LN25: When there is low staffing (C) supervision will suffer (O) due to patient load (M). (Student Nurse) But some other nurses, their tendency may be the supervision is not much, and I do not know whether it is the shortage of staff. Because I am assuming when you get into this room, I have like 13 babies and I am just reading the notes and I so this nature (short staffing), as much as she wants to supervise you more, it will be, it also becomes a challenge. (Senior Nurse) The first year student, first year student. So that one you find, most of the patient care, they don't know. So you have to be there to monitor, to teach. And sometimes there's shortage. You can't, you don't have that time to follow student to teach. So you find that it gets to a place staff neglect them, now I will waste time, to train, I don't have time, I do what I'm supposed to do, let them stay there, maybe I'll train them on their OBs, so, that they can do the OBs. LN26: When students feel supported by staff (C) they will feel at ease (M) improving satisfaction (O). (Student Nurse) Like she, was very understanding to the students very much. I remember there this time I didn't show up for the shift because of some reasons, I couldn't avoid, but now my mistake was I didn't communicate to, to her directly, I sent a student, but she never delivered the message. So the next day, when I came I explained to her, but she didn't have an issue, she was like, it's fine. (Student Nurse) Yeah, most of them, it influenced them because of the working environment. Cause we had access to everything, and also the nurses were supportive. You know we had much access to information, now it was kind of positive to us. (Student Nurse) The have very good listening skills...when you are not getting and they are explaining maybe the work was too much, ... they tell you go for a break then after that you come back and maybe you'll start your work more with a fresh mind, yes... Yes, considerate. ...About them they were also during break time or tea breaks... during maybe we are documenting they will tell you why, they educate they tell you why we do this, this is how you do it and explain to you why we do this way. LN27: When there is an assigned clinical instructor (C) students know they are monitored (M) setting an expectation of learning (O). (Senior Nurse) But for those institution, like the (X) staff, students who come with the ... with the clinical instructor, they know that here we must learn. So if students are followed from school, they will learn. If they are not followed from school attitude, attitude, that I'm just passing by. And especially for those ones who don't have exams. They know, I'm just passing by, if it's work, I'll do it once I qualify, here I'll just pass by. So you get that these students, sometimes they don't learn. (Nurse) ... they usually come with their lecturer....Yeah. Clinical Instructor, their clinical instructor. Yeah, she's usually, she's usually here... Now, I'm not talking on the (X) students. But now the (X) students, we usually have a, there is a nurse who is usually allocated students. (Nurse) The...the...the students they have a clinical instructor who always have eyes on them and there's also a nurse from the unit who is also allocated to deal with the students. There is also the doctors and the primary nurses in the rooms who also guide them... The primary nurse supervises... they...they allocate the student to patients; they tell them what to do.. they... they also supervise when they are working... so that they are sure that whatever is being done is the correct thing. Yes, and they also teach them a lot. LN28: A clinical instructor (C) can enhance student learning (O) by setting expectation, admin and pastoral care, point-of-contact, induction, practical training in procedures (M). (Student Nurse) The one I valued the most was our instructor, student instructor..... Because you see we have manual, our student manual is there, so it's like we refer to the student manual. Like likewise to her. So, I would prefer an information coming from our instructor, yes, and even the in charge. (Student Nurse) Yes, Clinical instructor. She is the one who introduced us today to the unit. The way she tells us to behave the way we behave, but with time you come to learn different behaviors from different primary nurses and primary doctors then you get the right behavior. (Nurse) For students, we have someone who is in-charge of students, the clinical instructor. So like for X students, you have the clinical instructor from the School of Nursing, who normally comes with them. She takes them through a group. ..Yes, in case they have challenges, something that they need to be taught. They have talent. The other students we initially had (Y) who was taking them through their orientation and their expectations and was answering their questions in detail.

Student initiative	LN29: When mentoring is successful (C) it is valued by both mentors and mentees (M) leading to satisfaction and personal growth (O).
	(Resident) We are being supervised by our seniors. Most of the time the fellows, the consultant, yes. Let's say a more of a mentorship kind of a program, yes, and that's observation with, yes. So that is the main thing, yes. And most of the time you the, the fellows and the consultants, so they will mentor us, they will teachers, they guide us, yes, kind of a family.
	(Consultant) ...Very fulfilling. The best thing is to see your mentees grow, become significant... having them make significant strides, even better when you see you have made a mark in their lives. I think that is the most fulfilling thing. I have had the privilege to have at least people I have mentored, and years later we later met and they told me 'had you not told me...' it is very fulfilling and it takes you even through the rough patches (laughs) and it makes you say, 'i am not all that bad, I have grown some good ones...it was not in vain after all! Yes, so that has been my experience. I cherish mentorship, and I would do it over and over again. I always prefer mentoring over supervising, I do not know if you get the difference?... because I find that mentorship lasts a long time and it is more permanent than when you are just supervising. When you mentor, you mold someone's perspective, than and you encourage them to rise rather than when you are just telling them: write this, do this... they become themselves and take up and go one.
	(Nutritionist) it's quite a good experience... yeah. Am, am always happy when I mentor somebody,
	(Resident) Okay, me personally, yes. The paediatric unit had allocated as mentors as we started the program. So,... Not fellows, they are consultants.....Yeah. And I would say my mentor is good, because we've met about three times to just discuss my experience I made and what my plan is and what career, yes. So, I think it's good.
	LN30: When students are proactive (C) nurses will be more likely to teach them (O) as they do not have to spend effort rallying students when they are already overwhelmed with clinical work(M).
	(Student Nurse) mentoring, I would say, mentoring? Okay, a little, a little bit..... I don't know if they're overwhelmed or,..... that's why they don't mentor as such..... yeah. But if you'd ask, you'd get, but they would not take the initiative to..... but maybe it's because they're overwhelmed or something..... the support is there, when you ask for it. it has to come from you, yes.
	(Nurse) ... And also it's the student's initiative to be able to want to know what they'd want to know. So I feel like the nurses are always willing but now it's, it's upon the students because you are overwhelmed. You can't work and still try and mentor somebody. And even them, they're not willing to even ...
	(Nurse) Yeah, you tell me sister I want to learn how to give medication. Sister I want to know how to put an injection. I won't be telling you that now because I'm working. I'm supposed to teach you on job. If I am doing a procedure and you decide to sit down or go outside to receive a phone call, I won't come looking for you to find you and teach you.
	LN31: When learning is self-directed and based on personal initiative (C) students and new staff will be proactive, or observers, or do the bare minimum (M) leading to spectrum in learning – from hands-on and ready to work, to not learning quickly, to avoidance and no learning (O).
	(Student Nurse) Yeah. But if you are the kind of person who, you, you know what you came here and you want to gain something from the experience, you'll just go to ward rounds, even if you've not been allocated there, like it was your own initiative, if you don't have that initiative, you'll come take the vitals and leave, the next day vitals, you go.
	(Nurse) Most of them are green, somewhat like okay, some will find that they're willing to learn others.... Okay. I wouldn't mention the institution....There are those students who would come, who are willing to learn. Others are busy dodging, for those who are willing to learn, you know, at least you, you know, by how they want to assist you in doing something, they're teachable. You'd carry out procedures together. But some, when it gets to another time, it's almost end of shift. They just, like, they won't even tell you they left, you just find them missing.
	(Nurse) For the students, the challenge is some don't want to learn, some are willing to learn. Some come, clock, they just loitering in the unit. Others come straight and they want to ask and learn. There are different aspects.
	(Nurse) ... like the students, si I said there are 2 types of students. There are students who are good and there are students who are just there for the rota to end... so, if you find these good students, today you teach them, tomorrow you're with them, and after 2, 3 days, you see a very big difference, they're doing the right thing.

	LN32: If a person is not motivated to change, or their motivation to attend a course is not primarily for learning (C) training received will not be implemented (M) and no change will occur (O). (Senior Nurse) Sometimes I went to the training because I wanted to get off the ward, I was stressed by the in charge, so I applied to go for nephrology, but my passion was not for that course. So, I went and studied it, now I'm through, but I don't want to work there. (Senior Nurse) I think, for those people, they have positive attitude, you will do it, you will apply. But you know there are other people who come from training, it's like they did not even attend anything. And others just, they continue practicing their former practices than, than whatever they've acquired of which they should be bringing a change. (Nurse) IPax: So, like personal attitude is like if that person feels like.. me ...I don't want to do it now...they keep on procrastinating, I will do next time, those are things personal to a person.

EQUIPPING

Physical environment intentionally enabling	EQ1: Where there is a low staff: patient ratio (C) overwhelm of staff (M) will lead to shortcuts, workarounds, missed care, mortality (O).
	(Nurse) Workload, when you're alone in a room with about 10 or 20 babies and their mothers you don't really have that time to really check on the mother the way she is breastfeeding and all that because you are also having, among them there could be a...a very sick one whom you are concentrating on. But having done the course and we usually do like the...the breastfeeding course, nutrition we usually... it is usually sponsored or...or taught by the nutritionist mostly and we have a nutritionist in the unit. So the only way to sort out that is to link the mother who requires any assistance with the with the nutritionist. Otherwise as unit, as a nurse you are not able to do it and maybe later as you continue not doing that you kind of forget.
	(Nurse) aah, for our unit, we are sixteen... so currently we've got like 3 on month leave, so whenever we find ourselves like, whenever one falls sick, like has a sick off... there's a massive shortage. You find yourselves like one nurse taking care of 60 neonates. Definitely as much as you try, you won't give quality care because of, that large number of neonates. You can't give quality care.... coz of, you'll be distracted. As in, you'll have to divide yourself into, into 60 parts
	(Nurse)... But you might find yourself you're so busy with everything with you like you have so many babies. By the time you start your management for this one, you go to this one, you go to this one, and when you go to the other one who was prescribed something else, you have not done that, maybe that, due to overworking, that can make or really hinder you not to do what is right
	EQ2: When there are insufficient staff and the unit is busy (C) managers may perform a patient care role (M) and neglect managerial tasks (O).
	(Senior Nurse) But most of the time it is burnout and time and shortage so you don't even... you can't even create an opportunity to come and sit down and discuss with your staff.
	(Senior Nurse) Okay, what I'll say, as per X, rarely do I perform those duties of a X because most of the times I do hands on and in fact I don't, I rarely do managerial work [laughter].
	EQ3: When equipment is insufficient on the unit (C) workarounds will be employed (O) as best practice is impossible (M).
	(Nurse) For example, okay, for example, if, if you have, let's say five babies who are jaundiced, you need to, they need, they need phototherapy and you know very well, they phototherapy machines are few. And you're forced to use one machine to be shared by, let's say, five babies or four babies, you know very well, they'll not be getting enough
	(Nurse) Probably in the use of equipment's, for example, CPAP. There is a time you find that the, there are missing parts so that we can get a complete one. So you get someone telling you, by the way, it reaches at some point, if you go, someone tells you, if you missed such a part, use this, it's an alternative, and you do exactly that, and you see it works. The same way in the other rooms, especially in when, I was in admission room. we used to experience, sometimes you find it may be as a little or small part like this, but it's very important in the, in the functioning. when you go to another room, you find someone is like, how do I work out to this, you tell them, take this, and you see them take it and it works. That's, I, I'll give that as a most clearest example, that you see at least you can actually see that it has followed through.
	(Nurse) As in, you see in class you learn too much theory. But now, in the clinicals it's the, it's like the real... Yes, the real situation. Maybe in, in class, for example, if it's inserting, like a certain procedure, the way you are supposed to set up a trolley on the top shelf, the bottom shelf, but now you come here we have no even those trolleys, so you have to improvise whatever is there to perform that procedure.
	(Student Nurse) Like us not having the VE packs you have to improvise by using the patients cotton so that you can do a VE instead of doing with the the sterilized equipment's.
	EQ4: When equipment is not readily available (C) staff will feel frustrated and may display blame/ incivility (O) because they cannot provide the care they want to and undertaking their job becomes very difficult searching for everything (M).
	(Nurse) With that also to being unrealistic, some things are unrealistic. Like you're being told now there's a certain medication, you're supposed to use a pump, and it's supposed to go for one hour. The pumps, first of all are not there. And now giving this medication with a pump, it, it's, it's just impossible.

(Nurse) That's what we are told to do. But you don't have enough. You must have boots, goggles and proper heavy gloves. But we don't have them as part of the organization. ...We've raised the issue, but they're saying that use whatever you have in place. It becomes difficult for us. But just try your best, that you don't get contaminated.
(Nurse) Yeah. Like I mentioned earlier, is lack of basic things, basic things like you can work, you can come even to duty and you find there are not even gloves, there are no syringes, there are no basic drugs. Yeah. And so, those are first line. So, if you're coming to duty, you're having to give medication, there's no medication, there's no syringes, so you feel like, "Have I just come to document that baby failed and retained?" So, yeah, and even the oxygen is not there. So, sometimes you even tell them, "Why can't you just close the unit, when you get this thing then we come back to job?"
(Nurse) Two, the negative also part is that sometimes we can come in labor ward then the first thing you're told when you enter is there is no gloves, so you're like, how am I going to work? So equipment's, may be today there are gloves then tomorrow you find that there is no gloves, today fluids are there and tomorrow they are not there, so equipment's tend to fluctuate.... So it kind of makes work difficult. You, you want to help out but you cannot, so equipment's also have stress.
(Senior Nurse) What another thing the negative part is when you lack supplies....Yeah you strain looking for this supply its hard.KWTRP: Mmh.MBT: But when you have everything in Place at least you are motivated. I think even in motivation is when everything is available. Whatever you want is available.... It will affect you because you will not want to deliver what you want to your patient.
EQ5: When equipment is kept orderly (C) staff will be able to locate what they need for smooth working (M) leading to greater satisfaction and smoother working (O).
(Student Nurse) Another thing is the environment by the way. And this, I can give it to the equipment guy again, because if you see how they are arranged, they are washed, they are cleaned thoroughly, and it's even appealing to the eye when, when, when, when, when you go into that maybe one of the cubes; you just see by, for yourself. Yes.
(Nurse) I should be able to make them be near them.... Available, so that they don't miss that. So when you come before you even... once you receive the report for me the first thing is usually take the things I know they will use very fast, even without a trolley, very fast put them there like suction, suction catheters I make them available and the gowns for wearing and then now I can come with my trolley and after I have done a quick check in that trolley, in the trolley where we put the consumable, what is really missing completely. If there are no gloves completely and the...there're no suction, I'll put them very fast then I come and now equip the rooms properly.
(Nurse) Me I am one person who likes about my safety then patient safety. If my environment is safe..... Yes, normally I do my own arrangement I know everything is ready before I start my work. Yes. So in case the information actually I want to ask is... be prepared for anything. When you come to workstation ensure your work environment is well equipped, arranged... so in case you have an issue you know where to get whatever you need.
EQ6: When equipment is poorly organised (arranged, stored, labelled) (C) it is difficult to locate the item (M) leading to workarounds (O).
(Nurse) Yeah. So you may ask and you look for it, you can't find it. And maybe somebody knows, maybe they're aware they're not in supply in the hospital, or they are they are placed somewhere maybe where we don't know. So sometimes you can miss such kind of information. On the clinical area, you may be needing maybe, there's a way we prepare dextrose from maybe 10% to 5% maybe 12 point something percent. You may ask somebody, they, they know the, they know the formula, but not a hundred percent. And somebody who knows maybe where the chart is or where the file is kept, it has been misplaced. So you may get, sometimes you may get something missing.
(Clinical Officer Intern) You just use what is there, sometimes you find the strappings are not there you are just there you want to canulate there is no strapping.... you go asking from other wards. Sometimes either the cannulas that we use are finished.
Observations
EQ7: When the person who knows the location of equipment is not around (e.g. at night) (C) staff will be unable to locate it (M) and feel overwhelmed (O).
(Nurse)... you have to go and borrow from the other ward, (chuckles).....if, they don't have, then that's all. (laughs)
(Nurse) Yeah. So you may ask and you look for it, you can't find it. And maybe somebody knows, maybe they're aware they're not in supply in the hospital, or they are they are placed somewhere maybe where we don't know. So sometimes you can miss such kind of information. On the clinical area, you may be needing maybe, there's a way we

prepare dextrose from maybe 10% to 5% maybe 12 point something percent. You may ask somebody, they, they know the, they know the formula, but not a hundred percent. And somebody who knows maybe where the chart is or where the file is kept, it has been misplaced. So you may get, sometimes you may get something missing.
EQ8: When an item is considered protected/precious (C) those who are considered to be overusing it will be blamed (M) leading to incivility (O).
Observations
EQ9: When an item is scarce and in high demand (C) staff may shout for it (O) because this is the norm (M).
Observation
EQ10: When physical areas are designated for specific functions (C) this will improve working processes (O) as staff will expect those tasks to be performed there and know where to find the necessary items/ paperwork (M).
(Nurse) You, you need to bring to bring them close, so, okay. I make sure they, they're well oriented to the place. Yeah. This is what we do. This is what we do, this and this when you want this, you find it here, such things. Just making the environment conducive for them.
Observations
EQ11: When the physical space in the unit is overcrowded (C) staff will find it more difficult to carry out their roles (O) due to lack of physical space to undertake duties effectively (M).
(Nutritionist) I've just said that colleagues who don't exercise teamwork as you say, you get in, and you see this shift, no, this will be a long day, or an environment that is not conducive. Like for now, I feel with all the things happening here, maybe they should consider expanding this place. How? I don't know. But it's not the best with that crowding.
(Nurse) Like You can't neglect baby because there is no space but at the same time the infection prevention is...its gonna be really hard like maybe they might share infections..... Increasing the like maybe bed capacity. Yeah.
(Nurse) cleanliness.... the place wasn't that clean. Maybe it was, it got washed once a day.... and it's congested
EQ12: When staff feel collective responsibility and sense of belonging (C) they will contribute to the order of the unit (e.g. clean, tidy, organise) (O) as they recognise the contribution of an orderly environment to provision of patient care (M).
Observations
EQ13: When patients are grouped in the unit according to their clinical needs (C) staff can be more appropriately allocated (O) as skills mix can be tailored to requirements (M).
(Nurse) OK. OK, I speak to colleagues when I am working, especially knowing NBU we are divided into rooms, and everyone works in their located area. So. For me specifically, I work in the NICU, and the Colleagues that I speak to are the ones that are located with and. Of course, the doctors that we are also allocated within the same room we I speak to them. I also speak to the team leader who comes to ensure that everything is running smoothly.
(Nurse) Yes. They in different room, like in NICU, at times in NICU 2. That's how the rooms have been divided. And also in terms of now, how they have, how they have, how is it called? How they have, what they are, they have narrowed down into, because they are neonatal nurses, they're also ICU nurses.... Specialization it is.
EQ14: When items and equipment are arranged/ positioned intentionally on the unit (e.g. different colour bins in same location, hand sanitiser on trolley, labelling of cabinets, gowns for mothers, etc.) (C) desired actions will be implemented (O) because 'the right way becomes the easy way' (M).
(Nurse) Me I am one person who likes about my safety then patient safety. If my environment is safe.... Yes, normally I do my own arrangement I know everything is ready before I start my work. Yes. So in case the information actually I want to ask is... be prepared for anything. When you come to workstation ensure your work environment is well equipped, arranged... so in case you have an issue you know where to get whatever you need.

	(Nurse) I should be able to make them be near them.... Available, so that they don't miss that. So when you come before you even... once you receive the report for me the first thing is usually take the things I know they will use very fast, even without a trolley, very fast put them there like suction, suction catheters I make them available and the gowns for wearing and then now I can come with my trolley and after I have done a quick check in that trolley, in the trolley where we put the consumable, what is really missing completely. If there are no gloves completely and the...there're no suction, I'll put them very fast then I come and now equip the rooms properly.
	Observations
	EQ15: When there is a unit telephone (C) communication between internal and external staff will be enhanced (O) as unit staff are empowered, and more accessible (M).
	(Nurse) mmh, I think there should be a telephone in every department.I.... like they are inter-connected. Like, let's say, if it's maternity, 911, just reach them.... I think there should be an information desk..... communication? For there it's just a notice board, and these posters....and having CMEs in the unit
	(Medical Officer) So we used to have that barrier which has been a bit resolved now coz we have a phone in the unit. So we have an NBU phone. So if labour ward is bringing like a preterm they tell us in advance. So we had that issue where suddenly babies were brought and we didn't know who they were.... But that has been improved recently like I think it's been like three or four weeks we have a phone.... So like referrals call now to the NBU not the hospital covering. Coz sometimes they used to call the hospital covering. Then the covering has not reached us to tell us such a baby is coming..... but now they call NBU directly. If the covering is called they call us on the NBU internal phone. ... We have like a phone for the NBU.....so I think it has improved communication skills. Yeah.
	EQ16: When the physical environment appears to require particular actions, e.g. waiting area, signing in book, hand sanitiser with sign (C) desirable actions are likely to follow (O) due to communication of clear expectations (M).
	Observations
	EQ17: When different cadres/ sub-groups sit at different tables (C) boundaries are enhanced (O) as identity/ difference/relative power is demonstrated (M).
	Observations
	EQ18: When physical information is accessible, specific and clear in function (e.g. manual, communication books, guidelines, handover book) (C) it is a useful reference source (M) to assist staff/ students in their work (O).
	(Senior Nurse) book in the unit. Where we again, document anything apart from, we are CME is about the teaching, but any communication, sometimes as the ward manager, we are called for meetings, the departmental meetings and we are briefed about the hospital and what is happening. So we are given knowledge from those meetings, and we come at the next nurse's desk and communicate, give the information what is happening, what is our expectation. And whatever we communicate, since it can't be able to reach all of us, we put it in the communication book.
	(Nurse) Okay, what there is, we have the protocols of management of a baby. Of course, even if you get maybe advice from me, we always refer to be sure..... Yeah, we refer maybe it was a management of a certain coordination everything is in that protocol you can discuss and maybe after whatever is settled we also go to get more information... I will do it this way but when I get time I go to the protocol and try at least to peruse and see are we on the right side or there is something we are missing.
	(Nurse) there is a, what do we call? there is this book in NBU, there is a book in NBU about paed. I can't really remember the name, but there is a book. Stating drugs... different types of medical condications.. and their management.
	(Senior Nurse) Yes we have a protocol....That is what guides us in the care of our babies... Yes we have a thought the neonatal protocol is not yet out but we have some things but currently we are using the paediatric protocol.... But we have some soft copy for the neonatal we are not we are not yet having a hard copy.... So we are have protocols there we just don't work. We are guided by protocols....This protocol can guide that's why even a nurse can act in the absence of a doctor or a clinician or whoever because the protocol will guide you on what to do. At least you will not be left without a knowing on what to do... You refer to the protocol and act.KWTRP: Okay.MBT: Yea
	EQ19: When posters/ protocols/ guidelines/ SOPs/ job aides are posted on the unit walls in strategic places (e.g. incubator guidelines on wall next to incubator) (C) they

provide a trusted, clear, timely reference source and reminder of what should be done (M) and improve ease of work, continuity, and student and staff learning (O).
(Nurse) Yeah, they are, there are work instructions in every room, they cover so many things. Maybe for example, let me start with the in brief three, the, the feeding, the feeding schedules that means the baby, those babies with tube feeding, cup feeding, breastfeeding. Okay. There is the kangaroo mother care, in the Bs, there is schedule on measuring or regulating humidity in the incubators. and there is a scope of, of things?
(Nurse) For example like in every room, you find for example if it's incubator settings depending on the baby's weight, if it's how to do kangaroo mother care and the benefits of kangaroo mother care, if it's like neonatal resuscitation, the steps that you are supposed to follow.... Yeah, we have charts.
(Nurse) I'm saying, like the work instructions, most of them are on the walls.... They are there in the walls. If it's doing a balance score, we have those charts on the walls. If it's doing the cooling therapy the charts will show you the minimum temperature. We have charts all over in the unit for different things.
(Nurse) we have a, nini (whatever), charts, heh, on the walls,.... yeah. Only those charts, as well as we've got some guidelines in the unit.... yeah, MOH approve
(Nurse) aah, the charts. We've got 'speaking walls'. I.. 'speaking wall'..... yeah. Those are the charts, the guidelines like standard management of neonatal pneumonia, neonatal sepsis,... charts on Apgar score, charts on fluid management,... yeah. Kangaroo care.
(Nutrition Intern) there was, there was, there are this charts that are put in NBU. What was it grading? Is it the z-scores? There, there are just very interesting things in NBU... especially at the resuscitaer, there is something that they use to score, is it, something score, am forgetting the name of that founder, yeah, but there is that score that I found very fascinating and I just went to look it up like how do you assess this, how do you assess this, and, in fact the people in NBU there was a time we had a case that just came in and I just approached one MO and I was like, what do you mean when you people just calculate the z-score and go like, oh, this score was 8. Is 8 a bad thing or a good thing and how do you grade? How do you get to 8? And they were very open to teaching and they were like, so this is how we score, and we scored a baby together and I was like, that feels good...it actually feels good, but there was never group discussions
EQ20: When a computer is physically available on the unit (C) staff may use it for information (O) as they can access online resources (M).
(Nurse) Maybe if you read from internet, modules... Yes, or the computer that is there.
(Student Nurse) Outside you would go for books and you google because you are not allowed to use phones in the NBU. ...Yes, but you could use the computer for the nini. [the unit]
(Nurse) Well, there are several ways of getting information disseminated into the unit, because we have computers that we are having in the unit. Through these computers, we have email addresses, WhatsApp information, so we keep on updating each other about all what is happening within the unit. So at any given time, if you go through the computer, you will get some update and WhatsApp group information
EQ21: When staff feel comfortable with a colleague (C) they may directly call them on the phone (O) because they want to get immediate information (M).
(Nutritionist) ...my first choice is phone call... that is my first choice. .. if I, it's like, it's like.... one on one,I.. yeah. To ask for that help, and guidance... then eeeh, sometimes if the phone call is not received, I'll follow it up with ... with a text.
(Nutrition Intern) I think, for when I need information and there is, and there is, the immediate person cannot really help me, and my in-charge is not around, I end up calling....I just make a phone call and am like, there is this patient...., I consult over the phone and then I get help. There is no time I've inquired, and they were like, no hata mimi sasa hapo sijui tutafanya aje (even me in that situation I don't know what we will do), and then we were all there. More often than not, I get the help that I need, even if it means making the phone call and consulting.
EQ22: When staff/ students use their phones as a tool at work (C) they can access guidelines (M) to assist with clinical tasks (O).
(Resident) Yes, I do, yes. We use internet so many platforms, yes, to check and see, what are the new things, what do I want, what do you want me to read about it? Yes.... Sometimes if possible. If you want to check the correct dosage of this medication, yes, it's possible, yes.

	(Resident) Yeah, yeah. I remember my colleague would tell me, you know, maybe there's this book that we were, people have on their phones, it's an app, so she was able to tell me to go download it and I did and it really made my work simple. Because now it was an app in the phone and any drug that I want, I can just get it, because now the other times you be like, "Oh, what's the dose of this? What it the dose of that?" Now that I have it in my phone, it became so much easier and I was like, "This is good." Yeah. And I would also want to share that with everyone, "Oh, download this book, it's better, it makes saves your time."... It's a neonatal, neonatal guidelines app that people can get on their phones and it's a really good, yeah, especially drug indexes and... So, it's mostly the person who, the person who compiled them was a South African. So, I'm thinking Africa and, but studies were also these are, I'm sure he's collected studies from all over, but the person who originated it was a South African. So, I'm thinking it works more in Africa, but I'm not so sure. But it's a book, it's a very relevant book for all neonates.
	(Nurse) ...you go you check in the book; we have some books there what is the name? in the unit... in the phones again.....Yes, yes, neonatal guidelines.....Yes, so you have them. Yeah they are in the... they are in the phone soft copies yeah.
	(Nurse) Most of the time I use Google. When you are stuck, Google is the right.
	(Student Nurse) I usually go to Medscape.
	(Resident) ...internet?... Initially, very often. But then, as I went along, and learnt all the protocols like where to get all the necessary things, then I just had an app....There is one app for neonatology.
	(Nurse) OK there is also those small books... they are called booklets?.... Yeah, so like there are those guidelines. We were told everybody at least to download, to have a soft copy. So, I think most people have them on their phones, so maybe you can just refer them.

Orderly storage and use of clinical records	EQ23: When there is insufficient supply of stationary for patient records (C) staff will use workarounds (M) which will exacerbate disorder (O).
	(Clinical Officer Intern) There used to some some gaps. Because you know with the stationaries we use because they are well because with the printed ones you look like this they are well elaborated like this and this part you could find a bit of a gap.. Yeah.... I prefer the printed printed... stationaries Because we them, at least you can't. because you know... So you know the they are you are just filling... It's like a Q and A just filling so there's no way you can leave a blank page because even you yourself why have I ever left this page blank? ... Yeah. But you see with the plain paper, you can't... it's not that easy to remember let's say everything that is supposed be the way the standard way... You will end up missing some parts.
	Observation
	EQ24: Poor quality written records (e.g. incomplete, multiple, duplicated, missing IP numbers, etc.) (C) lead to distrust of their accuracy by staff and families if used as a reference source (M) causing compromised patient care and dissatisfaction (O).
	(Student Nurse) ...so, maybe, if they can just incorporate everyone working there, so that we don't make mistakes, coz by the way mistakes were coming, were happening, coz of lack of that communication. Somebody was told, did not pass down!.. somebody went...., actually it even happened, it happened to me.. with another student. We like double gave medication... the student did not sign.... so she gave and did not sign. But you see in nursing, if it's not documented, it was not done! ..So, me I came when I was now, like that day I was the team leader, so, when I was going through my treatment sheets at the end of the shift, (smacks), of drug medications...I saw these were not signed. So, I assumed this one was not?... given....I went and? [gave] ...sasa, kumbe (so, it happens that), there were 2 treatment sheets again! For one baby.... you see, kumbe (it happens that) she signed one, another one was in the file that is not signed....exactly, this one comes from the, the COs, they just write the, the doctors, they write these things, they hoard them.. ikishapotea, ama (when it's lost) they don't even confirm that it is lost. They write another one.....so, a child ends up having 2,3 T-sheets.... unaona, unaona (do you see, do you see) the dangers of that?... there's a treatment sheet file! But these doctors sometimes will keep these things in their files.... yes, in the baby's medical files....and they are so..., by the way they could not even give you the files, if you ask for the file..I..do you know the danger there? Those kids in that NBU just survive by God's grace, that's what I can say.....Nobody is even supposed to tell you, that is the gold standard from school. You know, whatever you do, you have to document. If it's not documented, it was not done!
	(Nurse) poor! Poor! I even mentioned. People don't even sign T-sheets. Mtoto anapata dawa, hujui alipata jana, hakupata jana, hazijasigniwa (a baby gets medication, you don't know if s/he got yesterday or s/he didn't, they have not been signed)! Nobody cares, life goes on.
	(Student Nurse) .. Yeah. You know sometimes because of the paperwork; you can misplace some papers.... Yeah, you can ask the primary nurse but when you go through the file, you can find that it is the paper that was written that is missing.....If it was, if it was, if it was history, you just come and take it from the mother..... You go back to the mother.
	EQ25: When written records are integrated into verbal exchanges/ handovers/ taken to bedside (O) their value and purpose will be enhanced and expectations communicated (M) and quality of records will improve (O).
	(Senior Nurse) Those ones I talk to them frequently, because most of the time I go to the bedside, and that is where I meet them and we deliberate on patient management, on documentation, on how better or they are feeling on the bedside.
	(Nurse) Yeah. When the doctors do the ward round, whatever plan they have said... they've discussed or they have decided, they normally write it on the file, so you as a nurse...definitely there's a round book you will write. You write on the cardex, then you will implement whatever was written.
	(Consultant) So I'll take for example, handover. Handover is actually written down. So you can read about the handover at least from the nursing perspective... You can read on the handover and be able to take over. However, there has been sometimes where when you do not attend a handover of course your care is substandard and that's now where the issues around 'you're going to write me a report' come in... Because you did not hand-over... Meaning that you did not receive the report. Meaning some issues are not being taken care of or some things are being left undone. Just the same way with the medical officers who are writing notes while I'm leading the wardround... if you do not note that I

am the one making those decisions, later on when you are being asked 'who made the decision?', you can't even remember because you did not note down. So incompleteness. There are times we actually do what I call a 'paper around' just to make sure that documentation in itself is being adhered to. It's encouraging that they [referring to MOs and interns] hand over and they come [to conduct a pre-round patient assessment] before the wardround... which I've seen happen in most of the time. Of course we have groups of interns who are a bit difficult, but generally, once they get used to that kind of routine, they sort of appreciate how life becomes a bit easier. Sometimes they are just handing over the notes to each other. This is the cardex thing... Number one to 10 has been done take over 11/12/13. So when you someone comes and says yeah, number one to 10 was done. So I'm following up on that. The rest I have done I am following up on that. So it's a bit easier even for them.
EQ26: When quality of written information is poor (C) staff will find workarounds to gain necessary information (e.g. handheld notes, verbal exchanges) (M) thereby further degrading value of written information (O).
(Student Nurse) Yeah. You know sometimes because of the paperwork; you can misplace some papers....Yeah, you can ask the primary nurse but when you go through the file, you can find that it is the paper that was written that is missing.... If it was, if it was, if it was history, you just come and take it from the mother... You go back to the mother.
(Nurse) The doctor writes.... Yes. They're separate [from the Kardex]. Cause that's the doctor who writes. But now there's some investigations that now you have to confirm. If, if, let's say a blood work was done and I'm giving a report of blood work, which was supposed to be done during my shift, I'm supposed to go back now to the file and see if it was done. Because we don't interact much with the files. It's the doctors what we get there, maybe at the now the ward round itself.
Observations – hand held papers
EQ27: When there is no adequate storage system for patient records on the unit (C) staff will take records with them to different locations as they work (M) leading to misplaced files, frustration, wasted time, incivility (O).
(Nurse) So maybe somebody had gone to the lab and he or she has taken time you are supposed to take the patient to theatre... .. that delay. So and you are not aware that somebody has gone with that patient file. .. So you are here looking for that file... You can end up opening another one. So it becomes like double work... ..because of lack of communication in between our saying like I'm with patients file, I'm doing this and this or even like there is a a carder sometimes they say the consultant, the the second on call such thing the MO. So if the message is not passed down this is what we're going to do this. So you get here down on the ground the message is not well passed.
EQ28: When patient records are kept in an orderly manner (e.g. within organised patient groups) (C) 'the right way becomes the easy way' and respect/ valuing of records are enhanced (M) so order will be maintained and quality of documentation will improve (O).
(Nurse) Ward rounds, so we usually attend, but sometimes the work nature cannot allow us to attend. But if there is something a doctor needs you to be involved in, he usually tells us. ... Yes, the doctor will tell you. Because at the time, we have limited time, but with many procedures. At the same time, we have feeding procedure, we have medication. And we have also other things to attend to. And maybe you are one nurse in a room with ten babies, so you cannot work with a doctor from one patient to another patient listening to the doctor's sound. So you are just within the room as they go around. If there is anything they will tell you. Then later on you take your report from the files. .. I get my information. Some of them they tell you verbally, I want this hand over here. Like stat-photo. This baby is for blood transfusion, those specific vital procedures.
EQ29: Where documentation is integrated into ward rounds (C) it will be an accurate summary (M) and provide a useful reference source for all (O).
(Nurse) Yes, we do. And there are major ward rounds, which are particularly on Tuesdays, but thankfully for our unit, every day there is a doctor in every room. So there are rounds that they, they carry through every day. Every day. So with that, they're able to update you on the, the current plan of the, of the patients. And thankfully for documentation, there, there, there is a feeding chart where they always record. There is the files where they, they note the, the round notes. And then for us, it's just copying up to the, the round books. We have the round books where we have indicated each patient and the plan that they, they require. Yeah.
(Nurse) I can say not, well, we attend but not on a regular basis, but we usually find out what the, what, what the plan, the doctor's plan for that day..... From the file.
(Nurse) Ward rounds, so we usually attend, but sometimes the work nature cannot allow us to attend. But if there is something a doctor needs you to be involved in, he usually tells us. Yes, the doctor will tell you. Because at the time, we have limited time, but with many procedures. At the same time, we have feeding procedure, we have

Staff rest and recovery	medication. And we have also other things to attend to. And maybe you are one nurse in a room with ten babies, so you cannot work with a doctor from one patient to another patient listening to the doctor's sound. So you are just within the room as they go around. If there is anything they will tell you. Then later on you take your report from the files. I get my information. Some of them they tell you verbally, I want this hand over here. Like stat-photo. This baby is for blood transfusion, those specific vital procedures.
	(Nurse) When the doctors do the ward round, whatever plan they have said... they've discussed or they have decided, they normally write it on the file, so you as a nurse...definitely there's a round book you will write. You write on the cardex, then you will implement whatever was written.
	EQ30: When staff feel overwhelmed, or are tired/ hungry (C) they may respond to requests with incivility (O) as they cannot cope and are exhausted (M).
	(Senior Nurse) Those are long duties, and in the morning they are productive. In the afternoon they are irritable because some of them they've not even eaten. They've been in a busy nursery. They didn't have time even to take breakfast. So such a people get so irritable and you get the bad communication..... The afternoon, they're not productive, in the morning, they've worked well and they've worked smart. But since they've just continued working, they didn't have even lunch break. Because sometimes there's only one person in a nursery, she can't go for, for lunch. Who will take care of the nursery. Sometimes she's, there's a busy nursery. So you get such a person who works from morning to evening and you get it become so difficult in the evening. That person is worn out. She can't be able to be productive. She does, she has exhausted all her energies or his energy. That way she becomes irritable, even a mother asking something, they tell them for that one I don't know, he can't even, long duties.
	(Nurse) So, when you are tired and when you have burnout, you become mentally disturbed kind of ...so your input may be less, most of the time when you have burnout you become irritated... even communicating with the mother may not be good. You know somebody who has burnout is kind of sick and you may produce little.
	(Nurse) Yes, there is a lot that can be done. Like now you find that we work on shifts and sometimes the night shift is very very tiring. You can find yourself standing the whole night. Until sometimes you are not effective.... Overworking.... You can be overworked because of the shortage. Let us say you find yourself in the room alone with 15 babies, like even here now we have 15 babies. You are alone and the babies are very sick.
	EQ31: When staff have a rest space with adequate facilities (e.g. fridge, lockers) (C) it will improve satisfaction at work (O) as they feel valued and can refresh and relax during breaks at work (M).
	Observations
	EQ32: Protected staff rest areas (C) facilitate more open interactions (O) because staff can step away from the busy clinical environment (M).
	(Nurse) The discussions [in the tea room] about, maybe we have a case scenario or maybe you are so tormented you see like a patient can come...and this patient is saying it is today or today, this baby must get blood now or never,...and you are so tormented because you are not the one who give out blood, you go for blood Mostly we talk of, it's about the patient only, the things that you are supposed to do or maybe there is something like NNAK [National Nursing Association of Kenya] have launched.....Or maybe even its about maybe the CEO.... maybe there is an information that was, there was some information maybe it was written and maybe you never saw it on the notice board... Somebody can come up with it and is like did you...you people see this?
	(Nurse) It's more social [in the tea room]
	(Nurse) .. and during our breaks. Let's say tea breaks, we tend to, like a, it's an open forum, in that someone poses a question, we discuss...
	EQ33: When staff are not given adequate protected rest spaces (C) they must adopt workarounds (e.g. changing in corridor) (M) leading to feeling of not being valued (O).
	Observations
	EQ34: Where different cadres have different rest spaces (C) interactions between cadres may still be limited (O) as staff will take breaks where they feel most comfortable (M).
	Observations

	EQ35: When babies die or when mothers' suffering is witnessed (C) staff are grieved (M) and feel demoralised (O).
	(Nurse) You feel intimidated, you feel so down and you feel you're not complete, that means you have not done your best to the babies...And that one sometimes even it overwhelms you when even you go to at home, you find yourself even calling asking baby so and so ako aje? [how are they] how is that baby? Because you feel maybe that baby succumbed...
	(Student Nurse) Maybe when you are thinking of that pathway think about that patient, the mother of that baby. They pass through stress when they see their babies not feeling well.
	(Nurse) You see if a patient dies that one definitely, you, you just, when you are in a room and you have a case, a mortality, you feel that, hey, the day has not been good to you. Very. Very. First of all, when you find that the mother has struggled a lot, you feel like hey, it's the end of the world. Because you see the mothers crying. So psychologically it affects you.
	(Student Nurse) Mostly if something bad happened... like maybe if you we had a maternal or neonatal death
	EQ36: When babies are viewed as more desirable patients (C) staff will prefer working on NBU (O) as they are serving babies (M).
	(Student Nurse) It was a nice place to work because, at the, the babies, they don't bother as much as the adults.
	(Senior Nurse) Yeah, we should not put our issues first but patient's first. Then we have the needy babies like the ones the mothers have absconded.... It, now we take them as our babies. They are our real babies because now we do for them everything.
	(Nurse) Well, you know when you deal with the babies you are dealing with, they don't talk, they are not like those adults who will abuse you, and tell you anything, but the babies are just quiet, you have to work on them. Unless you know they come with a mother is not cooperating, but generally you will find it's good.

Support for adaptation of learned norms	EQ37: When staff have trained in a specific hospital setting (C) they will have learned specific norms/ workarounds (O) based on availability of equipment etc on the unit (M). EQ38: When staff transfer to a new hospital/ unit (C) they may have to learn new norms/ workarounds (O) as these will have evolved differently based on differences in how resourced the unit is in comparison to their previous unit (M). EQ39: When staff transfer to a new unit (C) norms may clash (O) due to differences in workarounds learnt at previous unit, which may have been poorer resourced or smaller (M).
	(Nurse) Yes, because there are sometimes you can also be talking with your colleagues outside you find that they are doing different things.... Yes, differently from the way...you are doing them. Yeah.
	(Nurse) Okay, okay. I...I have ever met once when I came when I was new and I was you know and I was taking the baby to theatre.... where I had come from we used to use cots and we wrap the baby.... cot, cot, cot and we wrap the baby so well and then it's like you cover the baby you take the baby to theatre, but when I came here it was the other way round, the babies were supposed to be taken by using an incubator.... Yeah. So when I asked one of the senior nurses she told me that it's okay using a cot and when I was almost leaving the room.. Somebody really shouted to me and it was like even I got like now what next. So after that, I just kept quiet look at them, they were there.... shouting. So I looked at them and I was like, now which is the way forward?.. And the other side the phone is calling for me to take the baby to theatre... So I looked at them and said I want to take that baby to theatre because if I take the baby to theatre and something happen, what will happen? It will be me...that has made that soul to go. So in the process of bargaining another person comes tells me no, it is not supposed to be that way you take with this because outside here there (baby cot) is a lot of cold... Yeah, you take with the incubator, so with that she really talked to me and told me it's only that they thought that you know.... So that is the time that I had that.
	(Nurse) Now that one, that one I would attribute to maybe where someone did the training....And how active that person was, they may not be the same but one of the things that I've observed in the time that I've been here ...most of them when they come here they think X have so many instruments and machines Yeah now that one I...I would say it depends on... as I was telling you in X mostly in the new born unit it has machines that so many hospitals doesn't have.... So, if probably someone did not rotate here sometimes it's not about knowledge, they have never seen some of these.... yeah equipment, so they tend to be somehow maybe confused a little bit. Now, and also the numbers that we have. You realise that so many hospitals across the country their new born unit is usually very small.....with less than 10 babies then you get into a unit where you are getting a hundred plus babies and there are procedures that probably you have never done ...maybe you just see it in books, so you... there is that maybe little confusion.
	(Student Nurse) I am empowered to do something there. Probably now like there are procedures that I am empowered to do as a nurse. When you come to these institutions, they have their way of doing things. This should be done by only the consultant or the medical team.... So, you cannot do it. Yes. You have the skill and the knowledge to do it... But despite having the skill and the knowledge you are limited.
	EQ40: If the clinical training environment is under-resourced (C) students will learn shortcuts/ workarounds instead of the correct way (O) as classroom learning is impossible to implement (M).
	(Student Nurse) ..when I come to the ground, I don't have the ideal equipment, to do my ideal procedure, how will I do it?... you see now si I'll start doing short cuts, I'll start doing what I've been, what I've found them doing....but at the back of my mind, I know this is not the right thing. This is not what I was taught.... I think it's just availability of resources, it's not...and then time, you know, just, maybe you're overwhelmed, you have so many people, you can't start doing like, these ideal procedures are very long, you know,...so, you can't start doing for every other person.
	(Nurse) ...the availability of resources... let me call that. yeah, because, you know, you know sometimes we say, there is the ideal thing and there is what is on the ground... so, most of the time we don't do the ideal thing, what is in the books... if you see, if you see like a, phototherapy is for one baby, and we're having 8 babies.
	EQ41: When clinical placements are well resourced (C) student learning experience will improve (O) due to better exposure (M).
	EQ42: If clinical training environment is small (C) learning may be limited (O) by scope of facilities/ set-up (M).
	(Student Nurse) Exposure for example, I can give an example, if, I can give an example of, or personally us the students. For example, from (name), we have got our rotations in

	(name of hospital) NBU, there are some students maybe from (name) campus, their access to the NBU, maybe they're going to a sub county hospital, the NBU has got a capacity of like four to five children, and there are limited kind of resources, here you find that our exposure is much better than their exposure. So when they're delivering the upcoming times, it'll be much lower than ours. And also the exposure to the learning materials and everything. Maybe the education system that is being given, on how to manage.
	(Nurse) For the newcomers, the graduates, some of them have not trained within (name of hospital). They come without knowing how they will find (name of hospital) to be. So, wherever they come from, maybe there were less facilities, they find a complicated place. Some come from nurseries where there were five babies or two. Those where they trained, maybe they were not nurseries. You are posted here, so we take them as they don't know and we just train them.
	(Nurse) Now that one, that one I would attribute to maybe where someone did the training... And how active that person was, they may not be the same but one of the things that I've observed in the time that I've been here ... most of them when they come here they think X have so many instruments and machines Yeah now that one I...I would say it depends on... as I was telling you in X mostly in the new born unit it has machines that so many hospitals doesn't have.... So, if probably someone did not rotate here sometimes it's not about knowledge, they have never seen some of these.... yeah equipment, so they tend to be somehow maybe confused a little bit. Now, and also the numbers that we have. You realise that so many hospitals across the country their new born unit is usually very small.....with less than 10 babies then you get into a unit where you are getting a hundred plus babies and there are procedures that probably you have never done ...maybe you just see it in books, so you... there is that maybe little confusion.
	EQ43: When staff employ workarounds on the unit (C) students will learn these as best practice (O) as they cannot implement classroom teaching due to lack of resources on unit (M).
	(Student Nurse) No, because they can't change because of the situation here. Maybe the ratio of nurses to, to the babies is small, so they're not like able to do the ideal so I should say the ideal. Yeah. Because we're being taught on the ideal, but on the ground things are different.
	(Student Nurse) Yeah. Somehow because back to the drug, [interruptions] like back to the drug, drug part, so after you're told, 0.4, won't get to the baby, you'll be like, by the way, even if I have calculated and gotten 0.2, and it won't get there, why not put it at 0.3, or 0.4. So that even when you flush, whatever remains in the line, just remains. Because, another thing, we were being told that, even if you flush, they can't repeat with the sterile water, water for injection, because it'll take a lot of time. Babies are many, that's why they would add up. So, like that one, that one the knowledge that I had in class, so I had to shed it.
	(Student Nurse) when I come to the ground, I don't have the ideal equipment, to do my ideal procedure, how will I do it?... you see now si I'll start doing short cuts, I'll start doing what I've been, what I've found them doing.... but at the back of my mind, I know this is not the right thing. This is not what I was taught... I think it's just availability of resources, it's not..and then time, you know, just, maybe you're overwhelmed, you have so many people, you can't start doing like, these ideal procedures are very long, you know,.. so, you can't start doing for every other person.
	EQ44: When staff/ students rotate to different units or are not exposed to relevant clinical scenarios (C) they cannot implement or consolidate training (M) leading to wasted efforts from courses/ learning/ education (O).
	(Nurse) For the newcomers, the graduates, some of them have not trained within (hospital). They come without knowing how they will find (hospital) to be. So, wherever they come from, maybe there were less facilities, they find a complicated place. We just take them the way they come and keep. Actually, we mentor them. We don't just allocate them and leave them. I'm new, you are attached to a qualified staff, you stay with them for one month to mentor you and orient you in the unit. You come to understand what happens in the unit and how you are expected to work in the unit. Some come from nurseries where there were five babies or two. Those where they trained, maybe they were not nurseries. You are posted here, so we take them as they don't know and we just train them. We train them on the surface. They come to learn. For the students, the challenge is some don't want to learn, some are willing to learn. Some come, clock, they just loitering in the unit. Others come straight and they want to ask and learn. There are different aspects.
	(Nurse) So, if probably someone did not rotate here sometimes it's not about knowledge, they have never seen some of these... yeah equipment, so they tend to be somehow maybe confused a little bit. Now, and also the numbers that we have. You realise that so many hospitals across the country their new born unit is usually very small ...with less

	than 10 babies then you get into a unit where you are getting a hundred plus babies and there are procedures that probably you have never done ...maybe you just see it in books, so you... there is that maybe little confusion.

Social network analysis findings

Detailed exploratory analyses of the social network data contributed to the GELLE Framework, and provided triangulation of qualitative findings, as described in Chapter 2.3. A glossary of terms used in this section is provided in Chapter 1 (Glossary of terms). Social network questionnaires can be found in Appendices 2.2.3 and 2.2.4.

Principal metrics used in the analysis were: 1) in-degree centrality, and 2) clustering coefficient.

Social network findings and their interpretation are presented below. In summary, high in-degree centrality refers to a nomination of a specific individual (termed 'node') by many others. Individuals with the highest in-degree (i.e. nominated by the most others) are represented as darker nodes in the sociograms presented in Figures 3.2.6 and 3.2.7. These sociograms are designed to show individuals in the same relative spatial location in each, so that the cadre of individual nodes can be determined by cross-referencing with Figures 3.2.4 and 3.2.5, in which nodal colours refer to cadre, rather than in-degree centrality.

The distribution of in-degree centrality (i.e. nominations by many others) amongst individuals in the two neonatal units for different types of social support (i.e. instrumental, informational, emotional and appraisal) is presented. Overall findings reveal that *different* individuals in H1 had high in-degree across different types of social support, whereas in H2 the *same* individuals had relatively high in-degree across all types of social support.

These and additional findings from the social network analyses conducted as part of this DPhil are presented below. As previously described in the Methods chapter, many additional sociograms were produced to inform the development of the realist programme theory, but were considered too identifying to include as figures in this thesis. Instead, a narrative which summarises how social network analysis contributed to theory development is presented, in addition to summary sociograms and their interpretation.

Figure 3.2.3 Contribution of social network analysis to GELLE Framework domains

Note: Domains in which social network data made contribution to theory development are emboldened.

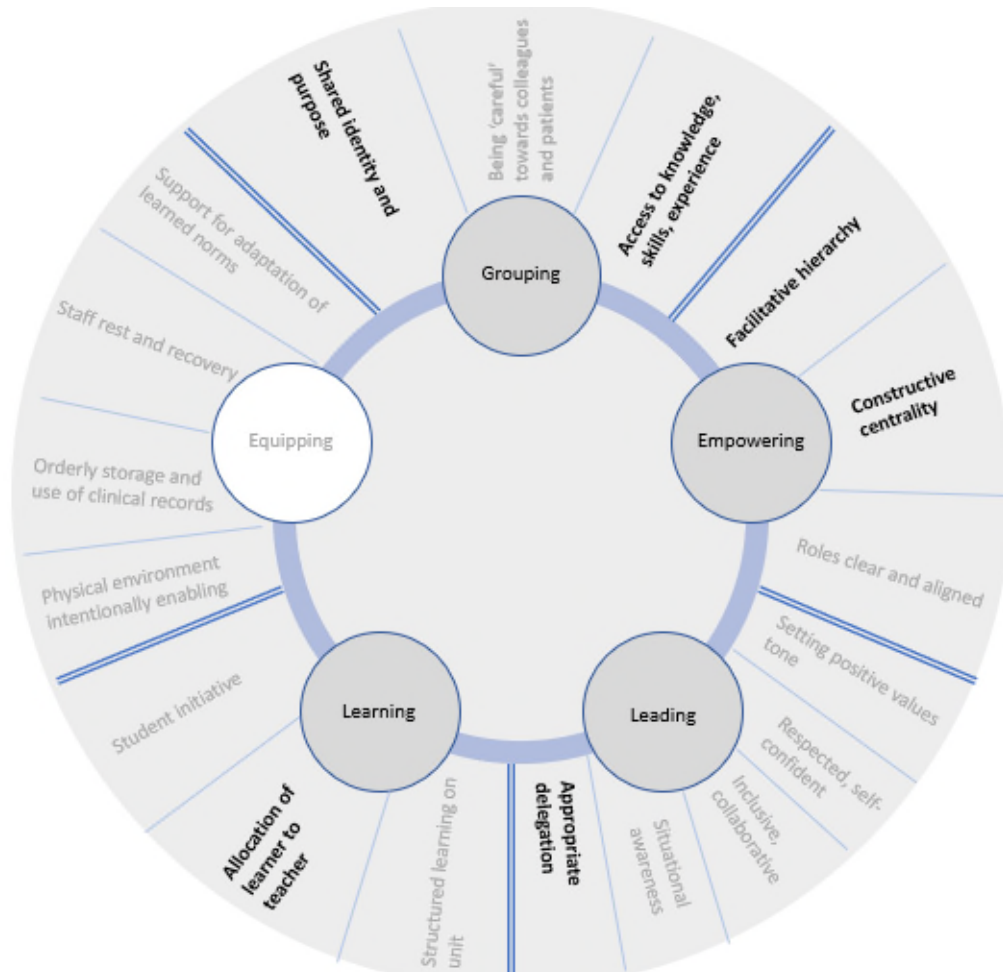


Figure 3.2.3 shows the theoretical domains in which social network findings particularly contributed to theory development and triangulation. These contributions are described in the text below, followed by an explanation of all proceeding tables and figures.

Grouping

- **Shared identity and purpose:**

Social network data showed that staff were grouped by profession. Nursing staff and nursing students tended to cluster together, whilst medical staff, clinical officers and nutritionists tended to cluster. This pattern is seen in both hospitals, and represented

in Figures 3.2.4 and 3.2.5. Further, in one hospital, lower status junior nursing staff were also seen to cluster and nursing students were found to preferably cluster with students from their own institution, as units accommodated multiple nursing schools.

- **Access to knowledge, skills, experience**

As confirmed in the qualitative data, participants were more inclined to nominate medical staff and senior nurses for decision-making advice, for example around medication dosage. As such, the larger networks shown in Figure 3.2.6 show a tendency for greater in-degree centrality of medical staff for informational support, compared to other types of support.

Empowering

- **Facilitative hierarchy**

In the larger Hospital 1, a nursing hierarchy was observed from the social network data, with junior nurses clustered together, and intermediate level nurses distributed between junior and senior nurses. (Data not presented in sociograms, to avoid potential identification of individual participants)

- **Constructive centrality**

Sociograms in both hospitals showed a core-periphery structure (see Figures 3.2.4 and 3.2.5). In the smaller Hospital 2, several central nodes were highly prominent across social-support seeking networks, and there was greater clustering. The qualitative data allowed further exploration of this structure.

Leading

- **Appropriate delegation**

In the larger Hospital 1, different nodes were most central (i.e. higher in-degree) for different types of social support, whereas in the smaller Hospital 2, similar nodes appeared central across all types of social support (Figures 3.2.6 and 3.2.7). In addition, there was a tendency for individual staff to approach the same colleagues for

all types of social support in Hospital 2, whereas for Hospital 1 there was much less correlation between who individuals sought for different types of social support (Tables 3.2.8 and 3.2.9). In Hospital 2 there was also greater correlation between clustering for different types of social support compared with Hospital 1 (Tables 3.2.10 and 3.2.11). This was likely to be a function of the size of the units and degree of differentiation of staff, for example by seniority (see later narrative relating to Figures 3.2.6 and 3.2.7). However, qualitative data also permitted further additional exploration around issues of delegation, overwhelm, power and authority.

Learning

- **Allocation of learner to teacher**

For those students who participated in the social network analysis questionnaire, data contributed to the interpretation of qualitative findings around allocation of students.

Explanation of presented sociograms and metrics

This section provides a more detailed explanation of the sociograms that have been drawn on to support the findings above. Summary sociograms and metrics are presented below for both study sites. The sociograms presented have flattened network layouts and the smaller multiple sociograms (Archambault, Purchase, & Pinaud, 2011) have node highlights which refer to in-degree nominations for specific types of social support (i.e. questions around instrumental, informational, emotional and appraisal support – Appendices 2.2.3 and 2.2.4) and associated clustering coefficients (see Table 3.2.7). The use of the reproduced flattened whole network layout throughout, allows comparison across the small multiple sociograms, relative to the total network. The presented figures and tables show:

- **Figures 3.2.4 and 3.2.5:** ‘Flattened’ sociograms for NBU staff in both hospitals (i.e. all edges are combined to single summary 1/0 value between two nodes of any edge present or absent). Nodes are coloured by coarse cadre status, shown as a key within the figure.

These sociograms show the relative sub-grouping of the workforce by coarse cadre, with doctors, clinical officers and nutritionists tending to be clustered together, with nursing students clustered around a nursing core.

More detailed exploratory analyses (see Chapter 2.2 – sociograms not presented here due to potential risk of identification) showed relative clustering of nurses by seniority and nursing students by institution, where data were sufficient to permit these analyses.

- **Figures 3.2.6 and 3.2.7:** Sociograms showing NBU staff nomination networks and their associated in-degree centralities and clustering coefficients for different types of social support (i.e. instrumental, informational, emotional and appraisal). Higher values of in-degree centrality and clustering coefficient are shown in darker colours, on a graduated colour scale, whereas values of zero (i.e. node not nominated) are not coloured.

Contrasting patterns are seen between the two hospitals. Sociograms from the larger Hospital 1 show differing in-degree nodal prominence for different types of social support between the healthcare workforce (i.e. different individuals are most highly sought for different types of social support). This is contrasted with the pattern seen in the smaller Hospital 2, in which similar individuals tended to be sought for all types of social support. Likewise, clustering coefficient was generally lower in the larger Hospital 1, than in the smaller Hospital 2 (i.e. the tendency for those around an

individual to also be interconnected – “how connected are my friends?”(Hansen et al., 2011))

As observed by my colleague Conrad Wanyama, these findings may be, at least in part, a function of the size of the units themselves and the types of staff that were employed. In the larger Hospital 1, numbers of staff were greater and there were a larger number of senior and more qualified staff. In Hospital 2, the unit and team were much smaller, with the employment of a higher proportion of more junior staff. There was therefore less functional differentiation and more pressure on individual staff to fulfil multiple functions. The findings supported qualitative data from NPOs and IDIs around how healthcare workers decided from whom to seek support.

- **Tables 3.2.8 - 3.2.11:** Correlation coefficients for in-degree centrality and clustering coefficient, comparing correlation between different types of social support in NBU staff nomination networks, by professional status.

These tables demonstrate the tendency for the pattern of social ties to be replicated, comparing one type of social support with another. In Hospital 1, instrumental and emotional support were most strongly correlated, which supports qualitative data around whom individuals develop closer ties with. In Hospital 2, patterns of ties across all types of social support were highly correlated, suggesting that individuals would tend to go to the same individuals for all types of social support, which supports qualitative findings around social groups.

Figure 3.2.4. Flattened sociogram for NBU staff in Hospital 1

Figure 3.2.5. Flattened sociogram for NBU staff in Hospital 2

Note: All edges combined, unweighted, by coarse status

Figure 3.2.4

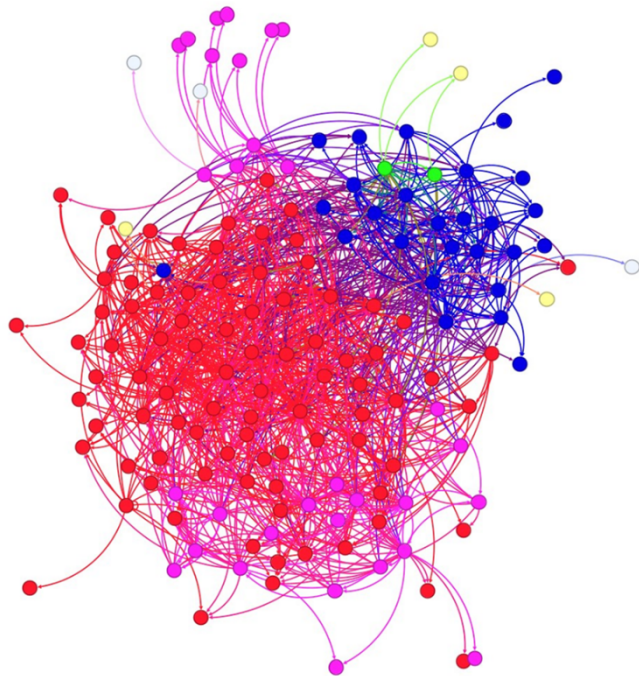
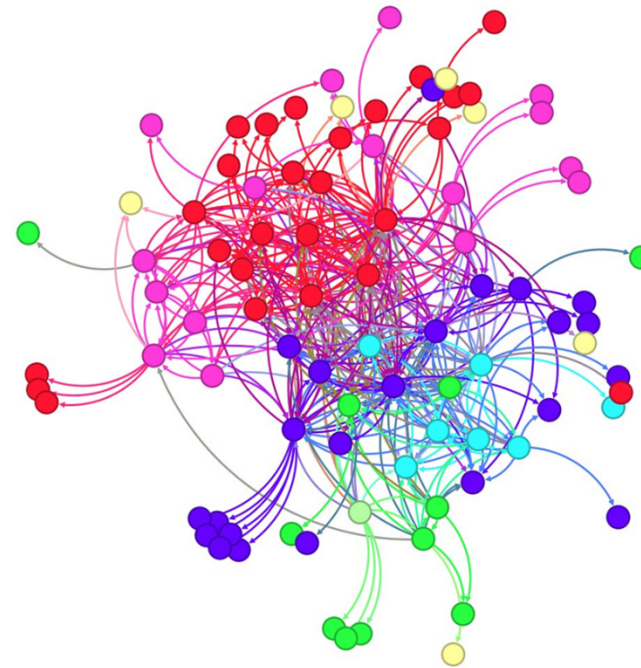


Figure 3.2.5



Blue	Doctor
Cyan	Clinical Officer
Red	Nurse
Magenta	Student Nurse
Green	Nutritionist
Light Green	Student Nutritionist
Yellow	Other

Figure 3.2.6. H1 NBU staff nominations for different types of social support

Indegree (darker colour indicates higher in-degree)

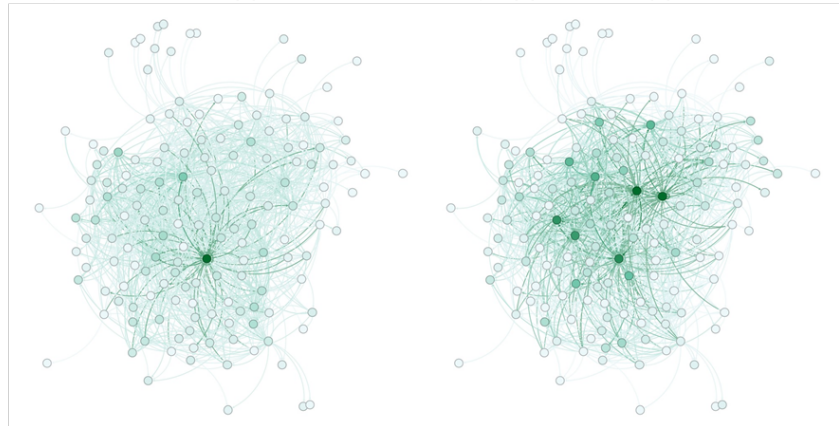
1) Instrumental support

2) Informational support



3) Emotional support

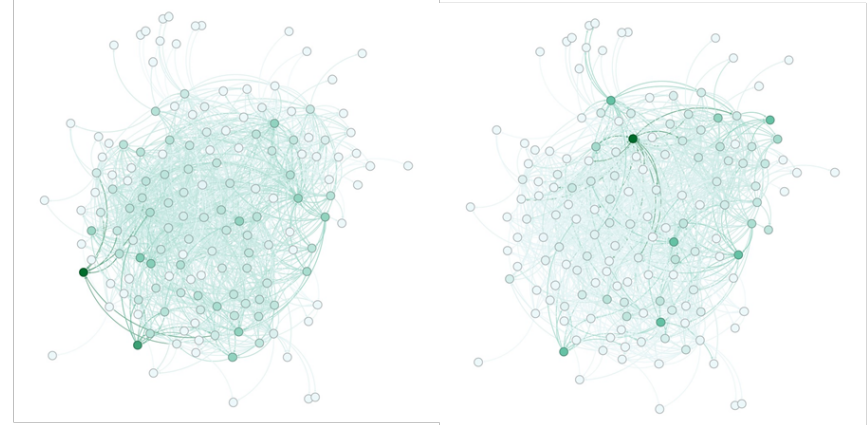
4) Appraisal support



Clustering Coefficient (CC) (darker colour indicates higher CC)

1) Instrumental support

2) Informational support



3) Emotional support

4) Appraisal support



Figure 3.2.7. H2 NBU staff nominations for different types of social support

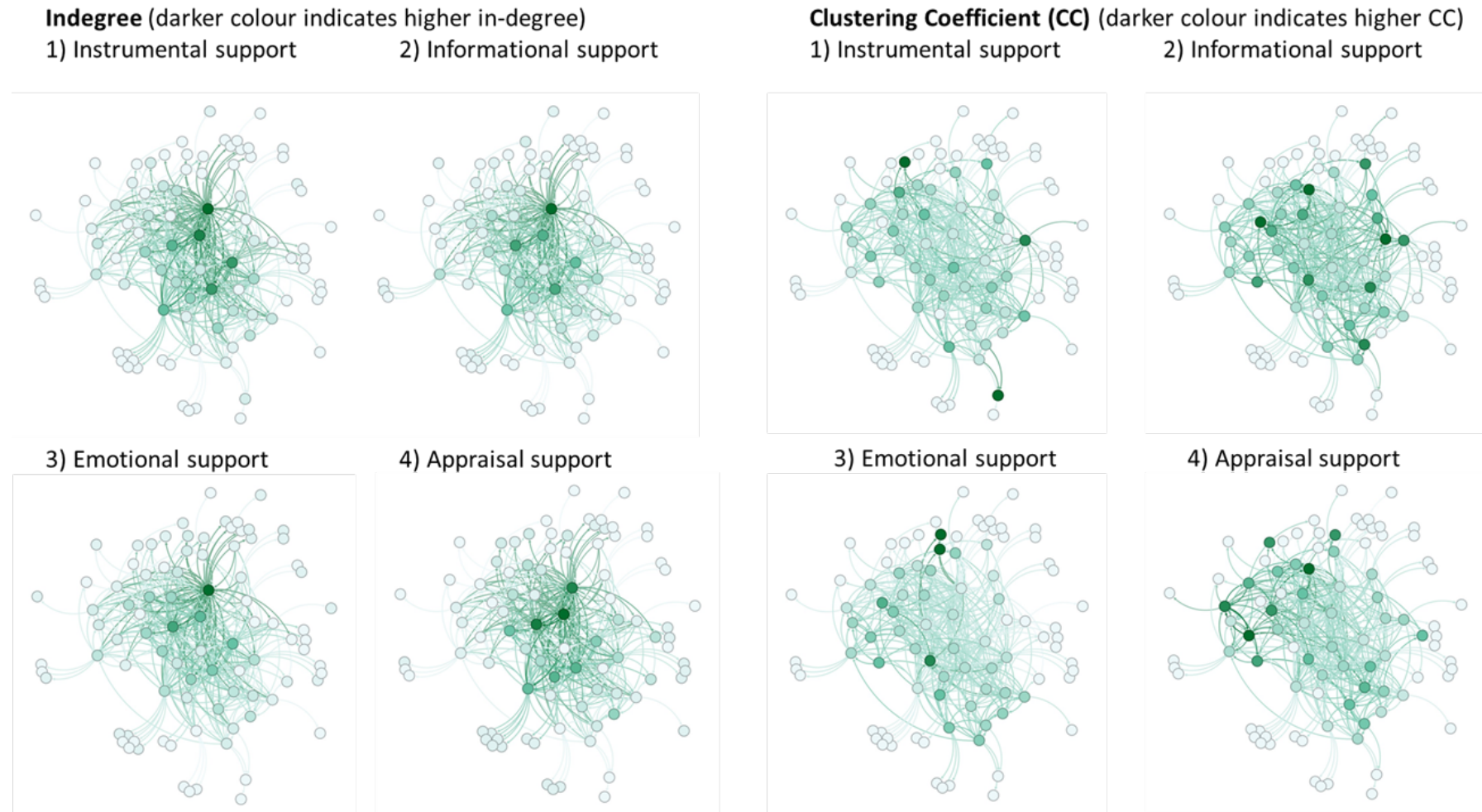


Table 3.2.8: Correlation between the in-degree of individuals for different types of social support, from NBU staff nominations in Hospital 1

	Instrumental	Informational	Emotional	Appraisal
Instrumental	1	0.26	0.58	0.55
Informational		1	0.23	0.37
Emotional			1	0.43
Appraisal				1

Note: correlation coefficients for each comparison shown in table

Table 3.2.9: Correlation between the in-degree of individuals for different types of social support, from NBU staff nominations in Hospital 2

	Instrumental	Informational	Emotional	Appraisal
Instrumental	1	0.96	0.90	0.90
Informational		1	0.93	0.90
Emotional			1	0.85
Appraisal				1

Note: correlation coefficients for each comparison shown in table

Table 3.2.10: Correlation between the clustering coefficient of individuals for different types of social support, from NBU staff nominations in Hospital 1

	Instrumental	Informational	Emotional	Appraisal
Instrumental	1	0.19	0.31	0.01
Informational		1	0.14	0.06
Emotional			1	0.04
Appraisal				1

Note: correlation coefficients for each comparison shown in table

Table 3.2.11: Correlation between the clustering coefficient of individuals for different types of social support, from NBU staff nominations in Hospital 2

	Instrumental	Informational	Emotional	Appraisal
Instrumental	1	0.46	0.25	0.39
Informational		1	0.45	0.57
Emotional			1	0.33
Appraisal				1

Note: correlation coefficients for each comparison shown in table

Stakeholder sense-checking feedback

Sense-checking feedback from stakeholders, intended to seek feedback from which to confirm, refute and refine the GELLE Framework identified broad agreement with the theory and led to no areas of revision to the theory. Participants also found the GELLE Framework useful as a reflective tool and a prompt for discussion around possible interventions.

Summary findings from the stakeholder event are presented in Table 3.2.12.

Table 3.2.12. Summary table of stakeholder sense-checking feedback and recommendations relating to the GELLE Framework

Table 3.2.12 is adapted from a previous version of a table prepared by Conrad Wanyama (unpublished), who collated and summarised the stakeholder feedback data from the Pathways Study stakeholder event, at which I presented the GELLE findings and CW and JJ presented focused thematic findings relating to clinical learning environments, and nursing models of care (see Chapter 2, sections 2.2 and 2.3).

GELLE Domain	Sense-checking feedback	Recommendations
GROUPING	Teamwork, supporting one another, and being 'careful' were valued as important. Insular cliques, division, friction, avoiding 'others' and 'lack of care' were recognised as limiting communication flow.	- Multidisciplinary team building and training exercises to break down silos - Customer care training - Improved staffing ratios for staff to have 'more time' to support others - Collaboration between colleges and hospitals to 'break down' institutional silos.
EMPOWERING	Clear role allocation was valued Appointments of staff to positions that empower them to influence others, reduce confusion, enhance communication, and eliminate role duplication were valued	- Clear job descriptions and role allocation - Conduct joint multidisciplinary meetings to understand the roles of others - Appoint of clinical mentors and preceptors to support students and junior staff - Deploy communications training to develop staff communication skills
LEADING	Servant and shared leadership styles were valued, that promote teamwork and workplace harmony	- Leadership development programme on conflict management, effective communication, and human resource management - Clear governance structures with clear role assignments - Nominated clinical mentors
LEARNING	Structured clinical placements that supported and developed learners into competent professionals were valued	- Regulating the number of trainees - Deploying professional clinical educators - Enhancing supervised peer-assisted learning - Longer clinical placement duration - Retaining clinical staff to minimise loss of experience and transactive memory.
EQUIPPING	Workstations with physical order and sufficient resources were valued. Staff well-being was considered important.	- Staff well-being should be enhanced by providing them with a resting and tea area with seats and drinking water. - Staff changing areas with lockers should be made available to promote dignity. - Sufficient medical supplies, spacious working areas and staff rotas with contact details for call-ups when necessary, to create a more enabling environment

Section 3.2c – GELLE Framework Programme Theory

The realist programme theory underpinning the GELLE Framework is set out below, organised by GELLE domains and sub-domains, and linked to umbrella CMOCs with an accompanying narrative. "U" refers to 'umbrella CMOC', and these are summary explanatory arguments within each theoretical domain. The detailed CMOCs used to build the programme theory are referenced at start of each section of narrative. These CMOCs can be found in full in section 3.2b CMOCs marked as "IPT" are derived from the initial programme theory (see section 3.1), and have been retained in the refined programme theory. Where a section of the programme theory narrative has analogy with existing sociological theory, the relevant literature is cited.

The programme theory is thus presented in the form of:

- Domain, subdomains, umbrella CMOCs
- Narrative with reference to detailed CMOCs and supporting sociological theory

Note on domains: example of Learning

As for all domains, there is integration between the Learning domain for example, and other domains within the GELLE Framework. For instance, many of the detailed CMOCs supporting the Grouping domain relate to students, for example the impact of incivility of staff on student learning. Indeed, the GELLE domains are not mutually exclusive, but should be referred to as a whole. I have deliberately chosen not to duplicate concepts across multiple domains (e.g. incivility – found in Grouping), so as to facilitate distinction. Consequently, this means that it is essential that all five domains are accessed from the specific position of interest. In the discussion chapter I give an example of accessing the GELLE Framework through the prism of Leading (Chapter 4.3) – the same approach can be taken for Learning, as for other domains.

GROUPING

Table 3.2.13: Umbrella CMOCs for Grouping Domain

Grouping <i>How individuals position themselves, based on displays of perceived characteristics by others.</i>	Shared identity and purpose	U1: When a group of individuals within the unit share identity/ purpose (C) they will trust and respect one another (O) because they perceive that they share a common representation and values (M). U2: When parallel cliques operate in a unit (C) negative impacts on staff and patients can occur (O) due to poor communication and teamworking (M).
	Being 'careful' towards colleagues and patients	U3: When a colleague displays they are 'careful' towards their co-workers and also patients, in the way they interact and communicate (C), individuals will seek support and advice from this colleague (O), because they feel trusting towards them and comfortable approaching them (M). U4: When a colleague displays 'lack of care' towards their co-workers and also patients, in the way they interact and communicate (C), individuals will avoid this colleague (O), because they do not trust them, consider them a poor team player and 'rigid to change', and/or fear they will respond with incivility. (M). U5: When students are recipients or witnesses of incivility by unit staff (C) students will disengage, show peer-reliance and experience poor learning (O) because they will fear staff and will feel discouraged (M).
	Access to knowledge, skills, experience	U6: When a colleague is identified as having knowledge, status, technical skills or experience (C) they will be sought for legitimate/ defensible information and help with decision making by individuals (O) because their advice is valued as trusted and authoritative (M). U7: When a colleague is identified as having poor skills (C) individuals will not seek their advice (O) because they will be deemed as unable to help (M).

Shared identity and purpose

Detailed CMOCs IPT1-IPT4 (see Table 3.1.1), G1-G25 (see Table 3.2.2)

When individuals feel that they share aspects of their identity with those around them, they will exercise trust towards these colleagues, due to assumptions about broader commonalities and mutual acceptance (Read, 2014). An individual's perception that they share aspects of their identity with others is often based on more immediately discernible characteristics, such as age, cadre, scope of work, level of education, or student training institution, which often form the basis of broader assumptions held about each other

(Freidson, 1989). Peer relationships form more easily with those considered to be like oneself, and friendships are developed. Within such peer groups, individuals will feel more comfortable, communicate more truthfully, help one another, and enjoy one another's company (Carrasco & Bilal, 2016). Peer relationships hence become preferred channels of advice and support (Zheng et al., 2010).

Shared aspects of identity can also be found between colleagues with deeper commonalities, such as passion for work, work ethics, beliefs and faith, or attitudes towards patient care, which may not be so immediately observable. Opportunities to discern such commonalities in deeper representations among staff are hence created and enhanced by the shaping of respectful reciprocal working structures, such as when individuals from different cadres are allocated (by rota or self-allocated) to a patient group as a team, or undertake multidisciplinary continuous professional training together (Monazam Tabrizi, 2023). As members of the mini-team work together, shared purpose and belonging is enhanced, which in turn strengthens communication and perceived commonalities, supporting collaborative working and shared decision making (Fligstein, 2001). Indeed, once individuals discover colleagues with whom they 'feel safe', they can speak in confidence, and feel better understood. As such, the ability of individuals to recognise elements of shared identity and purpose in their colleagues is essential for effective teamwork on the unit. When individuals feel valued, they will have confidence to make contributions within the team, further strengthening sense of belonging and enjoyment (Institute for Healthcare Improvement, 2017). Moreover, when individuals associate their own actions and those of their colleagues with achieving a common goal, self-motivation and respect for the work of others is enhanced.

Communication between individuals on the unit is therefore influenced by degree of perceived commonality. However, preferential and exclusive communication between some, can lead to the exclusion of others (Carrasco & Bilal, 2016). Thus, representations,

identities and purpose can diverge within the unit. Indeed, when individuals recognise commonality with certain colleagues, outsiders or 'others' are more easily identified, and assumptions and judgements conferred (which may be incorrect), leading to communication boundaries (Ferlie et al., 2017; Roberts & Schiavenato, 2017). Such boundaries can contribute to the formation of cliques, associated with peer-to-peer over-reliance, and redundant information (Scott, 2000), group think (Janis, 1972) and echo (Burt, 2005) - where opposing or contradictory information from those external to the clique is interpreted through sensemaking (Weick et al., 2005) within the group to confirm existing narratives (including existing prejudice and bias). Indeed, cliques based primarily on more immediately discernible characteristics of individuals, may obscure the deeper aspects of identity and purpose which may be more widely and commonly held within the wider workforce, and thereby fail to see these opportunities for unity. Consequently, when staff within the unit are seen to work in parallel cliques or silos without meaningful collaboration, the inputs of those outside a specific silo are unlikely to be recognised by its members, instead disregarded, leading to frustration from perceived inaction and blame by outsiders (Ferlie et al., 2017; Martin et al., 2015). Contentions and friction and conflict between members of different groups or silos can increase fragmentation within the workplace. Fragmentation into differentiated cliques can also occur within a professional silo itself, when the identity of individuals is perceived to diverge, for example by age, leading to 'othering' amongst staff of the same professional group (Roberts & Schiavenato, 2017). When siloed and operating in insular cliques, staff on the unit may become unable to communicate with one another effectively, make shared decisions, or form a unified plan. This can result in conflict and confusion, and the actions of staff and mothers can become based solely on hierarchical authority, or personal preferences.

Being 'careful' towards colleagues and patients

Detailed CMOCs IPT13, IPT15 (see Table 3.1.1), G26-G71 (see Table 3.2.2)

The observed conduct of an individual at work is foundational to how, why, and in what circumstances they are approached by others. Indeed, the observed behaviours of an individual constitute the evidence by which others reconstruct their character and personality in their own understanding.

When an individual is observed to make others feel comfortable and trusting towards them in their conduct on the unit (i.e. being 'careful'), others will be encouraged to approach them for their advice and support (Okello & Gilson, 2015; Owens et al., 2016; Papoutsi et al., 2018). Particularly when an individual takes time to listen and understand, and shows patience, others will feel that their needs have been understood without judgement (Cross et al., 2003; Institute for Healthcare Improvement, 2017).

Furthermore, the way in which an individual corrects others will influence the degree to which their behaviour will change. Specifically, if an individual (particularly when they are senior) corrects others with encouragement and respect, a change in behaviour is more likely to follow, as the correction is more likely to be accepted. Likewise, when giving advice, if the individual offers an accompanying explanation, or if advice is based on shared decision making, it will carry more weight. For very immediate information needs, individuals who are physically present, or appear less busy or ready to help, will be approached for support. Indeed, some individuals are identified by others as always being ready to help due to their consistent supportive behaviour and perceived collaborative attitude.

Fundamentally, individuals on the unit are continually observed by their colleagues. Individuals who show humility will attract advice seeking by others, and also will be offered advice, as they will be considered to have integrity and an open attitude to learning. When individuals are believed to be reliable, focused, hardworking and committed, others will appreciate the contributions they make to patient care, and the workload of others on the unit. As such, reliable individuals attract allocations by leaders

and are popular amongst staff. However, some may take advantage, by neglecting their own duties. Individuals who show respect for mothers on the unit are noticed, and esteemed. Likewise, individuals who refrain from gossip, complaining, and talking negatively about people, and instead have a joyful approach to their work, will infuse the working environment with good feeling and others will want to be on shift with them (Cross et al., 2003). Furthermore, when admirable conduct is modelled in the workplace, students and other staff are encouraged to emulate these behaviours themselves.

Conversely, some individuals will be avoided for support or advice, based on observations of their conduct on the unit (Monazam Tabrizi, 2023). Specifically, individuals who shout will instil fear in others, as well as intimidation and humiliation, and they will not be approached. Instead, colleagues will find alternative means of advice and support, and self-confidence will be eroded. Likewise, when an individual is blaming, bullying or dismissive of others, colleagues will fear and avoid them. When directed at a sub-group or clique within the unit, the recipients of blame by such an individual will protect their own and become defensive and aggrieved, with little likelihood of change. In the presence of fear, students will rely on student-directed peer-to-peer learning, missing wider opportunities for professional development within the unit (Cheetham & Turner, 2020). In addition, when students feel they are being judged or dismissed, they will lack sense of belonging on the unit and will become disengaged and discouraged (Mohammadipour et al., 2018; Papoutsi et al., 2018). An individual who is perceived to be condescending will not be approached for advice, as others fear being made to feel stupid. In addition, individuals who correct others in front of mothers will be avoided. Individuals who are perceived busy or not to have a collaborative attitude will also not be approached.

Moreover, individuals who display incivility towards others, who gossip, complain a lot, or who are felt to have a generally negative demeanour, will be not be approached for advice or support (Cross et al., 2003; Riskin et al., 2015). Likewise, an individual who is

unreliable in their work will be viewed in disdain, as others anticipate being overwhelmed as a consequence of their neglect of duties. Individuals who are felt likely to respond badly to correction, due to pride or being rigid to change, will discourage others from engaging with them due to perceived futility and fear of incivility (Duddle & Boughton, 2007). Importantly, when inappropriate behaviour or talk is witnessed by individuals in the unit, particularly if it is not dealt with appropriately by leaders, mitigating coping mechanisms will be developed by others (Duddle & Boughton, 2007). Therefore, without appropriate countering and calling out of such behaviours, with disciplinary and corrective support from seniors, harm, normalisation, social acceptance, and even imitation can occur (D'Ambra & Andrews, 2014; J. Westbrook et al., 2021).

Access to knowledge, skills, experience

Detailed CMOCs IPT7c (see Table 2.1.1), G72-G81 (see table 3.2.2)

Individuals who are deemed to have relevant knowledge, technical skills or experience, will be approached for advice and support. Senior colleagues therefore attract advice-seeking by others, as do colleagues who have been working on the unit for a long time, and those with specialist qualifications. Senior or experienced individuals remain more approachable within their own cadre, and are therefore particularly sought by juniors and less experienced staff within their own professional group, as well as being sought by those from other cadres.

Importantly, the practices demonstrated by individuals on the unit are used by others to assess their knowledge and skills. Those who display genuine quality in their practice will therefore be trusted by others for advice, and sought for support. Conversely, individuals who demonstrate poor skills will be avoided. Likewise, individuals whose observed scope of practice is most closely aligned to the query of a colleague, will be sought, for example residents and specialist nurses.

EMPOWERING

Table 3.2.14: Umbrella CMOCs for Empowering Domain

Empowering <i>How aspects of formality and structure within the unit can influence the capacity of individuals to act.</i>	Facilitative hierarchy	U17: When a ‘facilitative hierarchy’ is fostered by leaders (C) there will be oversight and access to advice and information, with improved sense of belonging and group purpose (O) because there will be clear and intentional positive use of power (M) U18: When a ‘restrictive hierarchy’ is present (C) there will be poor oversight and access to advice and information, reduced sense of belonging and freedom, and a tendency to follow orders (O) because of tension, fear and othering (M).
	Constructive centrality	U19: When an individual occupies a central position in the unit, or within a specific social group or clique (C) they will have greater influence on group norms (O) because they have more social power over group discourse and practices (M) U20: When an individual occupies a peripheral position in a social group (even if they have valuable contributions to bring) (C) they will not influence group norms (O) because they have little power to alter group discourse (M).
	Roles clear and aligned	U21: When individual roles are clear (C) communication will be more effective (O) because go-to people with the necessary delegated authority are more easily identifiable (M) U22: When individual roles are unclear (C) there will be role evolution, duplication, conflict, inappropriate delegation, etc. (O) because of confusion within the team about responsibilities and boundaries (M). U23: When roles do not align with the skills, capacity or perceived professional identity of staff (C) there will be frustration, overwhelm, and informal role filling (O) because of perceived mismatch by staff (M).

Facilitative hierarchy

Detailed CMOCs IPT8a, IPT8b, IPT10a, IPT10b, IPT11a, IPT11c, IPT12b, IPT17 (see Table 2.1.1), EM1-EM14 (see Table 3.2.2)

A ‘facilitative’ hierarchical structure within the unit will enable staff to receive, share and seek information in psychological safety. Hierarchical clarity makes information flows and processes easier, and identifies brokers. This clarity can help with oversight, communication and knowledge of who to go to for specific advice, as well as what should be shared with whom. Formal information from the hospital administration can be directed

to senior leaders, and disseminated within professional hierarchies (Fitzgerald et al., 2013). Individuals with specific formal authority, or those in leadership roles, become clear go-to people by those seeking specific support (Nzinga et al., 2013). Within a facilitative hierarchical structure, junior staff and those within specific sub-groups, such as students, will identify their own group leader as gatekeeper for information, and depend on them for administrative updates, for example. Indeed, individuals with gatekeeper roles within a facilitative hierarchy may skilfully manage information flows for whole team benefit, leading to more effective and transparent communication throughout the unit (Long et al., 2013; Nzinga et al., 2013). Likewise, WhatsApp online platforms have the power to facilitate open and equitable access to information, for example when sharing administrative updates. Indeed, sense of belonging and identity is enhanced when a WhatsApp group disseminates administrative notices to staff. Within the online WhatsApp space, individuals more senior in the hierarchy can also be accessed in real time, and when they respond quickly, this can act as an additional vehicle for decision making and learning on the unit.

However, fragmentation into sub-groups based on hierarchical status can occur when identity and trust is highly siloed, e.g. junior vs senior, and the hierarchy may become 'restrictive', with unclear and poorly functioning information flows and processes (Monazam Tabrizi, 2023; Riley & Manias, 2009). Fragmentation can be exacerbated by individuals feeling professionally undermined and frustrated by other status groups, and tensions build (Currie et al., 2012; Ferlie et al., 2017; Roberts & Schiavenato, 2017). When conflict occurs between different levels of the hierarchy (e.g. between junior doctors and senior nurses), this may lead to avoidance or circumvention, for example to an individual more senior in the hierarchy, and a reduced sense of freedom. In addition, restrictive hierarchies allow little scope, and no process or culture for challenging directives (Green et al., 2017). As such, instruction or advice received from a senior may be implemented on the basis of authority alone (Papoutsis et al., 2018). Furthermore, when

professions operate in siloed hierarchies, leadership consensus and collaboration between senior staff becomes essential for unit-level change (Ferlie et al., 2017; Long et al., 2013). When this is lacking, any change at unit-level is fundamentally limited (Martin et al., 2015).

Constructive centrality

Detailed CMOCs IPT5b, IPT6a, IPT6b, IPT7a, IPT7b (see Table 2.1.1), EM15-EM25 (see Table 3.2.2)

Individuals occupying central social positions within the unit have greater power and influence over unit norms, due to their social influence on narratives (Hopkinson, 2003; Long et al., 2013; Wilkins & Martin, 1980). Within the unit overall, staff with diverse or clear supportive roles (e.g. chief resident, nurse team leader) are often central in the communication network. At sub-group level, certain individuals are more socially connected and hence hold greater power and influence on group norms (Lockett et al., 2012). Some individuals may also dominate the online WhatsApp space.

Conversely, those who find themselves on the social periphery of the unit or on the periphery of a specific sub-group, will have less influence on core narratives and norms (Lockett et al., 2012) and may in fact deviate in their own behaviours compared to others, choosing to disengage if they oppose the narratives of central individuals (rather than feigning support). For example, when staff tend to work independently from others, even if this is due to a conscientious and hard-working ethic, they will isolate themselves from others, particularly those who are socially central. A peripheral individual's failure to conform may lead to their further exclusion by more central members of the sub-group. Whilst this may improve their own feeling of control (e.g. provision of higher quality care), it limits the peripheral individual's influence on norms of practice, and curtails scope for contributions, which may be highly desirable for bringing about unit improvements (Lockett et al., 2012). On the other hand, some staff become isolated by the actions of

others, for example when excluded from information sharing, or from participation (e.g. allied healthcare professionals, juniors or students, individuals who are shy), leading to a sense of reduced belonging and disengagement (Roberts & Schiavenato, 2017). As such, peripheral individuals (who may be highly proficient) can be overlooked, and remain limited in the contributions they can offer to the unit. In addition, if new staff or students find themselves peripheral and isolated, this will lead to poor professional socialisation and inadequate clinical learning (Centola & Macy, 2007).

Group norms act to self-sustain social power structures, thereby creating a feedback loop whereby practices become embedded (Busco, 2009; Granovetter, 1985). Central positions must therefore be occupied by good leaders who foster inclusivity and collaboration, for the ongoing health of group norms (D'Ambra & Andrews, 2014; Fligstein, 2001; Owens et al., 2016; Read, 2014; Weick et al., 2005).

Roles clear and aligned

Detailed CMOCs EM26-EM42 (see Table 3.2.2)

When individuals have clear roles, they can be more easily identified by others, leading to more effective communication on the unit. Vice versa, individuals can themselves develop appropriate communication ties for their role, making them more effective (West et al., 2020).

When an individual is allocated or self-allocates to specific tasks, these tasks can become their evolved scope of work, as seen by self and others (Merton, 1957). As such, the individual will develop and hone their skills in these tasks, but is likely to deskill in other areas. Difficulties may also occur when the individual is absent, because there may be no one else who can perform their specific role within the team, making the work of others more difficult.

When an individual has a clear role but their performance is felt to be inadequate, others will feel aggrieved, and consider the individual to not be contributing effectively to the unit. Likewise, when roles of individuals include too many tasks and they become overwhelmed, tasks that can be completed will be prioritised, with less urgent tasks omitted. For example, overwhelmed nurses are unlikely to attend a ward round, and in the same way allied health professionals may have many competing pressures.

When clarity and differentiation of individual roles on the unit is unclear, evolution, duplication, conflict, inappropriate delegation (e.g. to students) and non-completion of tasks can occur, as individual responsibilities and roles are poorly defined. As such, individuals who have personal preferences towards certain types of tasks or activities, may evolve their own role to encompass these, whilst neglecting less-desirable tasks, which must then be picked up by colleagues. This can lead to skewed roles, piecemeal delivery of patient care and documentation, and deskilling, for example in practical skills. Fluidity of roles on the unit can also lead to an individual stepping into a perceived role vacuum, either from personal ambition or sense of duty.

Individuals who feel underutilised in their skill set due to a mismatched or limited role on the unit, will experience unfulfillment, poor satisfaction and risk deskilling (Allen, 2004). Conversely, some individuals may consider certain tasks to be outside their own role remit, for example tasks that they consider should be undertaken by a different profession, or not part of their job, and they may refuse to do it (Fligstein, 2001). In the case of clinical teaching, this can lead to poor student and staff experience.

LEADING

Table 3.2.15: Umbrella CMOCs for Leading Domain

Leading <i>How leadership within the clinical unit can influence discourse and culture.</i>	Setting a positive values tone	U8: When leaders set a 'positive values tone' on the unit (C) it will be a more organised, positive and respectful place to work (O) because staff will normalise these values (i.e. will be encouraged to 'follow-suit') (M). U9: When leaders set a 'negative values tone' on the unit (C), normalisation of undesirable behaviours by staff will occur (O) because a reliable and consistent example of positive behaviours and attitudes is absent (M).
	Respected, self-confidence	U10: When leaders are respected by staff/students due to the demonstration of esteemed attributes, and have self-confidence (C), they will be more effective in their role, and supported by the team (O) because they have created a 'safe' working environment (M). U11: When leaders are not respected by staff/students or lack self-confidence (C) they will be considered ineffective in their leadership role, and will face resistance from staff/students (O) because staff perceive them to be disengaged from others and/or overwhelmed (M).
	Inclusive, collaborative	U12: When a leader is inclusive and collaborative in their approach (C), satisfaction, continuity and sense of teamwork will be enhanced on the unit (O) because team members will engage and participate (M). U13: When a leader fails to demonstrate an inclusive and collaborative approach (C) staff will disengage and not respect their leader (O) because they will feel excluded by poor or incompetent leadership practices (M).
	Situational awareness	U14: A leader with good situational awareness (C) will support staff in the provision of quality care (O) because they better understand and respond to the needs of the team (M).
	Appropriate delegation	U15: When a leader is clear about their own role and delegates appropriately to others (C) the leader will be less overwhelmed, more effective, and satisfaction of staff will improve (O) because they will be confident about which roles and responsibilities to delegate and whom to empower (M). U16: When a leader fails to delegate appropriately to others (C) their leadership will be considered ineffective and staff will feel frustrated and dissatisfied (O) because skills of the team are not being utilised, and the leader (and some staff) are overwhelmed (M).

Setting a positive values tone

Detailed CMOCs LD1-LD20 (see Table 3.2.2)

Leaders earn the respect of others by setting a positive values tone on the unit through their own conduct, for example by leading with kindness and humility, praising staff when appropriate, and listening to juniors. Modelling positive values will encourage staff on the unit to follow suit, influencing and nurturing the climate of the whole unit (Baker, 2019; Cross et al., 2003; Institute for Healthcare Improvement, 2017; Nzinga et al., 2013; Owens et al., 2016; West et al., 2020). Staff will pay attention to a respected leader, and will carefully observe how they model characteristics such as virtuous work ethic, patient-centredness, collaboration, clinical mastery, and professional behaviours, and will be motivated to emulate these. In addition to role modelling through a sincere display of professional behaviour (Nzinga et al., 2013), leaders who are clear and consistent in their expectations of staff within the unit, are more likely to see these upheld. For example, a leader who reinforces a structured and respectful handover, sets clear expectations amongst staff, leading to better fulfilment of handover functions. Likewise, proactive management by a leader of existing unit online WhatsApp spaces, can promote organised, informative and inclusive functions, and improve belonging and awareness. A leader who displays an open attitude to learning on the unit will cultivate a sense of freedom and empowerment within the team, to collaborate and challenge where appropriate. Likewise, when a leader works to correct errors in real time and support individuals in providing quality care, learning is facilitated and care improved. In the same way, a leader who ensures staff supervision is timely, supportive and focused on clinical, care will champion good practice and staff will feel supported (Akrimi & Bould, 2022; Okello & Gilson, 2015; West et al., 2020).

In contrast, leaders can set a powerful negative values tone on the unit, however unintentional, for example by blaming, humiliating, policing, and acting with incivility and overwhelm. When this occurs, the unit will lack a strong, positive, leadership role model,

and undesirable behaviours will become normalised (Duddle & Boughton, 2007). In addition, staff and students will experience fear and discouragement in direct response to the conduct of the leader, damaging self-confidence and causing fragmentation (Riskin et al., 2015). Likewise, when a leader does not reinforce clear expectations and standards, crumbling and disintegration of unit norms will occur, associated with futility and frustration amongst staff (D'Ambra & Andrews, 2014). Moreover, leaders who do not act on complaints of staff will not be trusted, and staff will deem them ineffective or indifferent, leading to frustration and disengagement (Dixon-Woods et al., 2019). Lack of appropriate supervision will cause staff to feel unsupported by their leader, resulting in poor satisfaction and inconsistent delivery of patient care.

Respected, self-confident

Detailed CMOCs LD21-LD26 (see Table 3.2.2)

A respected leader will enjoy the support of staff and students within the unit. In addition, when they are perceived to be working for the good of others, an atmosphere of safety is fostered, allowing others to approach them with any difficulties they are experiencing (West et al., 2020). A leader will also be more effective in their role when they have self-confidence and feel comfortable using their authority (McGivern et al., 2015; Sveningsson & Alvesson, 2003).

Conversely, leaders who feel undermined by others within the unit, risk becoming overwhelmed and disengaged. Subsequent perceptions of inaction by the leader can lead to perceived role vacuums, frustration by staff, and can further worsen the self-confidence of the leader (Fetta et al., 2012). Moreover, when staff do not respect their leader, they will resist the leader's inputs, leading to ineffectiveness of leadership in the unit due to low social power.

Inclusive, collaborative

Detailed CMOCs LD27-LD35 (see Table 3.2.2)

When a leader encourages others, and displays an inclusive and collaborative approach, the confidence of staff and students on the unit to engage and participate will be enhanced, due to improved sense of belonging and teamwork, and freedom to be themselves (Carrasco & Bilal, 2016; Institute for Healthcare Improvement, 2017; Owens et al., 2016; Read, 2014; West et al., 2020). Such investment in the team and development of staff, will mitigate over-reliance on individuals. For example, leaders can include staff and students by facilitative and convenient structure and timing of meetings, and by integrating regular open floor opportunities to enable whole team learning (Centola & Macy, 2007). Additionally, the online WhatsApp space of the unit can be intentionally managed to be inclusive and open to contributions from all, supporting discussion and consensus-building within the team.

Conversely, when leaders show favouritism, or are feared, exclusion of certain staff or students from specific types of work occurs (e.g. ward round), and cliques may evolve, reducing the wider team's capacity for collaborative working, learning and decision making.

Situational awareness

Detailed CMOCs LD36-LD41 (see Table 3.2.2)

Leaders who are proactive in gaining situational awareness, will develop good understanding of their team, including skills mix, available consumables, and patient care needs. As such the leader will be able to identify needs, gaps and lapses, and therefore provide (and make requests from the hospital administration for) as effective and timely support as possible (Martin et al., 2015, 2018). For example, this may include securing necessary supplies, or providing tailored correction or supervision. Consequently, the working shift will be smoother and staff will recognise and appreciate the leader's genuine

concerns and support, and will feel valued by the leader (Institute for Healthcare Improvement, 2017). Furthermore, when a leader is proactive in sharing information to bolster situational awareness of others, particularly those from other professional groups (Ferlie et al., 2017), continuity and consistency across the whole team will be facilitated because of shared understanding (Fligstein, 2001; Nzinga et al., 2013). Indeed, staff will also offer information to a leader when they recognise their effective oversight and provision of support. Likewise, confidence in a leader's oversight will reduce anxiety amongst staff and allow them to focus on their own role, as they feel secure that the leader has appropriately and responsibly allocated all other required tasks (Merton, 1957).

Appropriate delegation

Detailed CMOs LD42-LD47 (see Table 3.2.2)

A leader who clearly defines their own role (McGivern et al., 2015) whilst effectively and wisely delegating to appropriate colleagues (Nzinga et al., 2013), will be less overwhelmed. Furthermore, satisfaction will improve amongst those receiving delegated tasks (with appropriate support from a leader), because they feel empowered to undertake leadership functions. Effective delegation is possible where leaders are aware of the skills mix within their team. Indeed, allocation of staff to other non-leadership roles is also enhanced by a leader's knowledge of skills within the team, as staff can be allocated based on required skills mix for patient care needs. Appropriate allocations of staff based on skills, also improves wider team capacity for supervision, continuous learning, and delivery of quality patient care. As such, the degree of aptitude of a leader in delegation and allocation will influence staff satisfaction on the unit.

Conversely, when a leader is not able to appropriately delegate to others within the team, they will be overwhelmed and unable to perform their role effectively (Fetta et al., 2012; Long et al., 2013). Staff will also feel frustrated as a result of perceived inaction by the

leader. In addition, satisfaction amongst staff will reduce because their skills are underutilised, and they are not trusted in leadership roles.

LEARNING

Table 3.2.16: Umbrella CMOCs for Learning Domain

Learning <i>How learners can be supported to become competent professionals, in the clinical unit.</i>	Structure to teaching and learning on unit	U24: When clinical teaching and learning on the unit is prioritised and structured (C), inclusion, encouragement, appreciation will be strengthened in the unit, and consistency in patient care will be supported (O) because common understanding within the team will be promoted, and authority ascribed to the training (M). U25: When administrative aspects of student and new staff experience are well managed, e.g. inductions, number of candidates, assessment processes, clear mentor, opportunities for attending CMEs, etc. (C) learning experience and a trusting learning environment will be enhanced (O) because expectations, support and authority are made clear from the outset (M). U26: When administrative aspects of student/ new staff experience are poorly structured or poorly implemented (C) the learning environment will be chaotic, with discord, frustration and inappropriate reliance on individual student initiative (O) because of lack of oversight and clarity of expectations and understanding (M).
	Allocation of learner to teacher	U27: When students/ new staff are allocated to a specific member of staff for supervision (C), learning, trust and sense of belonging are enhanced (O) because of consistency and reliability (M). U28: When students/ new staff have inadequate clinical supervision (C) inadequate learning and adverse patient care can occur (O) because students may practice beyond their competencies (e.g. when they are unaware of errors made – ‘unknown unknowns’) (M) U29: When there is an assigned Clinical Instructor and/or Clinical Mentor (C) students will experience enhanced learning (O) because there is clear structure to the placement and a point of support (M).
	Student initiative	U30: When learning is self-directed and relies on a student's personal initiative (C) there will be a wide spectrum in student learning outcomes during clinical placements (O) due to differences in personal learning styles and motivations (M).

Structure to learning on unit

Detailed CMOCs IPT18b (see Table 2.1.1), LN1-LN18 (see Table 3.2.2)

The rituals and norms around learning on the unit will communicate expectations (West et al., 2020). For example, the structure of educational meetings, e.g. continuous medical

education (CME), clinical staff meetings, and nursing handover meetings, will demonstrate the value given to knowledge sharing and inclusion, and can hence set the tone for learning. Indeed, educational meetings hold great potential, as a vehicle through which information is legitimised, communicated and disseminated, and can promote common understanding of best practice within the team (Institute for Healthcare Improvement, 2017). Indeed, through inclusion in a CME meeting, information will be deemed legitimate and validated or officially endorsed by the unit and hospital. For ward rounds, when structured so that a senior doctor and others are convened together within collaborative team approach, an expectation of learning will encourage staff and students, and awareness and shared decision making will improve on the unit.

Likewise, the wider unit workforce will benefit when learning by those who have undertaken training, is effectively disseminated. Furthermore, when the impact of learning is perceived tangible, the encouragement felt will support its continued implementation. The provision of printed summary information on the unit walls (i.e. 'speaking walls') can also consolidate learning, and provide an important timely finger-tip reference for healthcare workers providing bedside care. Moreover, such speaking walls contribute a trusted educational source for learning by students rotating on the units, sometimes as a primary instructor.

Conversely, when educational meetings on the unit lack structure, fail to respond to the needs of staff, and information is not effectively disseminated, staff will feel frustrated and there will be fragmentation and poor consensus within the team. Moreover, when education and teaching is not specifically targeted to individuals with matched learning needs, or is not mandated within the unit, those for whom it would be most useful may not participate, or allocation may be considered unfair, reducing potential impact.

Structuring the experience of students and new staff (for example, by providing induction or orientation) can improve learning expectations from the outset, and help build teaching

relationships on the unit. Medical staff, who tend to follow an entrenched professional norm of mentoring immediate juniors, follow traditional expectations of teaching and learning. However, when there is no clear go-to person for students or junior staff on the unit, or when there is poor collaboration between the training facility and the clinical unit (Greenway et al., 2019), stress, misunderstanding and a chaotic learning environment can occur. Likewise, when training institutions do not actively follow-up students on clinical placements, those who show poor commitment will fail to gain satisfactory learning outcomes, as consolidation of learning through practical exposure is required to build competency.

Allocation of learner to teacher

Detailed CMOCs LN19-LN29 (see Table 3.2.2)

When junior staff or students are allocated to a more senior or experienced supervisor, they will develop a supportive relationship with that person, due to spending more time with them. This will improve satisfaction, enhance learning, foster a sense of belonging, and supervision can be integrated into everyday delivery of patient care (Centola & Macy, 2007; Granovetter, 1985; Weick et al., 2005). Indeed, supportive supervision can mitigate fear experienced by students and new staff, commonly associated with the intimidating and unfamiliar clinical environment, thereby improving self-confidence and developing competencies. Support for competencies in practical skills is enhanced within a psychologically safe supervisor-supervisee relationship, and where the learner is supported to be 'hands-on' for appropriate tasks. Conversely, when students receive inadequate clinical supervision, expected scope of practice may be unclear or lacking and they may practice beyond their competencies and experience poor learning (Grimshaw et al., 2004; Nzinga et al., 2019). Indeed, where there is severe staffing shortage, the overwhelming clinical burden on staff can lead to neglect of student supervision and teaching (Nzinga et al., 2019).

When available, an assigned Clinical Instructor enhances student learning on the unit, as students know they are being monitored and have clear expectations on their conduct and learning journey. The Clinical Instructor can also support student administration, pastoral care, and provide additional practical training in procedures.

Student initiative

Detailed CMOCs LN30-LN32 (see Table 3.2.2)

When learning on the unit is primarily self-directed, and reliant on personal initiative, there will be a spectrum in the learning achieved by individuals, ranging from quickly-competent individuals, to those who attain minimal competencies. This competency-spectrum is caused by differences in the approach and personal characteristics of the learner, such as being proactive, observing, or doing the bare minimum. When students are proactive, busy nurses will be more likely to teach them, as they do not need to first rally them (Monazam Tabrizi, 2023).

EQUIPPING

Table 3.2.17: Umbrella CMOCs for Equipping Domain

Equipping <i>How the workforce can be supported by physical order within the unit.</i>	Physical environment intentionally enabling	U31: When the physical environment is organised in an intentionally facilitative manner (C) desirable actions and practices will be implemented (O) because ‘the right way becomes the easy way’ (M). U32: When the physical environment is disordered and chaotic (C) there will be incivility and workarounds (O) because time will be wasted and staff will become frustrated (M). U33: When there is a high patient: staff ratio or overcrowding (C) there will be shortcuts, neglect of specific activities, and negative impacts on patient care and staff/student wellbeing (O) because staff will be overwhelmed, and will lack space/time to effectively carry out their roles (M).
	Orderly storage and use of clinical records	U34: When patient records are kept in an orderly manner and/or are integrated into communication exchanges between staff (C) the quality and use of written records will improve and be maintained (O) because value and purpose of documentation will be enhanced (M). U35: When patient records are not stored in an orderly manner and/or their quality is poor (C) there will be workarounds, poor patient care, dissatisfaction, blaming, and further worsening of the quality of documentation (O) because of frustration and wasted time from delayed file retrieval, missing components of (or entire) files, and distrust (M).
	Staff rest and recovery	U36: When staff are provided with a rest space with adequate facilities (e.g. fridge, lockers) (C) there will be improved staff satisfaction, and more relaxed communication with colleagues (O) because they will feel valued by the hospital, and will be able to step away from the busy clinical environment (M) U37: When staff are tired, hungry, and/or not provided with adequate rest facilities (C) they will not feel valued and will display incivility (O) because they will feel exhausted and will be required to adopt unsatisfactory workarounds (e.g. changing in corridor) (M). U38: When staff witness the suffering of babies and mothers, and death (C) they may seek social support, sharing, and debriefing with colleagues (O) because they are experiencing personal emotional pain (M).
	Support for adaptation of learned norms	U39: When a member of staff transfers to a new unit and is not made aware of the unit-specific norms (C) they are likely to practice different norms to those practiced by unit staff, which may clash (O) because norms of individuals evolve to fit different

		workplace environment (i.e. availability of resources, size of unit, and numbers of patients etc.) (M).

Physical environment intentionally enabling

Detailed CMOCs EQ1-EQ22 (see Table 3.2.2)

Intentional positioning of items and equipment on the unit can make ‘the right way the easy way’ (Liberati et al., 2021), thus enabling the implementation of desirable actions. Indeed, the physical environment can also appear to require certain actions, by communicating clear expectations (e.g. placement of hand sanitiser at the ward entrance). When the right way becomes the easy way, this will support staff to adhere to expected norms and there will be greater satisfaction and smoother working on the unit. Furthermore, staff will contribute to maintaining order when they feel a collective responsibility, sense of belonging, and recognise the contribution of an orderly environment to the smooth provision of patient care.

In addition, when physical reference information is accessible within the unit, for example, protocols, guidelines, handover books, communication books, it will assist staff and students in their work. Similarly, when relevant protocols, guidelines, and job aids are posted on the walls in strategic places, these will provide trusted, clear, and timely reference sources, serving as a reminder of what should be done. This will improve ease of work, continuity of patient care, and support student and staff learning. Likewise, access to electronic reference information can greatly assist individuals on the unit, for example via smartphone applications.

Conversely, when equipment is not readily available, or an item is scarce and in high demand or equipment is insufficient (or non-functional), staff will feel frustrated, may display incivility, and will employ workarounds, because it will be impossible to provide best practice (Greenway et al., 2019). Furthermore, when equipment is present but poorly organised it becomes difficult to locate the item, leading to workarounds. Similarly, when

the person who knows the location of an item is absent, staff will be unable to locate it. Additionally, incivility may be directed towards those who are considered to be careless with precious items, e.g. gloves. Tasks on the unit become difficult when staff must search for everything they need.

Insufficient staffing leads to overwhelm (West et al., 2020) and shortcuts, workarounds, missed patient care and managers will neglect managerial tasks to prioritise a patient care role. Furthermore, when the physical space is very crowded, it is difficult for staff to carry out their roles effectively.

Some physical items in the unit can enable communication, such as a unit telephone and a computer that can be used by staff to access information. Physical items such as tables can whilst enabling the completion of documentation, can also contribute to interprofessional boundaries when different professions sit at different locations.

Orderly storage and use of clinical records

Detailed CMOCs IPT20a, IPT20b (see Table 2.1.1), EQ23-EQ29 (see Table 3.2.2)

Similarly, when patient records are kept in an orderly manner, the 'right way becomes the easy way' and respect for documentation is enhanced, and order and quality maintained. Likewise, when documentation is integrated into routine patient care activities, such as during ward rounds and handovers, accuracy and function will improve and the value given to documentation enhanced. However, when quality/ accuracy of written information is poor, staff will employ workarounds, leading to further degradation of documentation quality. Staff and students will hence rely on alternative means to receive and share information.

Staff rest and recovery

Detailed CMOCs EQ30-EQ36 (see Table 3.2.2)

Protected areas for staff rest, not only make staff feel valued, but provide opportunities for informal interactions away from the busy clinical environment, for example seeking emotional support and debriefing clinical events, improving satisfaction.(Institute for Healthcare Improvement, 2017; WHO, 2020) Conversely, when staff do not have adequate protected rest spaces they can feel devalued due to inadequate workarounds (e.g. changing in corridor), and will lack opportunities for debriefing and sharing emotional burdens with one another. Furthermore, when staff feel overwhelmed or are tired and hungry, exhaustion can lead them to display incivility in the workplace. This is in addition to working in an already intense and emotionally demanding setting, where staff frequently witness the grief and suffering of mothers and babies.

Support for adaptation of learned norms

Detailed CMOCs EQ37-EQ44 (see Table 3.2.2)

The clinical setting in which students and staff have trained and worked, determines the norms of practice and workarounds that are learned and adopted by individuals, based on the availability of equipment and other unit-specific factors. Therefore, when staff transfer to a new hospital, these existing norms and workarounds must evolve to match those within the unit in which they are now working (e.g. ‘we do it this way’) (Brown, 2015). Indeed, differences in norms and workarounds may lead to conflict with new colleagues and students.

Therefore, resourcing of clinical student learning placements influences their exposure and ability to learn clinical competencies and norms. For example, if the clinical training environment is small, learning will be limited compared to on a larger unit, and students will learn shortcuts and workarounds as classroom teaching will likely be impossible to implement. Indeed, ultimately students will learn the workarounds which are modelled by staff on their clinical placements (Greenway et al., 2019).

Further abstraction

Now that I have provided a narrative and umbrella CMOCs for each domain, I move to a further level of abstraction, in the form of the novel GELLE Wheel figure (Figure 3.2.10), and an accompanying Summary Programme Theory (Table 3.2.12). In addition, to facilitate application of the programme theory to practice, I present a table of reflective questions, derived from the programme theory (Box 3.2.1): These were used in the handouts during the stakeholder event (Appendix 2.2.5) and are intended to promote reflection.

Figure 3.2.10. The GELLE Wheel

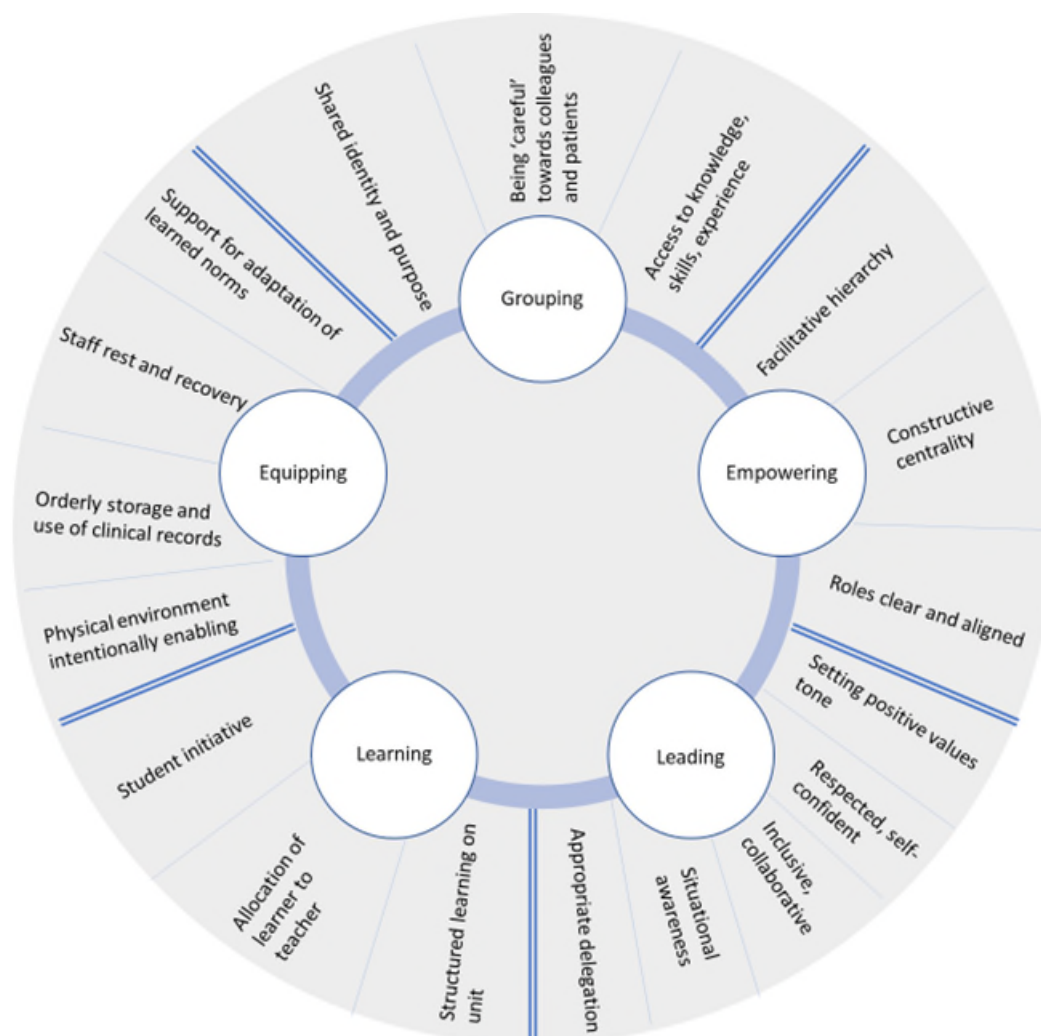


Table 3.2.18: GELLE Framework: Summary Programme Theory

GELLE Framework: Summary Programme Theory	
The relationships between healthcare workers influence how work is done, and patient care delivered, on a unit. Specifically, social ties, or channels of communication and support between individuals are shaped by the following integrated theoretical domains (GELLE): 1) Who individuals consider to be their peers and trusted colleagues, based on their observations of others (GROUPING), 2) The aspects of formality and structure within the unit which influence the ability of specific individuals to act (EMPOWERING), 3) How leadership within the clinical unit influences the relational culture (LEADING), 4) How those within the unit support learners to become competent professionals (LEARNING), and 5) How physical order within the unit influences relational processes within the workforce (EQUIPPING).	
GROUPING	Within a hospital unit, staff will group with colleagues who they identify with in some way, based on observations of their appearance and conduct. When staff feel they have aspects of identity in common, they will develop trust towards one another, and work together more collaboratively. However, assumptions linked to shared identity can lead to the formation of insular cliques, with those external to the clique recognised as outsiders, and judgements made. As such, factions and division deepen, and different cliques can operate in parallel within the same unit. The conduct of individuals is continually observed by others on the unit, and colleagues will feel comfortable approaching an individual for advice or support who displays that they are 'careful' in the way they communicate. In addition, when individuals demonstrate that they have good knowledge, skills or experience, colleagues will also seek them. Conversely, colleagues will avoid approaching individuals who show 'lack of care' in their conduct, or who are deemed to have poor knowledge and skills.
EMPOWERING	Social constitutions, for example the tacit structures of social hierarchy and formality within the unit, influence the actions available to individuals by empowering or disempowering. Indeed, hierarchy in a unit can improve oversight and communication and therefore empower staff, which can improve a sense of belonging and purpose within the unit team. However, when filled with tension and fear, a hierarchy will disempower and divide staff. Likewise, within social sub-groups on the unit, individuals who are most central within the group have most power and influence on group behaviours, unlike those on the periphery, regardless of competency. Communication on the unit is enhanced when the roles of individuals are clear. When roles are not clear within the team there will be confusion, conflict, individuals may adapt their own roles, and activities and tasks may not be completed by the most appropriate staff.
LEADING	The approach to leading on the unit influences culture. The ways in which leaders act, and display their own attitudes towards work, communicate a strong 'values tone' to staff and students and influence their behaviours and collective habits (either positively or negatively). Effective leaders earn the respect of unit staff by showing they possess admirable values and personal qualities, through their conduct, delivered with self-confidence and humility. Leading in an inclusive and collaborative manner cultivates a sense of belonging in others, and members of the team will be encouraged to share and contribute to unit activities and innovations. Likewise, leading from a place of well-informed understanding of the unit and awareness of the capabilities within the team, is essential for achieving meaningful support to staff in their day-to-day work. Leaders must also delegate clearly and wisely, to empower others in appropriate leading roles, and to avoid personal overwhelm.

LEARNING	Teaching and learning on the unit is socially determined, and influences how learners are supported to become competent professionals. The structure of training on the unit can either help or hinder the development of shared understanding amongst the team, and when structured well can be used to achieve both greater inclusion of staff and improved consistency and quality in patient care. Well-managed student placements help to create clear expectations and a better learning environment. Conversely, poorly managed student placements lack clarity and oversight, and lead to chaotic teaching and learning. When students are allocated to specific staff on the unit, they will feel more a part of the team, and will be better supervised. Indeed, without adequate supervision, students may undertake tasks they are not competent to complete. Moreover, when teaching and learning places ultimate responsibility on students themselves to seek and initiate their own learning during clinical placements, they will differ widely in approach, and therefore only some will gain the necessary knowledge and skills needed for their ongoing professional career.
EQUIPPING	Finally, the environment of the unit itself can help or hinder social processes. For example, when the physical environment is organised in an intentional and enabling way, 'the right way' becomes 'the easy way'. However, when the physical environment is chaotic, this leads to wasted time, frustration, incivility and workarounds by staff, impacting on work activities and delivery of care. Likewise, physical overcrowding on the unit can trigger overwhelm of staff, and reliance on shortcuts. When patient records are stored on the unit in an orderly manner, and their use is routinely integrated into day-to-day clinical practice by staff, the quality and use of documentation improves. In addition, the provision of a rest space for staff enhances wellbeing, and gives an opportunity to step away from their physically and emotionally demanding work, support one another, eat and refresh. Since the environment of a unit shapes the workarounds developed and used by staff and learned by students, when staff and students transfer to new unit, they will require support to adapt to its unique set of norms.

Box 3.2.1: Reflective questions, to support practical application of GELLE Framework in clinical practice settings

G - Grouping

1. Do staff (including junior staff and students) feel valued and accepted by their colleagues?
2. Do staff have opportunities to work with diverse colleagues?
3. Can staff communicate meaningfully with colleagues who are different to themselves?
4. Do staff treat colleagues and patients with cordiality, patience and respect?
5. Are staff humble, reliable, committed, open, collaborative and supportive, and do they display integrity and a joyful and caring attitude?
6. Can staff easily identify and approach colleagues who are knowledgeable, skilled, senior, experienced, or specialised?

E – Empowering

1. Does the hierarchy assist information exchange, by clear communication pathways and gatekeepers?
2. Do inclusive and collaborative practices on the unit, serve to empower those who have a positive influence on social norms?
3. Are individual roles sufficiently clear to allow staff to develop effective communication networks?
4. Is allocation of roles in the unit fair, and are roles aligned, with manageable scopes of work?
5. Do the roles allocated to individuals match their skill set, and are staff absences mitigated by appropriate distribution of key roles within the unit?

L – Leading

1. Do leaders act with kindness, encouragement, humility, patience, respect, and show an open attitude to learning?
2. Do leaders communicate clear and consistent expectations of staff, and exercise timely and appropriate correction and support?
3. Do leaders feel supported to use their authority with confidence in a safe learning culture, for the good of others?
4. Do leaders invest in developing team capacity through encouragement, inclusivity, and collaboration?
5. Are leaders proactive in gaining understanding of their team, to provide effective oversight and facilitate timely support?
6. Are leaders clear about the scope of their own role, and do they actively delegate to and empower others?

L- Learning

1. Is learning structured in an inclusive manner, which endorses best practice?
2. Are diverse opportunities to enable and consolidate learning for best practice exploited? (e.g. printed summaries on walls, peer dissemination, supervised clinical learning, making impacts of learning tangible)
3. Do students and new staff experience support for learning on first arrival to the unit?
4. Is a named clinical supervisor, based in the unit, allocated to all students and new staff?
5. Is learning overly-dependent on individual student initiative?

E- Equipping

1. Does the physical environment make 'the right way the easy way' by the orderly positioning of items and equipment?
2. Is written reference information positioned strategically on the unit to assist people in their work?
3. Is level of staffing and the available space sufficient?
4. Do physical aides (e.g. phones, tables) on the unit facilitate communication?
5. Are written records kept in an orderly manner and integrated into routine care?
6. Do staff have access to a protected rest space, and the means for rest and recovery?
7. Are new staff supported to adapt best practice norms within the unit?

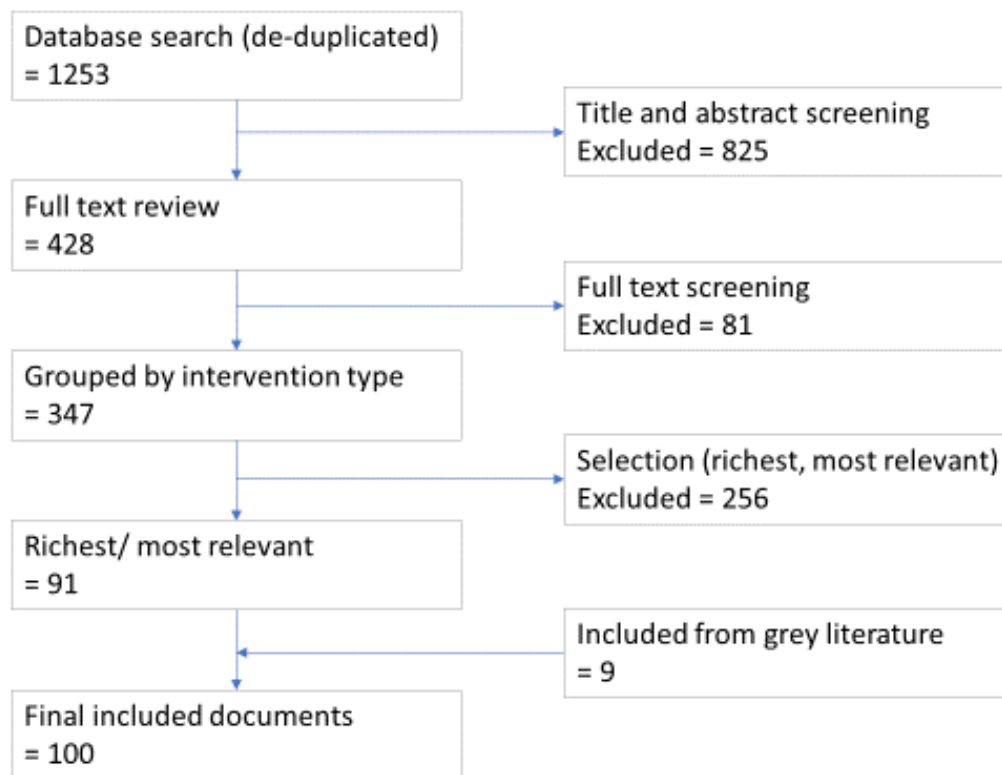


3.3 Candidate interventions targeting aspects of relational context

In the previous sections of this chapter, I reported the initial programme theory (3.1) and the main findings of the DPhil – the GELLE Framework (3.2). Finally, in this section (3.3), I will report the relevant candidate interventions from the literature, and how they relate to the GELLE Framework.

The database search retrieved 1253 documents, after de-duplication. After screening and selection of the richest and most relevant documents, 91 were included. Searching of the grey literature retrieved seven additional relevant documents from the UK NHS and professional bodies, the World Health Organisation, and two further relevant frameworks. The total number of included documents was 100. (Figure 3.3.1)

Figure 3.3.1: PRISMA diagram



The majority of included documents were from high income-settings, mostly the US, UK, Canada, and Australia. Full details of countries and types of document are presented in Appendix 3.3.1. Four included documents were from middle-income settings (Ghana, Kenya, Turkey and China) (Appendix 3.3.1).

Candidate interventions were identified which were relevant to aspects of relational context across all domains of the GELLE Framework (Table 3.3.1 and Table 3.3.2). Some interventions, such as shared governance, were relevant to more than one GELLE domain.

Table 3.3.1: Candidate interventions, grouped by GELLE domain

Candidate interventions	GELLE Domain	GELLE Sub-domains
• Partnerships between hospital staff • Schwartz rounds • Collaboration with: - Other hospitals - Experts	G = Grouping	• Shared identity and purpose • Being 'careful' towards colleagues and patients • Access to knowledge, skills, expertise
• Shared governance • Flattening hierarchy • Diversity, inclusion, representation • Innovative supporting roles	E = Empowering	• Facilitative hierarchy • Constructive centrality • Roles clear and aligned
• Philosophy, mission statement • Professionalism, civility, discipline • Learning culture • Recognition • External accreditation • Leadership development • Diversity, inclusion, representation, justice • Shared governance • Walk Rounds • Real-time data • Huddles • Partnerships • Appointments	L = Leading	• Setting positive values tone • Respected, self-confident • Inclusive, collaborative • Situational awareness • Appropriate delegation
• Peer to peer review • Coaching • Mentoring • Use of real-time data • Meetings • Collaboration with educational institutions	L = Learning	• Structured learning on unit • Allocation of learner to teacher • Student initiative
• Provision for staff wellbeing: - meals, water - Breaks - Responsive rota - mindfulness • Handovers • Positioning of equipment	E = Equipping	• Physical environment intentionally enabling • Orderly storage and use of clinical records • Staff rest and recovery • Support for adaptation of learned norms

Table 3.3.2: Examples of candidate interventions, grouped by GELLE domain

GELLE Domain/ Subdomain	Intervention type	Examples of interventions
GROUPING		
SHARED IDENTITY AND PURPOSE	Partnerships between hospital staff	Nurse-physician leadership dyad - Physical presence of the leadership dyad on unit. Jointly responsible for clinical, service and cost outcomes of unit (Castle & Shapiro, 2016)
		Appointment of Patient Safety Deltas from different units across the hospital, supported by the patient safety team. Education programme and regular for a, participate in patient safety rounds, help with implementing unit-based improvement initiatives (Schwoebel & Creely, 2010)
		Quality Control Circle - group of staff gather regularly to discuss, analyse and solve work-related problems and produce recommendations and standard operating procedures. Includes senior managers and front-line workers. (Zhang et al., 2020)
		Patient link – patient ambassador responsible for spending time with patients and families, thereby easing staff time (Brunges & Foley-Brinza, 2014)
		Each board member paired with ethnic minority network strategic ambassador to deliver specific actions for which they were accountable– North East London NHS Foundation Trust (West et al., 2020)
		Explaining Michigan - Project targeted senior leaders, team leaders, and ICU staff. Partnered unit with senior executive (Dixon-Woods et al., 2011)
BEING 'CAREFUL' TOWARDS COLLEAGUES AND PATIENTS	Schwartz rounds	Schwartz rounds -Structured regular forum for all staff to discuss emotional and social aspects of working in healthcare, 1hr, catering provided, sharing from panel then facilitated open discussion, confidential space, diverse steering group and senior clinician champion – support, appreciation for the roles of others, reduce hierarchies, open culture (Adamson et al., 2018; The Point of Care Foundation, n.d.)
ACCESS TO KNOWLEDGE, SKILLS, EXPERIENCE	Collaboration with experts	Link nurse for IPC. Had online training and direct communication with IPC team and other link nurses. Example of assigned role which has external expert ties, role needs to be legitimised and individuals need to be suited to the role in their skills. Internal factors, external support, role needs to be legitimised (Williams et al., 2019)
		QI Collaborative Royal College Paediatrics and Child Health – sign up as hospital multidisciplinary teams, training, online platform etc. (West et al., 2020)
		NHS-Virginia Mason Partnership – 5 NHS health boards partnered with US non-profit Virginia Mason – this included monthly face-to-face meetings as a group, lasting 6 hours, during which all focus was on honest, open, reciprocal and supportive discussion (Burgess et al., 2019)
	Collaboration with other hospitals	Health Foundation's Safer Patients Initiative - hospitals participated in a large multi-hospital programme, which included expert support and collaborative learner community (Benn et al., 2009)
		Participation of 10 hospitals in Leadership Saves Lives Collaborative. Training of core hospital team (guiding coalition) and sharing/networking between hospitals (Bradley et al., 2018)
		Collaborative of 6 tertiary care paediatric referral hospitals - shared data and collective commitment to improving quality of healthcare (Lyren et al., 2016)

		Ontario ICU Clinical Best Practice Project - 15 participating ICUs - central coordinating office took lead on QI activities, disseminated educational materials. Hospitals participated in biannual face to face conferences and monthly video chats. 1yr trial. (Dainty et al., 2013) Explaining Michigan - Institutional isomorphism amongst participating hospitals (networked), Normative and mimetic types of isomorphism were felt to be the strongest influencers in this programme, Community-based participatory approaches, cooperation, reciprocity “sense of community” – project workshops, online networking, project token (wristband, mirror, T-shirt listing the participating hospitals – project notepaper also contained a list of participating hospitals) – participants ended up leading most interactions themselves, Frequent communication outside the formal structure – virtual learning community, Building of horizontal ties and pressure to maintain “regard” of peers, Changing the representation through narrative of CVC-BSIs as a social problem, Sharing data – different types, Shared vision, Collective critical reflection and discussion as multi-hospital community built consensus and legitimacy, Local autonomy to adapt, with agreed parameters, Data collection, Sharing of anonymous comparative data from other units, Consequences for not submitting data, Back up/ legitimacy in carrying out role if encounter resistance, Importance of core team to provide support – discipline, but responsibility and local ownership (Dixon-Woods et al., 2011)
EMPOWERING		
FACILITATIVE HIERARCHY	Flattening hierarchy	Crew Resource Management - Two-challenge rule – if disagree, politely state concerns twice, then seek superior if not satisfied (Health Risk Management, 2007)
		Briefings, shared mental model, situational awareness, debriefings, communication techniques that allow all staff members to voice concerns in timely way. Implementation: project manager steering committee, train the trainers-style learning (with CPD credits and compensation for time out of working hours), reinforcement in meetings (McKoin et al., 2010)
		TEAM-STEPPS/ CRM – briefings and huddles, cross-monitoring, use of standard formats and skills in communication. Involve everyone in training who is involved in care of patient. (Deering et al., 2011)
		NetworkZ in-situ simulation training for OT teams in usual OT – 2 simulations and debriefs, training in closed-loop communication, speaking up, and structured recap. (Jowsey et al., 2019)
		“Call me Bob” – intended to flatten hierarchy and improve speaking out for safety. First name basis between staff, dropped doctor title (retained for patient and family interactions) New badge issue to doctors with familiar name prominent. Personally-delivered and email circulated. Hospital president met with influential resisters. Support gained from leadership and senior physicians first. (Connors, 2020)
		Time out procedure -a brief pause in theatre before first incision is made to check patient ID, op site and side, and procedure to be performed. Verbal and by inspection. Checklists have increased the number of things to check in time out. This study found that time-out was usually incomplete - either incomplete team, started after first incision, partial completion (Braaf et al., 2013)
		Multidisciplinary training – Maudsley simulation -appreciation for one another’s roles, fostering of collaboration

		(West et al., 2020)
		Explaining Michigan - Checklist as tool to aid speaking up, Nurses monitoring of doctors' adherence to checklist – flattening of hierarchy by these assigned roles (Dixon-Woods et al., 2011)
	Shared governance	See below
CONSTRUCTIVE CENTRALITY	Diversity, inclusion, representation	See below
ROLES CLEAR AND ALIGNED	Innovative supporting roles	Specific creation of facilitator role to take on some of the surrounding tasks associated with improvement projects; 'like a shop' to help improvement projects. Headed by senior consultant and all facilitators had working in the hospital for many years. Assisted staff in managing change. The facilitators did quite a bit of work -chaired meetings, kept time, documented, provided refreshments and set up room, etc. Had 'clout' by means of their social position (Thor et al., 2004)
		Freeing up senior charge nurse time through administrative support: NHS Ayrshire and Arran (West et al., 2020)
LEADING		
SETTING POSITIVE VALUES TONE	Philosophy, mission statement	Nursing philosophy of the organisation revisited/written after lots of discussion and interviews with staff...."We, the nurses of UCDMC..." Implementation of the nursing philosophy meant breaking down barriers, sharing information, encouraging participation in decision making and expecting and rewarding high performance. (Also talks about importance of avoiding mandatory overtime, adequate pool of nurses. Policies and annual training sessions about violence in the workplace) (Robinson, 2001)
		Mission statement - Leadership retreat with feedback and stories from staff, patients and community members re: culturally appropriate services. Cultural awareness taskforce then set up to create a strategic plan. Conducted environmental and organisational assessment. Created strategic vision, strategic plan, and implementation team, with implementation of sub-projects (e.g. recruit and retain diverse employees, language services, cultural material repository, etc.) (Gertner et al., 2010)
		Video of patient hospital experience was played to leadership team ('patient voice'). weekly operations huddle of all senior and programme leaders within the organisation to discuss progress and remove barriers. (Chattergoon et al., 2014)
		Revamped hospital nurse council to improve engagement. Project-based. Participation by senior leadership, training for nurse council members in QI skills, mentoring of new members, agenda and structured meetings with improved dialogue. (Gokenbach, 2007)
	Professionalism, civility, discipline	Implementing Code of Professionalism. Agreed code of professionalism disseminated to all staff and all given a copy and asked to sign. Reporting system (phone and online) that did not require name. Committee on Professionalism then held meetings with the relevant people following a referral. Importance of the committee and how they handled the reports. Triage and then investigation etc. (Capitulo, 2009)

		A civility educational programme for unit leaders in two hospitals, run by a group of Clinical Nurse Specialists (Garcia et al., 2021)
		Incivility educational programme and cognitive rehearsal training for nurses (Razzi & Bianchi, 2019)
		Diagnostic interviews conducted with staff about digressive behaviour - identified fear and futility, 'the untouchables'. Intervention (Safe at Hopkins): 1) sharing interview findings (widespread public sharing across multiple fora of uncomfortable findings - this alone signalled openness and people came forward), 2) coordinating and formalising mechanisms for identifying and dealing with disruptive behaviour (clear definitions and procedures, to risk assessment team outside of usual formal hierarchy structures, had power to follow up), 3) training leaders in encouraging voice (encouraging staff to report and zero tolerance for retaliation), 4) building capacity for difficult conversations (training for leaders). (Dixon-Woods et al., 2019)
		Violation letter - Sent to managers of violators of hand hygiene compliance, signed by chair of infection control committee as well as chief medical officer and chief nursing officer. Manager was required to reply in writing with actions taken. (Chou et al., 2010)
	Learning culture	Mersey Care NHS Foundation Trust - Deal with adverse incidents quickly and informally to reduce impact of lengthy investigations on staff wellbeing. Shift from blame culture to learning culture. Support for staff. Share good practice stories to learn from positives as well as negatives. Restorative practice. (British Medical Association, 2021; De-Regil et al., 2011) Template documentation to collect information before making the decision whether to instigate formal proceedings -led to reduction in disciplinary cases, contributing to psychological safety (NHS Resolution, 2019)
	Recognition	Celebration of nursing units who were compliant with hand hygiene measures. (Chou et al., 2010)
		Good catch award publicly given and displayed when an individual or group identifies and reports a patient safety hazard and then takes structured actions to mitigate the hazard. Award presented, and then displayed on unit with summary of what was done, and individual also given a certificate. (Herzer et al., 2012)
		Vouchers for outstanding nursing care (Brunges & Foley-Brinza, 2014)
	External accreditation	Self-assessment and accountability process(Ng, Leung, Johnston, & Cowling, 2013). – Canadian accreditation process,(Al-Awa et al., 2012) Australian Council on Healthcare Standards (Andres et al., 2019)
		Magnet Recognition Programme – 14 forces of magnetism: 1) quality of nursing leadership, 2) organisational structure, 3) management style, 4) personnel policies and programmes, 5) professional models of care, 6) quality of care, 7) quality improvement, 8) consultation and resources. 9) Autonomy, 10) community and the healthcare organisation, 11) nurses as teachers, 12) image of nursing, 13) interdisciplinary relationships, 14) professional development (Drenkard, 2005)
		Magnet Recognition Programme (American Nurses Credentialing Centre) -self nomination and self-appraisal against standards, multiday site visit by trained evaluators, annual submission of data and re-evaluated every 4 years (Havens & Johnston, 2004)
		ANCC's Pathway to Excellence Programme - 6 Pathway Standards: 1) shared decision making, 2) leadership 3)

		safety, 4) quality, 5) wellbeing, 6) professional development. (Pabico & Graystone, 2018)
RESPECTED, SELF-CONFIDENT	Leadership development	Multifaceted leadership development programme for mid-level managers, adapting the following two courses: 1) Introduction to complex health systems, 2) communication skills and emotional competence course (Nzinga et al., 2021)
		Explaining Michigan - Using credible trusted leaders to communicate evidence to staff, Modelling of desired behaviours by senior staff (Dixon-Woods et al., 2011)
INCLUSIVE, COLLABORATIVE	Diversity, inclusion, representation, justice	Nurse leader on hospital board (MacLeod, 2010)
		Bridging role of healthcare worker from specific served community (Topp et al., 2022)
		Monitoring: minority ethnic group representation at band 8c and above, executive and non-executive directors, and number of ethnic minority staff involved in disciplinary procedures. Changes to recruitment processes, diverse interview panels and training for staff participating in interview panels, wide discussions about equality and inclusion issues, including at staff inductions, strategy developed, mandatory training for white managers and for disciplinary panel members– North East London NHS Foundation Trust (West et al., 2020)
		Barts Health NHS Trust -pre-disciplinary checklist -had led to reduction of cases and narrowing of gap between white and BAME staff (NHS Resolution, 2019)
	Shared governance	Shared governance, involvement of nurses in communication and decision making in hospital, opportunities to shadow those in leadership (Johnston & Villa, 2018)
		Management Made Easy (MME) - daily problem solving by frontline workers -regular check-in meetings, rounding, huddles. (Chattergoon et al., 2014)
		House Staff Quality Council set up to communicate with both hospital administration and the entire house staff on issues of quality improvement and to initiate change projects to address preventable medical errors and system change. House staff Quality Council also included front line staff or managers from other healthcare professions. Aligned with division of quality and patient safety (Fleischut et al., 2011, 2012)
		High Commitment Management very successful in turning around a hospital in Ghana. Key elements of High Commitment Management: 1) bundles of management practices are more effective than singular practices, 2) Key practices include: selective staffing, self-managed team, decentralised decision making, attention for training and job flexibility, open communication and performance-contingent remuneration, participative decision making, efforts to reduce status differentials, 3) effective bundles are balanced - good internal coherence, synergistic, external coherence, good fit between practices and type of staff, organisational mission/task and type of organisation, combine tight rules and procedures with loose, autonomy facilitating practices. (Marchal et al., 2010)
		Shared Decision-Making Unit Councils. Set up by nurses to improve participation in decision making. Has also been adopted by multidisciplinary teams. Team conducted a survey of current practice of unit councils and then developed guidelines. Chair and co-chair were not the unit manager but reported to the unit manager. Decisions were reached by consensus (Murray et al., 2016)
		Unit-Based Safety Teams, which involve front-line staff as well as unit managers and are conducted on unit.

SITUATIONAL AWARENESS		Engagement and ownership. Also, patient safety rounds, which also involve parents of babies on the unit. Support from paediatric core safety team .(Alton et al., 2006)
		Shared Governance at Nottingham University Hospitals NHS Trust – elected councils of frontline midwifery and nursing staff throughout organisation – unit-practice councils, speciality councils, and themed councils. Self-governing. Training, tools and coaching from shared governance facilitators. Monthly leadership council meetings for chairs of councils, chaired by chief nurse. (West et al., 2020)
	Walk Rounds	WalkRounds - a way of connecting senior leadership to patient safety and to inculcate safety ideas into healthcare system. Information - analysis - action - feedback. Objectives of WalkRound project: 1) increase awareness of safety issues by all clinicians, 2) make safety a high priority for senior leadership, 3) educate staff about patient safety concepts such as non-punitive reporting, 4) obtain and act on information elicited from staff about safety problems and issues. (Frankel et al., 2003)
		WalkRounds guide - 7 steps: Preparation, Scheduling, Conducting, Tracking, Reporting, Feedback, Measurement. Conducted weekly. Training provided. (Frankel et al., 2008)
		Local adaptations common, but can either be bad (used as spot check assessments) or very good (foster a sense of trust and hear true feedback). Take care not to risk replacing the main objectives of WalkRounds (specific, actionable knowledge about safety issues, and a more positive safety culture and relationship between ward and board) with a form of surveillance which could alienate frontline staff and produce fallible insights. Must ensure that local adaptations align with rather than conflict with the intervention's model of change. WalkRounds should follow script in toolkit, information should be confidential, systems rather than individual focused. (Martin et al., 2014)
		Counter-productive issues with implementation of WalkRounds - 1) nominal respect for front-line concerns, 2) executive presence without engagement, 3) controlling the conversation (Rotteau et al., 2014)
	Real-time data	Regular staff surveys, results of survey used by unit practice council to focus change initiatives (Brunges & Foley-Brinza, 2014)
		Real-time electronic mortality review system capturing views of front-line staff. Email sent following death of a patient. (Mendu et al., 2020)
		Use of unit-based data to inform/improve clinical practice, promoting transparency (Castle & Shapiro, 2016)
		Electronic incident reporting system which produces useful data for decision makers to improve patient safety (Mushcab et al., 2020)
		Anonymous web-based incident/error reporting system – increased rates of reporting, particularly near misses which were not captured by the old system (Unal & Intepeler, 2020)
		Electronic events reporting system with reports reviewed by multidisciplinary team, regular assessment of safety culture, patient safety dashboard for hospital leaders and board of trustees. (Paine et al., 2010)
		Anonymity and freedom from punitive action in reporting medication “variance”. Check box style reports. Unified database to identify targets for intervention. Front-line staff involved in reviewing data and suggesting

		improvements. (Stump, 2000)
		Senior multidisciplinary leadership rounds to discuss issues with nurses – increased capital of nurses and lead to substantial changes (e.g. new orthopaedic nurse coordinator role, appointment of more nurses) (Johnston & Villa, 2018)
		Leveraging Frontline Leadership Expertise intervention cycle: 1) information gathering (observation and safety fora), 2) prioritisation (debriefing, identify priorities, assign responsibility and promote follow-up), 3) follow up (individual and collective action to resolve problems and enact change), 4) feedback communication (with unit staff regarding information gathered and actions taken) (Singer et al., 2013)
		Structured debriefing by nurse leaders for clinical teams involved in critical events outside ICU. Areas for improvement were identified and acted on by nurse leader. (Gabriel et al., 2022)
		Structured morbidity and mortality rounds using Otowa M&M Model (OM3): appropriate case selection, cognitive/system issues analysis, interprofessional participation, dissemination of lessons (Kwok et al., 2017)
		Designing of a tool for patients and families to report harm. Investigation and action by staff. Used for learning (Lachman et al., 2015)
		Patient visits programme - where senior clinician paired with non-clinical administrator to visit patients and ask for their feedback on the hospital/their stay, using a structured tool. Tool for gaining insights into patient experience (Sidhu et al., 2002)
		Green cross method - Proactive way of collective incident data at daily staff meetings. Visual method for reporting patient safety incidents for a whole month (Källman et al., 2022)
		Root cause analysis -structured process - data collection, review and observation, and analysis to identify root cause of problem. Systems approach to thinking. Corrective action. Complex problem solving, team approach, system/process focus, promotes staff awareness and knowledge (Karkhanis & Thompson, 2021)
		Explaining Michigan - Use of data on unit in communication to staff (Dixon-Woods et al., 2011)
		Newsletter (Paine et al., 2010)
		Synthesis file from journal club or nurses and allied health professionals involved in research in hospital posted on hospital intranet (Dall'Oglio et al., 2018)
		Corona Voice– weekly short web-based staff survey -used data in evolving action plan during pandemic– Northumbria Healthcare NHS Foundation Trust (West et al., 2020)
		Jointly reducing workload: led to a reduction in audit activity as a review within Trust found that many activities did not add value - East London NHS Foundation Trust (West et al., 2020)
	Huddles	Hospital level: brief 15-minute structured stand-up meetings every morning, requiring representative from each department to give 30sec safety summary. Open to all staff. (Castaldi et al., 2019)
		Twice daily safety huddles on PICU, which identified patients at high risk of deterioration and improved situational awareness and better patient outcomes. PICU warning tool also used. (Dewan et al., 2022)
APPROPRIATE DELEGATION	Partnerships and	Specific creation of facilitator role to take on some of the surrounding tasks associated with improvement projects;

	appointment	'like a shop' to help improvement projects. Headed by senior consultant and all facilitators had working in the hospital for many years. Assisted staff in managing change. The facilitators did quite a bit of work -chaired meetings, kept time, documented, provided refreshments and set up room, etc. Had 'clout' by means of their social position (Thor et al., 2004) Freeing up senior charge nurse time through administrative support: NHS Ayrshire and Arran (West et al., 2020)
LEARNING		
STRUCTURED LEARNING ON UNIT	Use of real-time data	As above
	Supporting revalidation	Improving appraisal and revalidation: align external revalidation by embedding in everyday hospital practice, appraisal, and line management, revalidation workshops, evidence pack, forms, templates, completed examples, standard certificate of learning for all trust CPD events, with electronic record of practice hours and CPD hours on staff portals – Central Manchester University Hospitals NHS Foundation Trust (West et al., 2020)
	Meetings	Patient safety grand rounds for all staff, journal clubs, research meeting, discussion and networking groups (Paine et al., 2010)
		National speakers, lunch and learn, online opportunities, posters, journal clubs (Tetuan et al., 2017)
		Journal club monthly, with CPD credits, JC coordinator, facilitator role assigned for each session, preliminary literature search, then synthesis files produced and posted on hospital intranet (Dall'Oglio et al., 2018)
		Monthly patient morbidity and mortality conference - case study presented for root cause analysis by interdisciplinary audience. Meeting starts with summary of last month's case and findings/recommendations. good catch award given to recognise reporting of an identified near miss that could have led to error. Presentation, structured discussion, scribe. Findings and recommendations integrated into improvement efforts. Medical director instigated initiative and supported by senior management, with approval from relevant departments. Resources (personnel and space) were allocated. Same day and time every month, with necessary equipment/furniture. Held at noon and lunch is provided. CPD points for attendance. cases selected as opportunities for learning (Szekendi et al., 2010)
	Collaboration with educational institutions	Science of safety training (Paine et al., 2010)
		Hospital education committee - Monitor and promote quality of residency training. Need to claim strategic position, create educational culture and structure and work with external stakeholders (Silkens et al., 2017)
		Culture of caring team (CoC) – collaborative between academic institutions and hospital. Included academic practice leaders, clinical instructors, staff nurses, and students. Learning was relevant to the clinical environment, and topics were paired with journal articles and activities (Gierach et al., 2019)
		Recommendations and conceptual framework of how to align quality and safety mission of teaching hospitals and graduate medical education. Culture of engaging trainee in continuous improvement process and non-blame culture in safety meetings etc., Create positions on hospital quality and safety committees for GME leaders and hospital leaders to attend GME board meetings. Access to reporting systems and QI data etc. Core curriculum.

		Training of trainers. Embed other professions in resident safety work and vice versa- MDT. (Tess et al., 2015)
ALLOCATION OF LEARNER TO TEACHER	Peer-to-peer review	Nurses provided constructive feedback to peers, based on observed practices compared to professional standards. Standard documentation tool developed. Nurses were provided with training and the programme was supported by the nurse executive team. (LeClair-Smith et al., 2016)
	Coaching	Experienced staff trained in coaching to support aspects of usual work or improvement efforts (one of several interventions) (Gershengorn et al., 2014)
		Staff volunteers were trained as ‘safety coaches’, then took on responsibility for educating, monitoring and reinforcing on units (one of several patient safety interventions) (Phipps et al., 2018)
		Unit-based safety programme included assistance by a coach and by partnering with a member of the hospital leadership. (Paine et al., 2010)
		Supporting newly registered nurses and those from overseas: senior internal team of experienced nurses – mentoring and coaching programme for all new nurses - Barking, Havering and Redbridge University Hospitals NHS Trust (West et al., 2020)
	Mentoring	Intermediate Improvement Science Series (I2S2) training course. Multidisciplinary classes (12 days over 6 months) - training followed by improvement project with mentor. (Kaminski et al., 2012)
		Quality Academy Programme started by one hospital. Conducted by trained staff, teaching plus requirement to complete a QI project, with on-to-one mentoring. (Sarff & O’Brien, 2020)
		Reverse mentoring – all board members matched with mentor from minority ethnic group – North East London NHS Foundation Trust (West et al., 2020)
		Supporting newly qualified midwives: Cardiff and Vale University Health Board – Prep for practice programme – worked with university to make continuity placement where students final placement matched first clinical rotations when newly qualified. Allocated mentors (continuity preceptors’). Protected supernumerary status for first two weeks of job, then 2 weeks working same shifts as preceptor. Provided with special badges to allow colleagues from across MDT to identify them as potentially needing more support. WhatsApp group. Monthly meetings for preceptees (West et al., 2020)
EQUIPPING		
PHYSICAL ENVIRONMENT INTENTIONALLY ENABLING	Positioning of equipment	Explaining Michigan - Dedicated trolley for CVC insertion -instrumental and expressive functions, creating a ritual (using checklist) (Dixon-Woods et al., 2011)
ORDERLY STORAGE AND USE OF CLINICAL RECORDS	Handovers	Structured interdisciplinary bedside rounds, promoting patient-centred workflow. These were adapted and improved using PDSA cycles, and diagram made of agreed final model. Team undertook some training in advance (on the model, situational leadership, managing conflict, personality) (Castle & Shapiro, 2016)
		Handover of patient from theatre to ICU involving members of ICU team coming to theatre for the last 30mins to familiarise with patient. Could ask questions face-to-face but too much time away from unit (Hamid et al., 2021)
		Bedside nursing handover (instead of meeting room or corridor), with standard format. Helped nurses to prioritise patient care. (McAllen et al., 2018)

STAFF REST AND RECOVERY	Provision for wellbeing: - Meals, water - Breaks - Responsive rota - Mindfulness	Standardised I-PASS handover (at same time as TEAM-STEPPS training) and new EMR system which included I-PASS template. Needed adaptation for different units and surgical unit resistant to implementation. (Shahian et al., 2017)
		I-PASS used in transfer of ICU patients to medical ward. Family members participated. 1) Common understanding of patient, confirmed with read-back technique, 2) standardised structure with pre-populated patient details, 3) face-to-face, one message at a time, synthesis and questions, 4) formal acknowledgement of responsibility and accountability. (Sheth et al., 2016)
		Meal breaks, serenity area (quiet space away from patients), fun activities (football, T-shirts to wear on Fridays, party), unit redesign (Brunges & Foley-Brinza, 2014)
		One-hour off-unit meal breaks for nurses working 12 hr shifts in acute medical ward (Stefancyk, 2009)
		Mindfulness - volunteers who signed up in staff area participated in 45min mindfulness sessions every other day - didactic and experimental activities: waking up from autopilot, body scanning, refraining from judgment, using the breath as a stress reliever, and befriending yourself. (Hallman et al., 2017)
		Mindfulness - daily group mindfulness sessions for internal medicine team immediately before the daily interdisciplinary board round, conducted in the nursing station. Facilitator. Body scan, mindfulness breathing, movement and sensory awareness exercises (Kang et al., 2022)
		Responsive rota - Try to accommodate preferences and needs of staff (Brunges & Foley-Brinza, 2014)
		Mutual Aid rota arrangement, central coordinators and formal process (including request form) to facilitate redeployment and shift swapping. During pandemic - NHS Lothian (West et al., 2020)
		Provision for staff to buy vouchers for hot meals at night from patient menu, which were delivered by porters - Royal Free London NHS Foundation Trust (West et al., 2020)
		Think to drink initiative— hydration stations on every unit and reusable water bottles given to staff - James Paget University Hospitals NHS Trust (West et al., 2020)
		WeCare café— café and garden for staff to take break away from ward, and access to 'listeners' - promoting proper rest breaks, supported by local community donations – Kettering General Hospital (West et al., 2020)

In addition to literature describing specific interventions, many healthcare workforce professional bodies in the UK have published recommendations tackling relational aspects of organisational culture (see Appendix 3.3.2). Examples include incivility, fostering psychological safety and a learning culture. The importance of inclusion and collaboration has also been echoed in reports from such stakeholders, as well as autonomy and the need for staff rest spaces and wellbeing (see Appendix 3.3.2). The ideas and principles communicated in these professional documents, closely align with the types of interventions identified in the literature.

The King's Fund Courage of Compassion report, commissioned by the Royal College of Nursing (RCN) Foundation, is a particularly helpful example and offers a useful ABC framework to present the core needs of nurses and midwives within the healthcare team, in addition to giving eight recommendations for practice, and several case study examples, some of which have been included in the reported candidate interventions (West et al., 2020). It is indeed useful to be able to pin principles to practical examples, for effective implementation. A similar Framework for Improving Joy in Work has also been developed in the US by the Institute for Healthcare Improvement (2017). Many of the recommendations in reports from workforce professional bodies, also align with findings from studies of positive (and negative) deviance in healthcare (Curry et al., 2011; Liberati et al., 2020; Vaughn et al., 2019). For example, Liberati (2020) and colleagues identified seven features of safety, including teamwork, cooperation and positive working relationships, respectful relationships and reinforcing of safe, ethical and respectful behaviours.

In summary, many potential candidate interventions, identified through an exploratory review of the literature, can be mapped onto the theoretical domains of the GELLE Framework – in other words, the review of the literature identified a range of candidate interventions that target aspects of relational processes that were found to be important in

how relational structuration occurs with the healthcare workforce from realist evaluation. Furthermore, the apparent validation of GELLE Framework domains from literature sought on candidate interventions targeting organisational culture and quality, promotes a hypothesis that much of the GELLE Framework may be transferable to hospital settings outside of neonatal care, and indeed outside of Kenya (Aveling et al., 2015). The findings of this review are intended to facilitate focused, yet creative thinking in intervention design and implementation planning, by researchers and practitioners using theory-based knowledge of specific healthcare contexts to guide appropriate selection and adaptation of candidate examples of interventions. In other words, this mapping exercise offers ideas for potential candidate interventions, which can be selected/adapted based on specific identified contextual needs and theory-informed contextual targets.

4.0 Discussion and Conclusion

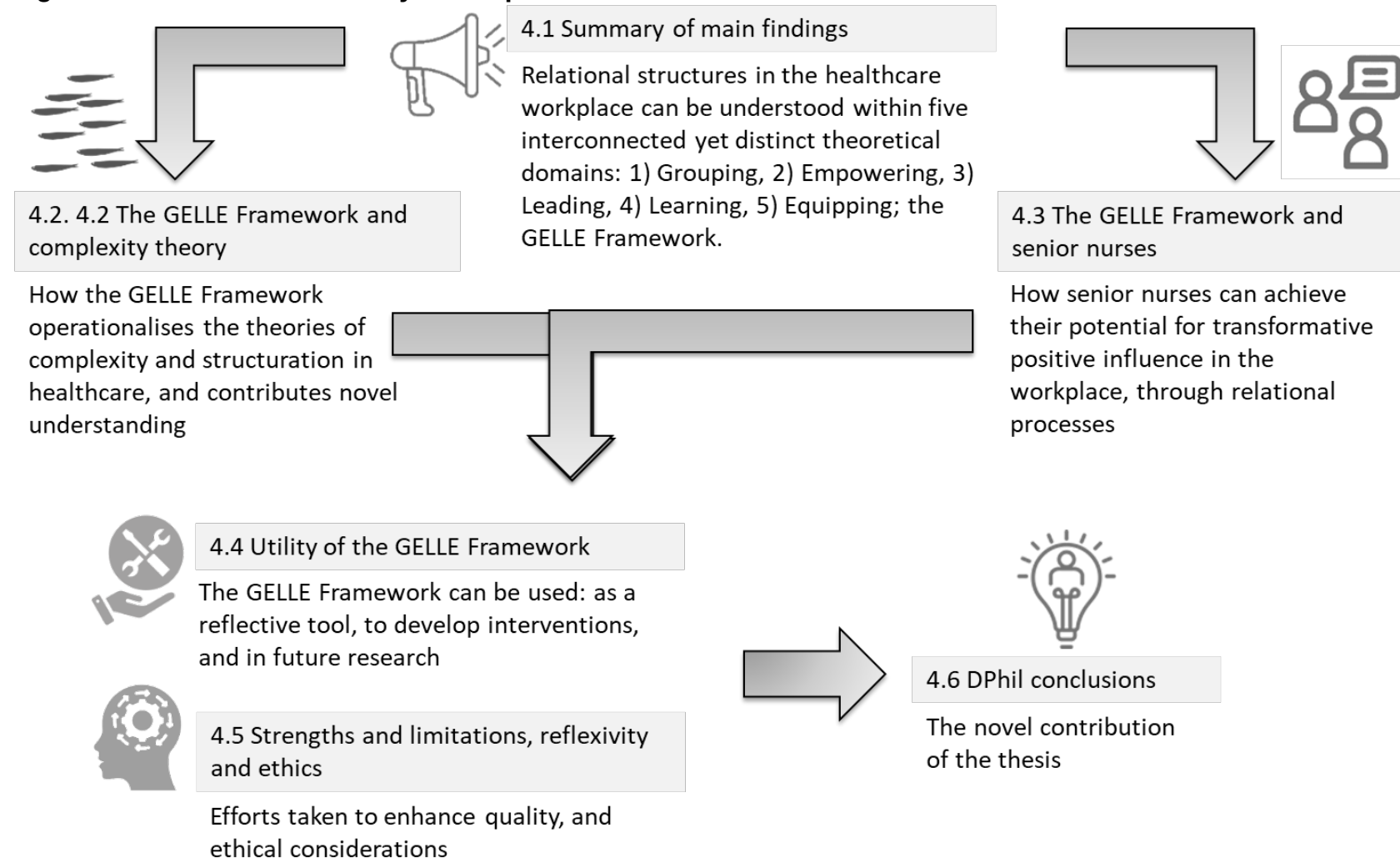
Table 4.0: Outline of Discussion and Conclusion Chapter

4.0 Discussion and Conclusion		4.1 Summary of main findings	A summary of the main findings of the research undertaken
		4.2 The GELLE Framework and complexity theory	How the GELLE Framework operationalises the theories of complexity and structuration in healthcare, and contributes novel understanding.
		4.3 The GELLE Framework and senior nurses	Learning drawn from the GELLE Framework, specific to senior nurses in neonatal care, with reference to complexity theory and Merton's Role-Set.
		4.4 Utility of the GELLE Framework	How the GELLE Framework can be used: as a reflective tool, to develop interventions, and in future research, and a discussion around communication and engagement
		4.5 Strengths and limitations of the research, reflexivity and ethics	Discussion around the strengths and limitations of the DPhil and ethics in practice
		4.6 DPhil conclusions	The conclusions of the study

In this chapter, I first summarise the main findings of the DPhil in section 4.1. Next, in section 4.2, I discuss the contribution of the DPhil findings to understanding of complexity and how structuration of the relational context of the healthcare workforce in hospitals occurs. In section 4.3, I then discuss learning specific to senior nurses in neonatal care in Kenya. Following this, I set out how the GELLE Framework can be used in section 4.4. In section 4.5, I discuss the strengths and limitations of the research, as well as reflexivity and ethics in practice. Finally, in section 4.6, I conclude the thesis with the main messages arising from the DPhil.

A schematic overview of chapter 4 is shown in Figure 4.0 below

Figure 4.0: Schematic summary of Chapter 4: Discussion and Conclusion





4.1 Summary of main findings

In my DPhil research I set out to better understand staff social ties in hospitals and how they influence the workplace and neonatal care in Kenya (Chapter 1). Informed by an initial realist synthesis of the literature, a realist evaluation was undertaken, using mixed methods data (non-participant observations, in-depth interviews and social network analysis) from two urban hospitals. A subsequent scoping review was also conducted (Chapter 2).

In this section (4.1) I summarise the main findings of the DPhil, which are reported in full in Chapter 3.

Novel contribution of the thesis

The essence and novel contribution of this DPhil is to expose and account in detail the relational ‘software’ which exists amidst the delivery of healthcare, as it applies to the delivery of neonatal care in Kenya. This written representation of the tacit and informal is achieved through the development of theory in the middle-range, using a mixed methods dataset and sense-checking engagement activities with stakeholders.

The result is a novel lens through which to view the healthcare workplace, enabling the relational aspects which have long been blurry, to come into sharper focus and clarity. Greater clarity enables appreciation of both relational structure and systems as a duality, termed ‘structuration’ by Giddens (Giddens, 1984, 1991) and furthermore, how this duality operates, from precision and detail through levels of theoretical abstraction. The GELLE Framework thus demonstrates the inner mechanics of the duality of relational structure

and systems in neonatal care, and why, for whom, and in what circumstances, reproduction and transformation take place.

The middle-range theory demonstrates the integration and interactions of different GELLE Framework domains. This view of the 'entire' (however imperfect), is indeed necessary for better understanding of the 'partial' – for example, a domain in isolation – and is why expansion of scientific study beyond senior nurses in isolation was necessary in this thesis, to understand the relativity of senior nurses in the fabric of the social. Study of the parts within the context of the whole (Sturmberg & Martin, 2013) aligns with complexity thinking:

“Complexity thinking is a change in mindset— away from understanding the whole arising from an understanding of its individual parts (the Newtonian approach) towards an appreciation that the whole is different and less than the sum of its parts; viewed in isolation the parts exhibit different properties to those seen in the context of the whole.” (Sturmberg & Martin, 2013, Ch.1, p.1)

Faithfulness to the aim and objectives of my DPhil, approached from a relational perspective, therefore required broadening of my scientific inquiries, so as to focus on the relational whole as well as the part - and to hence understand the relative. The findings of this DPhil therefore are intentionally broad, in order to be more confidently specific. The middle-range theory deepens understanding of the whole – the relational environment of the neonatal care workforce – to thus illuminate the specifics of the role of senior nurses.

Compressed summary of the GELLE Framework

That which follows is a compressed summary of the GELLE Framework. For greater detail, see Chapter 3.2.

The GELLE Framework can be understood at varying levels of detail vs abstraction, depending on the purpose. The level of greatest detail is provided in Chapter 3.2b, by

means of an extensive table of CMOCs with illustrative quotes, and social network analyses. The higher levels of abstraction are presented in Chapter 3.2c, progressing through narratives to summary 'umbrella' CMOCs, and eventually the GELLE wheel and a set of reflective questions for practitioners. The GELLE Framework represents the relational environment of healthcare, as it relates to neonatal care in Kenya. In summary, social ties, or channels of communication and support between individuals are shaped by the following integrated theoretical domains (GELLE):

- 1) Who individuals consider to be their peers and trusted colleagues, based on their observations of others (GROUPING): Staff will group with colleagues who they identify with in some way, based on observations of their appearance and conduct. Colleagues will feel comfortable approaching an individual for advice or support who displays that they are 'careful' in the way they communicate, and will seek individuals who demonstrate that they have good knowledge, skills or experience.
- 2) The aspects of formality and structure within the unit which influence the ability of specific individuals to act (EMPOWERING): Tacit structures of social hierarchy and formality on the unit, including within social sub-groups, influence the actions available to individuals by empowering or disempowering. Clarity of individual roles also influences communication on the unit.
- 3) How leadership within the clinical unit influences the relational culture (LEADING): The ways in which leaders act, and display their own attitudes towards work, communicate a strong 'values tone' to staff and students. Leading in an inclusive and collaborative manner cultivates a sense of belonging in others, and well-informed understanding of the unit and awareness of the capabilities within the team, is essential for providing meaningful support. Wise delegation can empower others, and mitigate personal overwhelm.

4) How those within the unit support learners to become competent professionals

(LEARNING): The structure of training on the unit influences consistency and quality in patient care. Likewise, how student placements are managed influences the social learning environment. Allocation of students to specific staff on the unit improves supervision, whereas over-reliance on student initiative leads to inconsistent learning.

5) How physical order within the unit influences relational processes within the workforce

(EQUIPPING): How the physical environment, including equipment and written records, is organised influences relational interactions on the unit. Physical overcrowding on the unit can trigger overwhelm of staff, and reliance on shortcuts. The provision of a rest space for staff enhances wellbeing, and gives an opportunity to step away from their physically and emotionally demanding work, support one another, eat and refresh.



4.2 The GELLE Framework and complexity theory

In the previous section (4.1), I summarised the main findings. In this section (4.2), I now discuss the GELLE Framework and complexity theory.

GELLE demonstrates the features of complex adaptive systems in a single fingerprint.

Indeed, relational 'software' alone is sufficient to define health systems as complex adaptive systems. An example is how GELLE demonstrates non-linearity within the social fabric of the healthcare workplace.

"... a small change in input may, under certain conditions but not others, produce a large change in outcome..." (Marchal et al., 2013, p.125)

The significance of relational aspects to the implementation of improvement efforts, specifically trusting relationships, has been highlighted elsewhere, as well as the need for enhanced understanding in this space (Bartley et al., 2022; Metz et al., 2022).

Well-developed theory therefore matters, to both illuminate and provide the necessary arena for crafting change. Indeed, as a useful tool for reflection and action, theory must also be specific and detailed. In their critique of too simplistic conceptualisations of healthcare culture, including reports of healthcare scandals that have implicated culture as both culprit and remedy (Mannion & Davies, 2018). Mannion and Davies (2018) make the following claim:

“Greater specificity around both culture and performance enables us to understand more precisely the possible relations between them: quality improvement work is ill served by broadbrush accounts of culture and service quality. We seek to move past the use of culture as simply a rhetorical tool used by politicians and in policy edicts.” (Mannion & Davies, 2018, p.2)

With this I agree. Despite alarming exposés around ‘culture’ in healthcare in numerous public reports (Begeny et al., 2023; Mannion & Davies, 2018) (and indeed in professional spheres, such as the British Medical Association (Romney, 2009)), the conceptual depth of ‘culture’ has not been adequately developed, nor the specifics of the contribution of leaders, in this case senior nurses. The significance of this omission is to miss both the social mechanics and any clear opportunities for action, by failing to dig sufficiently deep. As such the contribution of the GELLE Framework to this space is both novel and timely. Through written representation of the tacit and informal from the development of theory in the middle-range, the invisible is made visible, and that which is feared chaotic and unmanageable, is laid out with recognisable form, both intricate and precise.

If we are to use incivility as an illustration of non-linearity, the GELLE framework also exposes the potentially far-reaching and substantial negative outcomes relating to this. Indeed, an angry shouting outburst by a nurse on the unit, which may itself have been a

product of tiredness, hunger and overwhelm, can be seen to permeate the GELLE wheel. For example, other colleagues may avoid that nurse and not approach them for help, students may opt to consult with their student peers when checking drug dosages, and negative emotional energy may be felt in the unit (particularly if the individual is a leader) (El-Sayed et al., 2011; Owens et al., 2016). If that nurse is a leader, others may prefer not to approach them for important information, may not share with them their needs or concerns, and the nurse may lose respect on the unit. As such, the momentary display of incivility may indirectly influence and continue to influence quality of patient care and staff wellbeing on the unit, and even influence the subsequent behaviour of staff and students rotating onto different wards.

Likewise, feedback loops can be seen to occur within the GELLE wheel, for example peer-over-reliance of students, caused by fear of incivility from staff, may exacerbate staff overwhelm due to poor development of student competencies. A leader who has lost the respect of staff due to displays of incivility, may feel a compounded sense of personal overwhelm and low self-esteem, arising from perceived lack of support from the team.

The reverse, and brighter, side of the complexity coin communicates a clear message of powerful hope – that seemingly small relational acts can have substantial and widespread positive influence within the healthcare workplace. For example, displays of kindness to patients, and approachability of an individual on the unit for example, can improve the enjoyment of work by others, information sharing, encourage imitation of positive behaviours, and enhance student learning and achievement of clinical competencies. Likewise, an inclusive leader can empower and encourage others, who can then take on delegated roles, improving job satisfaction, effectiveness of clinical care, and reducing overwhelm.

Again, GELLE thus demonstrates the importance of examining the 'whole', at least in relation to social processes within the workforce – different outcomes impact different

parts of the system in ways that might otherwise appear unrelated – e.g. incivility of a nurse and poor procedural skills of students.

The GELLE Framework demonstrates why it is misguided to neglect or overlook the social realities of healthcare when implementing interventions to improve quality. Indeed, it can be easily anticipated how insufficient understanding of relational structure and systems leads to “minimal, negligible and negligent interventions” (Hawe, 2015). Likewise, large variations in performance between apparently similar facilities (usually assessed by similarities in ‘hardware’ features) do not surprise (Barasa et al., 2017; Blacklock et al., 2016; Irimu et al., 2021). Indeed, the composition, integrity and condition of the social fabric of healthcare is essential to its function. Fundamentally, principles matter. Where human beings apply principles to their social interactions in the workplace, patterns develop. As Best (2012) and colleagues argue:

“Changing the principles by which people carry out their work is much more important than attaining a predefined target (which may have been arbitrary in the first place).” (Best et al., 2012, p.423)

As such, it is important that relational aspects of health systems software are not “disappeared” from the construct of work (Fletcher, 1998). As argued by Fletcher (1998), the construct of what constitutes work often embodies traditional assumptions and values associated with the “public sphere” (Fletcher, 1998), historically linked to masculinity (e.g. paid, marketable goods as output, focus on individuality). Whereas the “private sphere” (Fletcher, 1998) is a traditional locus for emotions, love, community and social relations, and linked to femininity (Fletcher, 1998). Fletcher (1998) argues:

“.... private sphere attributes, such as emotionality, caring and community, are often invisible in commonsense definitions of work and competence in the public sphere.” (Fletcher, 1998,p.166)

Through her ethnographic work in a high-technology company in the US, Fletcher (1998) observed that:

“....there was a dynamic process in operation in which relational practice got disappeared as work and got constructed as something other than work.”(Fletcher, 1998,p.178)

Specifically, relational skill, supporting others, and decision-making based on building community for example, were not classed as real work, and were interpreted as showing maternal instincts, or as personal weakness (Fletcher, 1998). Fletcher (1998) found that relational practices were associated with gendered expectations, assumptions and misinterpretations within the organisation, with female engineers expected to display gendered relational behaviours (e.g. undertaking support tasks for male colleagues) that were not expected of male engineers. Fletcher (1998) summarises:

“...[this study] identifies the gap in our knowledge about relational aspects of work and highlights the need to develop expanded models or organizational effectiveness and a new language of relational competence. It invites exploratory research that extends and further classifies relational activity as work, making it an object of study rather than a taken-for-granted aspect of interpersonal relationships or process.” (Fletcher, 1998, p.180-181)



4.3 The GELLE Framework and senior nurses

I have summarised the main findings of the DPhil (4.1) and discussed GELLE and complexity theory (4.2). In this section (4.3), I demonstrate how GELLE can bring insight into the role of senior nurses in neonatal care delivery (4.3).

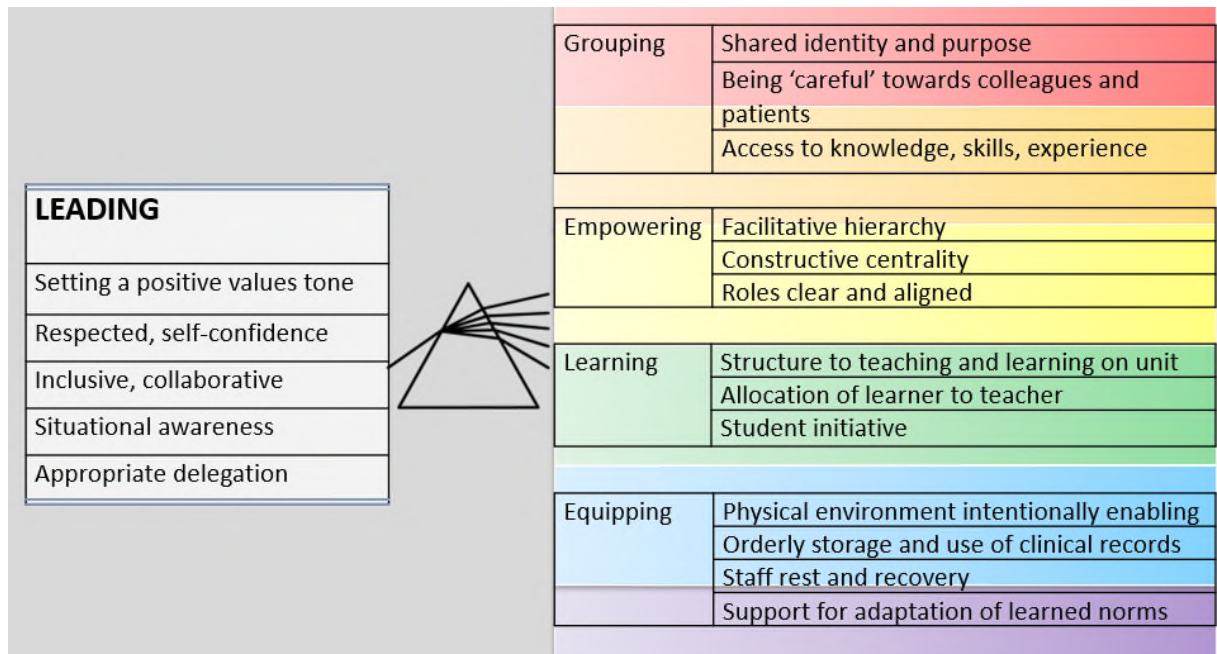
The GELLE wheel points to the unique position of influence held by senior nurses in the unit. As such, this DPhil adds explanatory evidence to the frequently reported observation that leadership is fundamental to quality and safety, change, and resilience in healthcare. (Befani, 2016; Fitzgerald et al., 2007; Gilson & Agyepong, 2018; Ginsburg, 2007; O'Connor et al., 2019)

To return to the analogy of a murmuration (see chapter 1.2), the 'direction of travel' of a senior nurse matters. Even if the senior nurse themselves does not recognise and/or intentionally utilise their own influence in the workplace, their influence remains. Which begs the question, what is their influence? The GELLE wheel provides answers, summarised as: an absent leader is not an absent influence. By this I mean that even if a leader is themselves absent, their influence on the social fabric of the clinical unit remains significant – and in such a case is very likely to be negative. Indeed, there are social consequences of perceived poor performance, of perceived poor communication, of perceived exclusion..... the list goes on. Importantly, such consequences often amount to avoidance and adaptation in others.

However, when a leader is able to 'be' and to 'do' positive relations in the workplace, enormous positive potential is offered. From the GELLE Framework it becomes possible to see with greater clarity the ways in which senior nurses (and others in leadership roles) can embrace being a positive influence within their units and hospitals. Indeed, the leadership domain of the GELLE Framework can be used as a prism through which to enter the whole (Figure 4.3.1). For example, even if the leadership domain was the primary focus of reflection and work towards positive change, benefits and rewards will also be felt in other domains. To illustrate, when a leader focuses on setting a positive values tone on the unit, they will act in a more 'careful' manner towards colleagues and patients. Likewise, a leader who focused on being more inclusive and collaborative, will promote shared identity and purpose, greater access to knowledge, skills and experience,

and constructive centrality. In the same way, improved delegation by a leader will enhance the clarity and alignment of roles within the unit, and the actions of a leader will influence the professional training of many. As such, leaders should be encouraged that, whilst it could appear relatively insignificant when viewed in isolation, reflecting on the details of leadership character and conduct (i.e. the principles of operation (Best et al., 2012; Mannion & Davies, 2018)) has great power – both direct and indirect.

Figure 4.3.1: A prism approach to entering GELLE Framework – LEADING



Importantly, leadership as characterised by the GELLE Framework, is associated with attributes such as humility and service. Perhaps a seemingly far cry from heroic leadership models of the past (Bolden et al., 2003; Fletcher, 2004). Indeed, true 'heroes' of healthcare leadership (and perhaps of leadership more generally) empower and enable others through their social conduct (Fletcher, 2004). Such leaders are highly influential in shaping relational structuration within the unit (Giddens, 1991), and thus possess unique potential (Gilson & Agyepong, 2018). The influence of positive affect within organisations, particularly from leaders, is commonly achieved through relational means (Abalkhail & Allan, 2016; Cleary et al., 2018). The importance of a leader's relational or 'soft' skills is already identified in the literature (Cleary et al., 2018; Fletcher, 2004; Gilson & Agyepong, 2018; Nzinga et al., 2021). In addition, the potential utility of leadership paradigms such as distributed leadership (Fitzgerald et al., 2007) have been proposed, including in Kenya. Within a distributed leadership model, the unique position and potential influence of

'hybrid' clinical managers is recognised, particularly the influence on clinical colleagues (Nzinga et al., 2013; Waring & Crompton, 2017). Furthermore, some leadership models (e.g. relational leadership) emphasise social processes as the way in which leadership occurs (Cleary et al., 2018). Distributed models of leadership may help mitigate Merton's (1957) "problematics of the role set" (Merton, 1957, p.110), introduced below. The sharing of power through governance structures such as 'shared governance' (Alton et al., 2006; Fleischut et al., 2011, 2012; Marchal et al., 2010; Murray et al., 2016) has also been implemented in certain healthcare settings, and is included amongst the findings of the scoping review, presented in Chapter 3.2.4.

Notwithstanding, senior nurses must navigate the inevitable impossibility of fulfilling all requirements on their time and energy, exacerbated by staff shortages and other resource constraints. Merton's (1957) role-set is useful to consider here, and to remind ourselves that the roles of senior nurses (like the roles of anyone else) are always relative to the roles of others in the workplace. To each other person in the workplace, the perceived role of the senior nurse is likely to differ (e.g. to junior nurses, to doctors, to managers, to students), with different expectations, and an overwhelming total role set. Senior nurses must therefore navigate conflicting expectations, time management, and own identity, as they undertake their work (McGivern et al., 2015; Nzinga et al., 2018). In Kenya, as in many other settings, this must be done in an environment of severe understaffing, high patient numbers, and scarcity of resources (McKnight et al., 2020; Nzinga et al., 2018).

The way in which senior nurses manage their role set is important, and determines how and where their influence is focused. The GELLE Framework helps to identify how the role set of senior nurses might be optimally managed, in certain circumstances. For example, the expectations of many colleagues might be adequately or even superiorly fulfilled by a leader's efforts to improve situational awareness, or by a leader extending an invitation to join a meeting.

Likewise, appropriate delegation by a leader may help to mitigate issues around their own personal over-commitment to specific roles within their role set (Marks, 1977), whilst at the same time empowering others in the team. In relation to the concept of role strain, Marks (1977) puts forward the following points, abridged here:

“1....persons construct their response to the demands of others. Thus, they implicitly decide how to use their energy and whose demands will be honoured, if anyone’s.

2. People may withhold the full flow of energy into a given role, thereby freeing that energy for engaging those role performances that are the most greedily demanded and heavily sanctioned or for embracing those that are simply the most valued culturally or personally.....

3. a feeling of energy loss.....is more a function of the stance of persons towards their activity clusters and their role partners within them, rather than.. every role performance costing us some of our scarce biological resources.

4. Abundant energy is “found” for anything to which we are highly committed, and we often feel more energetic having done it; also we tend to “find” little energy for anything to which we are uncommitted, and doing these things leaves us feeling spent, drained or exhausted....” (Marks, 1977, p.927)

Marks (1977) goes on to discuss alternative forms of “commitment systems” through which multiple roles are valued in relation to one another, from which he proposes that a system of concurrent over-commitments and under-commitments is most common.

Further, he states:

“Concerning under-commitments, the phenomenon of scarce time and energy should be very much in evidence. Here, what limits the expansion of time and energy is the omni-presence of one’s overcommitments.” (Marks, 1977, p.931)

For neonatal care in Kenya, under-resourcing, understaffing and high patient numbers can contribute to substantial over-commitment in certain roles for senior nurses, and consequent under-commitment to others (Marks, 1977; Mbutia et al., 2023). However, leadership roles to which a leader may be under-committed are also essential for the effective functioning of the unit. A challenge for senior nurses is therefore managing these competing commitments, and delegation of certain roles within the team may be

appropriate to mitigate overwhelm and improve satisfaction and effectiveness of other staff.

Moreover, when considering Marks' (1977) work on role strain and commitment if the status (Merton, 1957) of a staff member (e.g. senior nurse) does not align with the degree of commitment to associated roles demanded by a particular individual (e.g. student does not receive supportive supervision from the senior nurse, and is instead dismissed), this individual will not know who to approach to fulfil this supervisory role. Indeed, as presented in Chapter 3.2, students were found to rely on peer interactions in the absence of supportive supervision from qualified nurses. As my supervisor, Bernie Hogan, has reflected during our various discussions about Merton's (1957) role-set, mis-alignment between role-set and status can lead to confusion within the team, with staff and students unsure of who to turn to for specific assistance. As such, the GELLE Framework identifies both the contributors to, and 'down-stream' repercussions of, role strain.

Nzinga's (2019) work on hybrid clinical managers (e.g. unit in-charges) in Kenyan hospitals found they often lacked formal training or support in management roles, with many forging their way from their existing familiarity with clinical roles and professional peers (Nzinga et al., 2019). There was tension between the formal (accountability to higher management) and the informal (accountability to clinical colleagues), with implications on the degree to which aspects of particular roles were implemented. Indeed, in regards to the tensions around the informal the GELLE Framework exposes associated fragility, whereby standards (e.g. around shift punctuality) must be consistently upheld and appropriate correction and support exercised, to be maintained. Furthermore, Nzinga (2019) highlighted the greater value placed on clinical vs managerial work by hybrid clinical managers, and how they felt their additional management roles received little recognition, and their personal agency was limited.

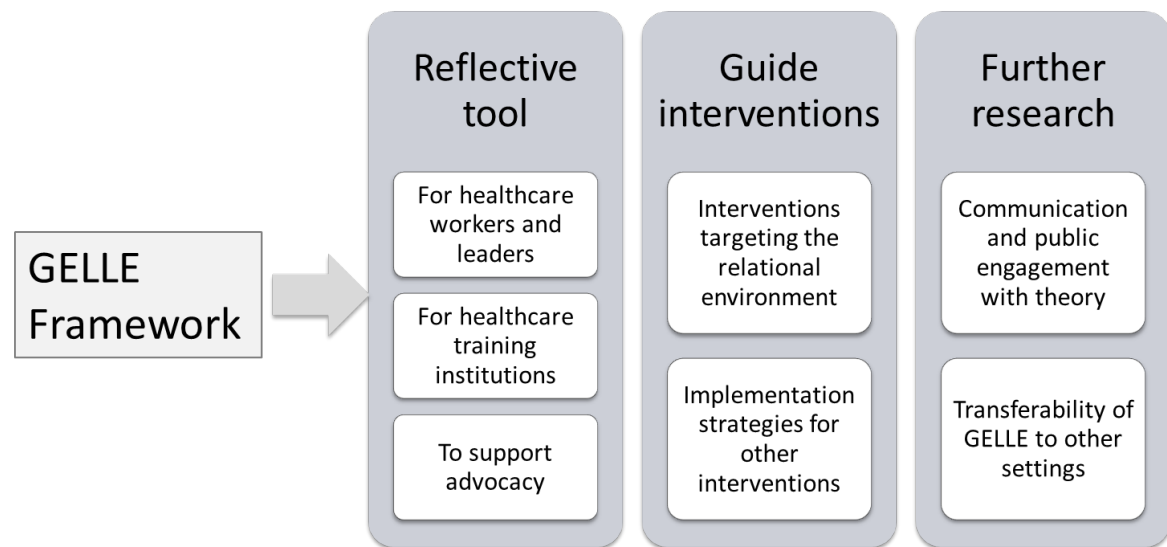
An additional role of senior nurses within the Kenyan system, is of an advocate and potential change maker, if given sufficient authority (Garud et al., 2007; Lockett et al., 2012). The term 'institutional entrepreneur' has been used to describe an individual within an institution (i.e. a resilient social structure (Lockett et al., 2012)), who can both imagine and also embed different norms to those which currently exist (Garud et al., 2007; Lockett et al., 2012). The role of institutional entrepreneur therefore requires considerable relational skill, and the necessary level of legitimacy, whilst also being able to think beyond normative institutional constraint (Garud et al., 2007; Lockett et al., 2012). This thesis shows that senior nurses are located in a highly influential position in neonatal care in Kenya, and have the potential to innovate and foster change. Indeed, during the stakeholder event it was clear that senior nurses were in a position to both innovate to improve relational aspects of the workplace. Moreover, during a subsequent policy dialogue event in Kenya, a potential role for senior nurses in advocacy and mediation (Levin, 2013) around the importance of the relational workplace to those in authority at ministry level was discussed.



4.4 Utility of the GELLE Framework

I have summarised the main findings (4.1) and discussed the GELLE Framework and complexity theory (4.2). I have then demonstrated how GELLE can bring insight to the role of senior nurses (4.3). In this section (4.4), I set out how the GELLE Framework can be used.

Figure 4.4.1: Uses of GELLE Framework



The different potential uses of the GELLE Framework are presented in Figure 4.4.1.

The GELLE Framework as a reflective tool

The GELLE Framework is itself an intervention, in its capacity to promote individual and collective reflection, and improvement discussions within healthcare teams (healthcare workers and leaders), training facilities and at policy level.

For healthcare workers and leaders

During the stakeholder workshop in Kenya, it was clear that the GELLE Framework facilitated discussions around software in the healthcare workplace, and what could be done to improve relational aspects of work. Participants identified with the umbrella CMOCs and discussed these aspects of relational software within their small groups, also proposing recommendations for action. Indeed, stakeholders gave feedback that they would have liked extended time for these discussions during the event, as they found them interesting and useful.

Following the stakeholder event, CW, JJ and I spent time discussing the potential future uses of GELLE as a reflective tool, with ideas including:

- Development of an interactive GELLE reflective tool online
- Use of the GELLE Framework to prompt discussions as part of a continuing professional development activity
- Display of aspects of the GELLE Framework within staff areas of the clinical environment, to prompt reflection on relational behaviours

For healthcare training institutions

Those from healthcare training institutions were also represented at the stakeholder event, and used the GELLE Framework as a tool to reflect on student learning during clinical placements in hospitals, and the role of the training institution in this critical learning period. The influence of the relational environment in the clinical setting, on learning, is clearly demonstrated by GELLE (and was further expanded during the stakeholder event by JJ and CW, who presented additional qualitative work around clinical learning environments and nursing models of care from the Pathways Study). As such, specific relevant aspects of the GELLE Framework could be emphasised and made available to training institutions, as a tool for reflection on the quality of student clinical placements.

To support advocacy

In response to the high degree of interest in the findings of the Pathways study in Kenya, and following the stakeholder engagement event, CW was invited by KEMRI-WELLCOME to write a policy brief for hospital leaders and nurse educators on the Pathways Study findings, and convene a policy dialogue event in Kenya, where findings could be shared and discussed. This occurred on 19th September 2024, and was well-attended by senior hospital managers, senior representatives from training institutions, professional body representatives, and county-level policy representatives. The findings of the Pathways

Study, of which GELLE was a key component, were felt to be highly relevant, to extend beyond neonatal care, and to be important and timely. Those attending the event felt that the findings should be used as an advocacy tool to prompt thinking and action at higher levels of decision making and policy in the country.

The GELLE Framework to guide interventions

Interventions targeting the relational environment

The GELLE Framework can be used as a tool to guide the rationale, justification, selection and design of theory-driven interventions, and operationalised to facilitate the conditions for “*productive emergence*” (Barasa et al., 2017, p.112) The detailed explanatory arguments, provided in the form of supporting CMOCs, can direct theory-guided interventions to improve those aspects identified. By developing and expanding the conceptualisation of relational ‘software’ in the hospital workplace, the GELLE Framework facilitates greater precision in theory-driven interventions targeting relational aspects of healthcare. In addition, in Chapter 3.4, I have mapped a landscape of candidate interventions targeting the relational environment of healthcare, to inform and inspire creative, theory-informed intervention design, planning, and implementation. The practical examples provided in this thesis, ‘flesh-out’ many of the guiding principles and aspirations found in professional recommendations and calls to action to improve organisational culture (Appendix 3.3.3), and offer useful on-the-ground cases to inspire creativity. An example is Shared Governance, which targets several different aspects of the GELLE Framework in a single intervention (Alton et al., 2006; Fleischut et al., 2011, 2012; Marchal et al., 2010; Murray et al., 2016).

During the policy engagement event in Kenya, several immediate and low-cost interventions were identified as ‘low-hanging fruit’ (e.g. providing material care for staff, e.g. microwaves, communication training, teambuilding, collaborative engagement

between hospitals and training institutions), which could improve relational working. Other interventions were felt to require higher level political engagement and support.

Implementation strategies for other interventions

A further important utility of the GELLE Framework is to expound the concept of 'culture', which is identified as responsible in part for inconsistent results associated with interventions implemented across different settings (Dixon-Woods et al, 2012). Indeed, with expanded language and meaning that enables 'culture' to be unpicked, essential relational influences on behavioural norms and change are brought into focus (Mannion & Davies, 2018). As such, these can be carefully considered at the outset of intervention design and implementation approaches and strategies.

The GELLE Framework and further research

Communication and public engagement with theory

Something that has become increasingly clear, is the need to develop a way to communicate the complexity and entirety of the GELLE Framework as an engaging summary, whilst retaining important and relatable detail and nuance. Indeed, throughout the DPhil, particularly in the later stages, I have discussed collaboration with artists and a physical theatre company with CW and JJ, who agree that this would be worthwhile. As further confirmation of the value of artistic collaboration, it was suggested at the policy engagement meeting (with hospital leaders and nurse educators) that we collaborate with a film-maker to creatively engage higher levels of national policy makers (i.e. within the Ministry of Health), where it was felt the study findings should next be directed.

Furthermore, sentiment around the difficulties communicating complex theory was echoed by academics at a recent intersectional gender analysis meeting I attended. I was encouraged to hear about the activities of others, who had worked with artists to better

communicate theoretical work. Indeed, the arts can communicate science in a powerful way (Zaelzer, 2020).

Consequently, I intend to apply for a Public Engagement with Research fund on submission of this thesis, in collaboration with CW and JJ, to explore collaborative working with artists and physical theatre, with the view of creating a series of artworks and a short video, which will help to capture, access and communicate the unavoidable complexity of relational software in healthcare. These creative outputs would be used in dissemination and advocacy, as well as contributing to the development of a reflective GELLE platform, to be used in continuous professional development and quality improvement activities.

Once appropriate modalities of communication had been developed, the use of the GELLE Framework as a reflective tool could be evaluated in further research, for example.

Transferability of GELLE to other settings

Further research is required to understand the degree of transferability of the GELLE Framework to settings outside of neonatal care, and outside of Kenya. During the policy dialogue event in Kenya, it was felt by stakeholders that the findings of the Pathways Study extended beyond neonatal care.

Existing frameworks from the UK and US, such as the Courage of Compassion's ABC (West et al., 2020), and the Institute for Healthcare Improvement (2017) Joy in Work Framework, suggest that aspects of the GELLE Framework may be highly relevant to healthcare settings outside of Kenya. These two frameworks are reproduced with permission here (Figures 4.4.2 and 4.4.3).

Figure 4.4.2 The ABC Framework of nurse and midwife core work needs

Reproduced with permission from Courage of Compassion, Kings Fund (West et al., 2020, p.30)

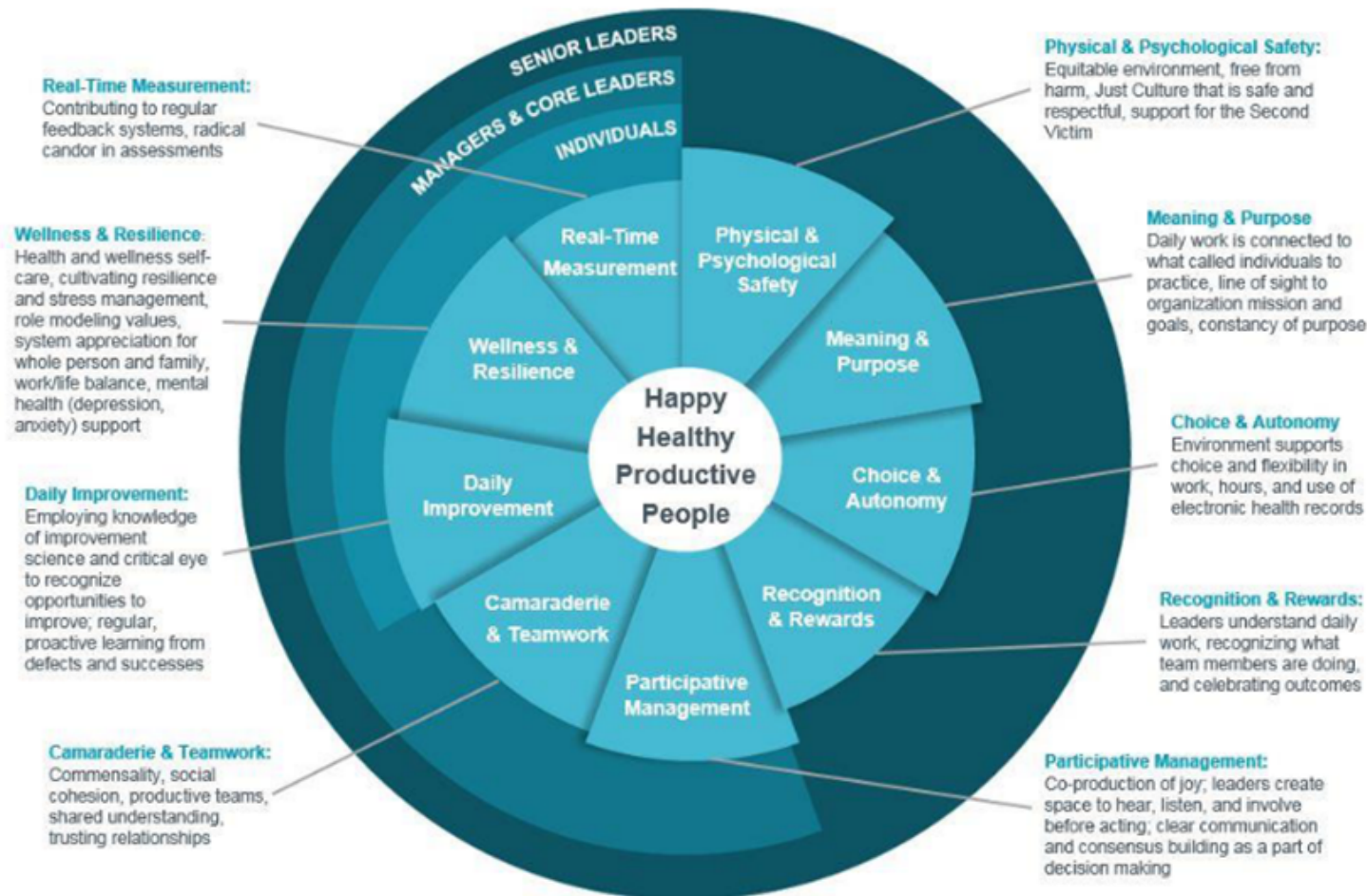
Figure 1: The ABC framework of nurse and midwife core work needs



Figure 4.4.3 IHI Framework for Improving Joy in Work

Reproduced with permission from Institute for Health Care Improvement (2017, p.16)

Figure 3. IHI Framework for Improving Joy in Work



However, there are clearly aspects of the neonatal care setting in Kenya that are not shared by other settings, including often critical levels of understaffing and scarcity of resources, the clinical complexity of neonatal care itself, and features such as the relative dominance of nursing and of female gender staff. Further research to confirm, refute and refine the GELLE Framework in other settings would help to identify threads of transferability.



4.5 Strengths and limitations of the research, reflexivity and ethics

I have summarised the main findings (4.1), discussed the GELLE Framework and complexity theory (4.2) and how GELLE brings insight to the role of senior nurses (4.3). In the preceding section (4.4), I set out how the GELLE Framework can be used. In this section (4.5), I discuss strengths and limitations of the research, and discuss reflexivity and ethics during the research process.

Strengths

The core work undertaken in this DPhil was a realist evaluation, and steps were taken throughout the work to ensure quality, in accordance with RAMESES II Quality and Reporting Standards (Wong et al., 2016). The guidance that I received from Geoff Wong throughout my DPhil work, as well as my participation in a realist DPhil student group, enabled me to develop my personal skills in realist methods. Data collected during the realist evaluation were trustworthy, as a consequence of robust mixed methods and procedures, explanatory arguments were coherent and set out as CMOCs, and the GELLE Framework was deemed highly plausible by stakeholders (see Figure 1.3.1 in

Chapter 1.3). The plausibility of the final GELLE Framework programme theory is additionally strengthened by: 1) its consilience, 2) the simplicity of conceptualising the highly complex and integrated phenomenon of the relational 'software' (Sheikh et al., 2011) of health systems as five explanatory domains, and 3) the analogy of GELLE with existing sociological theories (see Chapter 3.2b) (Duddy & Wong, 2023). As Duddy and Wong propose (Duddy & Wong, 2023), assessment of rigour and quality at the programme theory level of realist work is essential:

"We advocate an approach that applies three criteria: consilience, simplicity and analogy. The consilience of a theory refers to its ability to account for as much relevant data as possible; simplicity expresses the expectation that a theory should be as parsimonious as possible, avoiding the need for ad hoc exceptions, and analogy considers how well a theory 'fits' with what we already know. Any assessment of a theory using these criteria must consider all three principles together." (Duddy & Wong, 2023, p.179)

Furthermore, the initial programme theory that guided the empirical work was developed from a realist synthesis which used a comprehensive search strategy with no language or date restriction, and included documents studying different types of social ties within the workplace (e.g. from friendship, to medication advice ties etc.). The analysis, interpretation and development of initial programme theory was refined in discussion with stakeholders, realist researchers, and co-authors with broad collective experience, and drawing on existing theory. The Pathways Study itself collected robust data through immersion of researchers (JJ and CW) who were clear in research focus, scope, and exercised continuous reflexivity. JJ and CW are both fluent in Swahili and were therefore able to understand all healthcare worker dialogues in both English (preferred by medical staff) and Swahili (preferred by nursing staff). Data were analysed alongside collection, enabling continual sense-checking and adaptation of study tools. Mixed methods data were integrated throughout the study, and used to inform sampling and triangulate findings. The core research team prioritised collaboration and frequent discussions, and

co-investigators and invited stakeholders brought diverse expertise and highly relevant knowledge and experience to sense-making activities.

Strengths of the scoping literature review included its exploratory focus to enable creativity in thinking around potential interventions to target aspects of relational 'software' (Sheikh et al., 2011). There was a comprehensive database search, transparent process of inclusion, exclusion and final selection of documents, and checking for systematic error by a second reviewer.

Limitations

Limitations throughout the research process included the initial realist synthesis, in which the majority of studies were from high income countries. This was mitigated at the time by involvement of stakeholders from Kenya and Sierra Leone, and in the design of the realist evaluation, which sought to be exploratory in approach, in light of anticipated differences in the Kenyan neonatal care setting.

Limitations of the realist evaluation included the challenges to data collection posed by the busy and understaffed clinical environment of neonatal units in Kenya. This influenced participation rates in the research, particularly the SNA questionnaire. To try to mitigate potential research burden on staff, the SNA questionnaire was shortened to just four questions in Hospital 1, in recognition of the pressures on staff. However, all four types of social support still remained in the questionnaire. In the SNA analysis, K-core was applied in order to exclude isolates, which may have appeared in the network if participation rates had been higher. Though I travelled to Kenya twice at the start of my DPhil, I did not travel during the Pathways Study. This was mitigated by regular weekly meetings between CW, JJ and I, as well as shared document folders and frequent communication by email, etc. A full account of mitigation strategies around travel is given in the foreword.

Limitations of the scoping review of candidate interventions included the grey literature mostly coming from the UK, however this was intentional and treated as a sense-checking exercise for the purposes of the review. A realist-informed approach was taken during the final selection of included documents. Whilst the richest and most relevant documents were selected, some useful documents may not have been included as a result of this approach. The review did not set out to quantify or compare effectiveness of identified interventions.

Reflexivity and ethics in practice

Throughout my DPhil I exercised both procedural ethics (e.g. preparing applications for ethical board review in Kenya and in Oxford and submitting requests for amendments, extensions, and annual reports, in collaboration with Conrad Wanyama) and “*ethics in practice*” (Guillemin & Gillam, 2004, p.261) (e.g. the discussions we had as a research team regarding any ethical issues arising during data collection, as well as how best to share and communicate research findings, particularly relating to the social network analysis data). During our discussions as a core research team (CW, JJ and I), we exercised reflexivity (Guillemin & Gillam, 2004; Macbeth, 2001), adapted as necessary (e.g. location of in-depth interviews, shortening SNA questionnaire in Hospital 1), and consulted experienced colleagues where appropriate, in KEMRI-WELLCOME and also in Oxford. In particular my primary supervisor (ME), who is highly experienced and knowledgeable of the neonatal setting in Kenya, offered helpful advice regarding any ethical issues arising during data collection. Further, my supervisor, BH, offered very useful advice and ‘food for thought’ regarding the ethical issues associated with the communication of social network data to participants. This is discussed further below.

Throughout my DPhil, I exercised positional reflexivity, as well as textual reflexivity (Macbeth, 2001). Regarding positional reflexivity, clearly my professional, social and

cultural background (see Personal Reflection at start of thesis), as well as those of my close colleagues in Kenya (CW and JJ) were important to consider throughout the work. The close working relationships that I developed with CW and JJ, meant that we were able to have extensive and open discussions about emerging findings, throughout data collection and analysis, and were able to each consider our own position and those of one another. Further, the efforts taken throughout my DPhil to integrate different perspectives, for example from stakeholders, co-investigators (who were very experienced in the Kenyan neonatal care setting), and my supervisors (see Chapter 2.3) permitted further positional reflexivity when considering these inputs. Potential biases associated with my own personal socio-cultural background, that may have influenced data collection, analysis, interpretation, and engagement with stakeholders, were mitigated in the following ways:

- Data were collected by CW and JJ – both Kenyan and fluent in Swahili
- Data were analysed alongside data collection activities, and continual sense-checking and discussion were embedded within the weekly meetings held between CW, JJ and I, throughout the Pathways Study, as well as being the subject of numerous email exchanges.
- The engagement event with stakeholders in Kenya was arranged and facilitated by CW and JJ, who are both highly skilled communicators. CW and JJ were physically present at the event with stakeholders on the day, during which group reflections and discussions took place, as well as the use of sticky notes to share recommendations, and informal conversations over tea and lunch. I attended the stakeholder engagement event via MS Teams, and so I was therefore a step removed, which may (or may not) have eased the perceived ability of participants to challenge the presented theory.

I exercised textual reflexivity throughout the DPhil (Macbeth, 2001), motivated by a strong desire that the thesis findings and the construction of knowledge were of high quality. To this end, I checked anything within the observation data collected by my colleagues, CW and JJ, that may have been open to misinterpretation and clarified any queries and additional context with them. We also discussed these in our meetings. We shared interim CMOCs with the co-investigators of the Pathways Study, and received useful feedback from highly experienced colleagues. In addition, I recoded all the interview data by detailed CMOC towards the end of the realist analysis, as a further quality check. The stakeholder sense-checking event offered a principal opportunity to test the adequacy of textual representation within the GELLE Framework, and I was relieved and very thankful to learn that the participants considered the theory to be representative, based on their experiences. As already expounded in the discussion, I feel an important next step to enhancing the ways in which complex theory can be more effectively communicated to different stakeholders, is through collaboration in the arts, to convey meaning and sufficient detail to translate theory into practice.

A particular area of learning for me in this DPhil, was around the ethics of communicating social network findings (Benton, 2015; Hogan, 2021; Tubaro et al., 2021). It soon became clear that sociograms and other social network data could become identifying and could lead to unintended consequences within units if shared without sufficient consideration of the potential unintended impacts on the very social structures that were the subject of study. For example, the potential temptation for individuals to try to locate themselves and others in a sociogram, led to considerable reflection, discussion and deliberation within the core team (CW, JJ and I), with substantial inputs and advice from BH. We considered methods other than sociograms to communicate the salient SNA findings, and where sociograms were constructed for communication in this thesis, these were limited to 'coarse cadre' (e.g. all types of doctor classified as "doctor", rather than as MO, resident, consultant, etc.).

Finally, as a DPhil student, my positionality evolved over the course of the work presented here, particularly as I engaged with sociological theory. Indeed, the positionality of my colleagues and supervisors also likely influenced my own positionality (and possibly mine theirs). I undertook the DPhil as a part-time student. As such, I was able to conduct the research presented in this thesis over a longer period of 'real-time'. This offered some practical advantages, for example, ethical review submissions took time to be approved, research permits needed to be obtained by CW in Kenya, the start of data collection was delayed in one hospital, etc. Furthermore, even though I did not work on my DPhil outside of my 50% FTE, I continued to mull over the ideas and concepts in my head. Most importantly, I was able to develop close working relationships with CW and JJ, through our regular interactions over the entire course of the Pathways Study.



4.6 DPhil conclusions

In this chapter, I have summarised the main findings of the research (4.1), discussed the GELLE Framework and complexity theory (4.2) and how GELLE brings insight to the role of the senior nurse (4.3). I then set out how the GELLE Framework can be used (4.4), and discussed strengths and limitations of the research, reflexivity and ethics (4.5). I now conclude the thesis with its central claims (4.6).

In my DPhil research I set out to better understand staff social ties in hospitals and how they influence the workplace and neonatal care in Kenya (Chapter 1). Informed by an initial realist synthesis of the literature, a realist evaluation was undertaken, using mixed methods data (non-participant observations, in-depth interviews and social network analysis) from two urban hospitals. A subsequent scoping review was also conducted (Chapter 2). Programme theory was developed that explained how, why, for whom and in

what context, the social ties of staff influence quality of care, using five domains (GELLE): Grouping, Empowering, Leading, Learning, Equipping. Candidate interventions targeting aspects of the relational workplace were identified (Chapter 3). In this chapter (Chapter 4) the contribution of the GELLE Framework to theoretical understanding of the relational workplace is discussed, the utility of the GELLE Framework is proposed, and strengths and limitations of the research and reflexivity are discussed.

In this thesis I have answered the three research questions presented in the Introduction Chapter, in the following ways:

Research question #1: What can we learn from research on staff social ties that informs our thinking on strategies that support collective behaviour change in hospitals?

This question has been answered by undertaking a realist synthesis of the literature. A programme theory to explain the social ties of hospital staff was developed from 75 relevant included documents that used social network analysis as a methodology. The realist synthesis found that the social position and therefore the relative social influence of healthcare staff could be understood in terms of: 1) social group, 2) hierarchy, 3) bridging distance, and 4) discourse. By identifying aspects of context that influence the social power of individuals to influence change in the workplace, the realist synthesis has provided insights into how behaviour change might be supported in hospitals through relational means. The theory developed from realist synthesis of the literature was used as an initial programme theory, to be tested (i.e. confirmed, refuted and refined) by undertaking a realist evaluation of empirical data.

Research question #2: How, why, for whom, to what extent and in what context do the social ties of staff (particularly senior nurses) in a neonatal unit in Kenya influence quality of care being targeted by improvement efforts?

This question has been answered by undertaking a realist evaluation using mixed methods data from two study sites in Kenya, to develop a new programme theory – the GELLE Framework. The new GELLE Framework developed in this thesis is an explanatory conceptual framework to better understand the relational structuration between staff providing neonatal care in Kenya. The GELLE Framework answers research question #2 by providing detailed explanatory context-mechanism-outcome configurations, which are abstracted to five overarching conceptual domains: 1) Grouping, 2) Empowering, 3) Leading, 4) Learning, and 5) Equipping. Using the GELLE framework as a conceptual lens, the influence of staff social ties on the processes of clinical care and therefore aspects of quality targeted by improvement efforts are identified. The specific relational influence of senior nurses relative to other healthcare staff in the neonatal care setting is presented in the context of the relational whole.

Research question #3: What lessons can be drawn from examining staff social ties, to guide the design of interventions to improve neonatal care in Kenyan hospitals that require collective behaviour change?

This question has been answered in the thesis in several ways. Firstly, through realist evaluation, specific aspects of context that trigger relational mechanisms of interest are identified in the GELLE Framework. These identified aspects of context present potential targets for interventions to support desirable collective behaviour change and improvements in neonatal care. Secondly, stakeholder engagement in Kenya identified recommendations offered by those working in neonatal care, based on the new GELLE Framework. These recommendations can be considered in the design of relational interventions to improve care in these settings. Thirdly, candidate interventions targeting aspects of the relational workplace were identified by a scoping review of the literature. By specifically focusing on identifying interventions targeting relational aspects of the workplace, broad and creative approaches to quality improvement in hospitals were

identified, which can inform the design of relational interventions that intend to target specific aspects of context. To further facilitate the application of scoping review findings to the design of interventions, candidate interventions have been presented using the GELLE Framework as an organising schema.

The conclusions from my thesis are:

- The relational workplace within hospitals exemplifies the features of a complex adaptive system, displaying features such as non-linearity.
- The relational workplace can be understood in terms of: 1) who individuals consider to be their peers and trusted colleagues, 2) the aspects of formality and structure which influence the ability of specific individuals to act, 3) how leadership influences relational culture, 4) how learners can be supported to become competent professionals, and 5) how physical order influences relational processes (i.e. the GELLE Framework).
- The GELLE Framework expounds meaning around relational 'culture' and offers detailed and holistic theory, which can be useful to identify aspects of relational causation within the hospital workforce. GELLE provides explanation as to how structuration of the relational workplace occurs in hospitals.
- The importance of the relational workplace to staff wellbeing, training and patient care is demonstrated, as well as the specific influence of leaders.
- Aspects of relational context are identified through GELLE as possible targets for interventions to improve quality of care. As such, GELLE can be used as reflective tool to inform quality improvement interventions. Future work will explore and develop creative approaches to facilitate communication of complex theory to stakeholders.

In summary, this thesis exposes and conceptualises the relational workplace of hospitals, which has long been under-theorised. It explains how duality of relational systems and structure operates, and thus how reproduction and transformation can occur. As such, the

findings illuminate possibilities for influencing deep-rooted, “visible, invisible”, social phenomena in healthcare, such as norms, values, power and culture.

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2.1.2	The Social Networks of Hospital Staff: A Realist Synthesis Blacklock C, Darwin A, English M, McKnight J, Hinton L, Harriss E, Wong G. The social networks of hospital staff: A realist synthesis. J Health Serv Res Policy. 2022 Jul;27(3):242-252.
2.1.3	Example search for realist synthesis – reproduced from Blacklock C, Darwin A, English M, McKnight J, Hinton L, Harriss E, Wong G. The social networks of hospital staff: A realist synthesis. J Health Serv Res Policy. 2022 Jul;27(3):242-252.
2.2.1	Protocol for the Pathways Study: a realist evaluation of staff social ties and communication in the delivery of neonatal care in Kenya Wanyama C, Blacklock C, Jepkosgei J, <i>et al</i> Protocol for the Pathways Study: a realist evaluation of staff social ties and communication in the delivery of neonatal care in Kenya <i>BMJ Open</i> 2023;13:e066150.
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Appendix 1.1: Table of medical insurance-based data reports, identified by systematic search of the literature and excluded from the realist synthesis

	Author	Population of focus	Social network data extraction	Main findings
1	Bachand 2018(1)	Physicians peer groups (n157) sharing the care of women with breast cancer (n8338) in the US.	Patient-sharing physician groups identified from Surveillance, Epidemiology, and End Results (SEER)-Medicare linked database in US. <u>Network measures</u> • Provider density • Provider transitivity <u>Other measures</u> • Racial composition of women with breast cancer in a physician peer group • Delayed breast cancer surgery was defined as delay between needle biopsy and surgery of >30 days	• 31.7% women experienced surgical delay, with marked variation across physician peer groups (IQR 28.2%-50%). • For every 10% increase in the percentage of black patients in a peer group, there was a 41% increase in the odds of delayed surgery for women in that peer group regardless of a patient's own race (OR 1.41, 95% CI 1.15-1.73). • Highest density within the peer group was associated with less delayed surgery than lowest density (OR 0.65, 95% CI 0.44-0.98). • No association between provider transitivity and delayed surgery.
2	Barnett 2012(2)	Hospital-based networks of physicians (primary care or specialist physicians), connected by 'significant encounters' with common patients (who had one of 9 life-threatening common conditions, and were in the last 2yrs of life). Final sample included 61,461 physicians affiliated with 528 hospitals.	Patient-sharing physician groups (hospital and primary care) identified from 2006 Medicare Carrier File for 50 randomly sampled hospital referral regions (HRRs) and the Boston HRR in the US. <u>Network measures</u> • Physician's adjusted degree – higher adjusted degree indicates sharing patients with a broader array of other doctors, compared to lower adjusted degree • Betweenness centrality • Relative centrality of Primary Care Providers (PCPs) – calculated as ratio of mean centrality of PCPs/mean centrality of other doctors in a hospital <u>Other measures</u> • Hospital characteristics, e.g. beds, teaching hospital status etc. • Case-mix adjusted health care spending (total inpatient plus outpatient, imaging and laboratory tests) • Case-mix adjusted health care utilisation (hospital days)	• PCP relative centrality decreased with hospital size, from mean 1.11 (SD 0.87) in smaller hospitals to 0.80 (SD 0.54) in larger hospitals (p<0.001) • An increase of one standard deviation in the median adjusted degree (corresponding to an addition of 107 doctors per 100 patients shared to the typical doctor's number of contacts) was associated with a 17.8% (95% CI, 13.2-22.5) increase in total Medicare spending, 17.4% (95% CI, 12.6-22.4) more hospital days, and 23.8% (95% CI 18.6-29.1) more physician visits in last 2yrs of life. • Higher centrality of PCPs by one standard deviation correlated with reduced overall spending of 6% (95% CI -9.5,-2.4), and 9.2% (95% CI -13.1, -5.1) less spending on imaging, and 12.9% (CI -17.0, -8.6) less spending on tests.

			(total, ICU and general med/surg), and number of physician visits (incl. PCPs and specialists))	In addition this correlated with 8.6% (95% CI, -19.4,-9.7) fewer physician visits and 14.7% (95% CI -19.4, -9.7) fewer medical specialist visits. • Authors conclude that more effective coordination of patient care is associated with lower costs and lower healthcare utilisation, as illustrated by higher costs and utilisation found when patients are seen by multiple different providers compared to lower costs and utilisation when primary care providers are more central in the network.
3	Choudhury 2018(3)	Physicians prescribing four specific pain medications within three large IDNs in the US	• Medical-prescriptions dataset and Healthcare Organization Services (HCOS) physician-affiliation dataset used to explore pain medication prescribing. Three large Integrated Delivery Networks (IDNs) selected from east coast of US, consisting of 14 hospitals and 288 physicians. Directed influence graphs created using prescribing history of physicians. • Assumptions made that two physicians were connected if they were affiliated to the same IDN, affiliated or working in the same hospital, belonging to the same speciality, and belonging to the same speciality-group. Time of first prescription of one of four pain medications was taken to be time of adoption. Influence thereafter on other physicians was assumed if they also adopted prescribing the medication in the next 6 or 12 months. • A weighted network was then constructed, weighting on the number of similarities shared between physicians. Weighted approach of unequal weights methodology used to analyse binary similarities of physician attributes (e.g. place of work). General threshold model was used to analyse directed influence. <u>Measure</u> • Diffusion of prescribing behaviour	• Affiliation to the same hospital, or the same integrated delivery network, found to influence diffusion of prescribing behaviour. • Authors suggest that such links represent weak ties (compared to same speciality, for example).

4	Donohue 2018(4)	Physicians (11,958) who demonstrate some minimal prescribing in the therapeutic classes of interest (≥ 1 prescription/quarter of anticoagulant, antidiabetic and antihypertensive medication)	• Social networks of physicians in Pennsylvania constructed using: patient-sharing data from Medicare and Medicaid data, medical group and hospital affiliation from the American Medical Association (AMA) Masterfile, and medical school/residence programme from the American Medical Association (AMA) Masterfile. • Prescribing data were collected from the QuintilesIMS's Xponent™ database. • Adoption was defined as writing at least the median number of prescriptions among physicians prescribing the new drug at least once in its first 15 months on the market. <u>Outcome</u> • Peer adoption rate	• Adjusted analysis revealed that patient-sharing networks were most highly associated with peer adoption of all three of the new drugs studied. • 10% increase in peer adoption in patient-sharing network led to a 5.90% (SE 1.5%, $p < 0.001$) increase in physician adoption of dabigatran, 8.32% (SE 1.51%, $p < 0.001$) increase in sitagliptin, and 7.84% (SE 2.93%, $p < 0.001$) increase in aliskiren adoption. • There was no significant association with peer adoption with being affiliated with the same hospital (non-significant increase), medical group or training institution. • Physicians in top decile of patient-sharing network peers estimated to have almost 2-fold stronger influence on peer adoption, compared to physicians in top decile of prescribing volume.
5	Everson 2018(5)	Physicians caring for patients undergoing coronary artery bypass grafting (CABG) in 24 hospitals in the US.	• Physician patient-sharing networks constructed using Medicare and Medicaid data for patients undergoing CABG in Michigan between 2008 and 2011, from 6 months before surgery and 60 days after hospital discharge. <u>Network measures</u> • Reinforcement – the extent to which physicians work together repeatedly • Clustering coefficient – high coefficient indicates cohesive group of physicians that work within a group of shared colleagues • Density <u>Other measures</u> • Teamwork climate, as measured using the teamwork section of the Safety Attitudes Questionnaire at each of the 24 hospitals (total 1,108 physicians)	• Reinforcement and clustering were associated with higher levels of reported teamwork (adjusted – $p 0.006$ and $p 0.004$). • Density not directly associated with higher teamwork ($p 0.641$). • Interaction between density and reinforcement, suggesting greater interconnectedness may have negative effects at low levels of reinforcement, however this negative effect was lessened at higher levels of reinforcement. • Stronger teamwork was associated with cohesive teams that worked repeatedly with one another.
6	Ghomrawi 2018(6)	Physicians caring for patients aged 66yrs and older undergoing	• Physician patient-sharing networks constructed, using Medicare data for patients undergoing THR, from 30 days prior to admission until 60 days after discharge.	• Physician-referral networks which served a greater proportion of black patients were seen to show more clustering into sub-groups with

		total hip replacement (THR) in the US	Tie strength was constructed based on number of patients shared between physicians. External ties were also constructed. <u>Network measures</u> • Clustering coefficient – tendency for a tightly interconnected group • Number of external ties – ties outside of immediate area (outside Core Based Statistical Area where hospital was located) <u>Other measures</u> • Proportion of black residents of each Hospital Service Area	some sub-groups having no external ties. This suggests these groups are more insular. • In contrast, physician-referral networks serving a lower proportion of black patients were found to be more centralised with more external ties.
7	Herrin 2019(7)	Physicians caring for patients with breast cancer in the US	• Patient-sharing networks of physicians constructed from Surveillance, Epidemiology and End Results (SEER) Medicare dataset for patients with breast cancer. • Physicians must have treated the patient between the time period of 3 months before diagnosis to 9 months after. (Physicians treating patients from more than one hospital referral region were treated as being two separate physicians.) • Stability calculated by randomly dividing total patients into two cohorts of patients (n142,098 and n136,680) to identify peer groups through process of comparison, then dividing whole cohort into two time periods. <u>Network measures</u> • Peer groups – as calculated using Girvan-Newman algorithm <u>Other measures</u> • Overlap between hospital-based groups and peer groups	• Patient-sharing physician groups were found to be relatively stable over time (median 70.8%, IQR 0%, 21%). • Peer groups were distinct from a physician's hospital affiliation. Mean overlap was calculated as 32.2% (IQR 12.1%, 59.2%)
8	Hollingsworth 2016(8)	Physicians caring for patients aged 66yrs and older undergoing coronary artery bypass grafting (CABG) in the US	• Patient-sharing networks of physicians (466,243) constructed for patients undergoing CABG (251,630), from 30 days before to 60 days after admission, using Medicare and the Medicare Provider Analysis and Review file. <u>Network measures</u>	• Patient-sharing physician networks were seen to vary in structure, by geographical location, from low levels of teamwork and fragmentation, to high levels of teamwork and a core cohesive team. • Low teamwork groups were associated with a

			- Bipartite clustering coefficient – tendency to assemble into dense tightly-interconnected groups around shared patients – measure of ‘teamwork’ in this study <u>Other measures</u> - Emergency department (ED) visit within 60 days of discharge - Readmission within 60 days of discharge - Mortality within 60 days of discharge	greater proportion of patients from ethnic minorities, as well as several hospital-level attributes (e.g. larger academic centres). - Health systems with physician teams that worked together frequently around CABG episodes achieved ED visit, readmission, and mortality rates, which were 24.6%, 24.4% and 28.4% lower, respectively, than those of health systems with low teamwork levels. 25% increase in bipartite clustering coefficient associated with decrease in readmissions of 17 per 1000 CABG procedures.
9	Ito 2017(9)	Physicians providing care to patients registered with health insurance company in Brazil.	Physician patient-sharing networks constructed from data comprising 18 months of claims to a large health insurance company in Brazil. Data from 219,675 physicians included in the analysis. Comparisons also made over time, using quartile time intervals. <u>Network measures</u> - Degree – interpreted as importance - Eigenvalue – patients shared with other important physicians - Betweenness - Closeness – degree of separation	- Network positions found to be relatively stable over time - Highly connected core of well-connected physicians - Paper excluded from narrative analysis due to quality concerns
10	Landon 2012(10)	Physicians (68,288) providing care to Medicare patients (4,586,044) in 2006 across 51 Hospital Referral Regions in the US	- Shared patients identified from Medicare claims from 2006. Physician characteristics identified from American Medical Association’s Physician Masterfile. Practice-level patient characteristics were also described for each physician. <u>Network measures</u> - Adjusted physician degree - Number of patients shared by physician - Relative betweenness centrality - Physician-level clustering coefficient <u>Other measures</u> - Physician characteristics - Practice-level patient characteristics	- Variation in physician adjusted degree and clustering seen in different geographical locations, associated with differences in network size - Certain aspects of network differences however were not a function of differences in network size, e.g. betweenness centrality - In all areas, male physicians were more likely to have ties with other males, but female physicians less likely to have ties with other females - Ties were also more likely within the same speciality, same hospital, close geographical

				region, and when colleagues were more similar in age. Ties were seen between physicians with similar practice intensity, and between those whose patient groups were similar in ethnicity, age, proportion of Medicare beneficiaries and morbidity complexity.
11	Landon 2018(11)	Physicians providing care to all Medicare patients in 50 Hospital Referral Regions in the US, between 2005 and 2010 (mean 3,761,223 patients seeing 40,241 physicians per year)	Physician patient-sharing networks from 50 hospital referral regions were constructed from Medicare data, by connecting pairs of physicians who share patients with one another during an episode of care. <u>Network measures</u> - Degree – the number of doctors connected to a given physician through patient sharing - Physician dispersion – the extent to which a physician’s patients are treated by other physicians outside their community % Primary Care Physicians (PCPs) <u>Other measures</u> - Total standardised annual spending, per patient - Spending on inpatient services, physician services, skilled nursing facilities, hospice use - Hospital admissions (excluding transfers), hospital days, emergency department visits, PCP visits, specialist visits - Readmissions within 30 days of discharge - Screening mammography for women aged 52-69yrs, 3 services for patients with diabetes, LDL testing for patients with CVD - Prevention quality indicators	1 SD increase in adjusted degree of the assigned PCP was associated with increase in total spending of \$1009 ($p<0.001$). 1 SD increase in physician dispersion was associated with \$172 ($p<0.001$) increase in spending. 1 SD increase in % PCPs in community associated with \$94 decrease in total spending (not statistically significant), and decreased spending for hospitalisations of \$38 ($P<0.001$). 1 SD increase in adjusted degree was associated with more hospital admissions and days (0.02 and 0.18 respectively, $p<0.001$) more emergency visits (0.02, $p<0.001$), more visits to specialists (0.37, $p<0.001$), and more primary care visits (0.11, $p<0.001$). - Patients whose physician’s networks had more PCPs had more primary care visits (0.44, $p<0.001$) and fewer specialist and emergency visits (-0.33, $p<0.001$ and -0.008, $p=0.008$) - Measures of quality inconsistently related to network measures – increase in any of network measures generally led to slight worsening of care.
12	Moen 2016(12)	Physicians working at two hospital referral regions in the US, one with higher (86%) and one with lower	Physician patient-sharing networks constructed using Medicare claims data. Physicians were assigned to a single hospital, based on claims made. ERGM in R used in analysis. <u>Network variables</u>	- Hospital was a significant predictor of evidence-based practice. - Certain specialties were associated with homophily - Node strength of ICD capable physicians was

		(66%)rates of evidence-based use of implantable cardiac defibrillator placement in patients aged 65yrs or older with one of specific list of cardiac diagnoses.	- Density - Degree - Node strength - Geodesic distance - Weighted geodesic path - Weighted closeness - Weighted betweenness centrality - Eigenvector centrality - Clustering coefficient <u>Other variables</u> - Evidence-based use of implantable cardiac defibrillator placement in patients with cardiac failure	associated with evidence-based ICD use Findings suggested that differences in ICD capable physician node strength and closeness centrality partly explained variation in evidence-based care between hospitals.
13	Pollack 2012(15)	Physicians (n4,300) caring for men aged 65yrs and older with localised prostate cancer diagnosed between Jan 2004 and Dec 2005, living in three cities in the US.	Registry and administrative claims data used from the Surveillance, Epidemiology and End Results (SEER) – Medicare database. Physician data from Medicare Physician Identification and Eligibility Registry and the 2005 American Medical Association Masterfile. Data linked. Included physicians were: diagnosing urologist, majority urologist, primary care provider, plurality provider, and radiation oncologist. <u>Network variables</u> Physician subgroups, as calculated by the Girvan-Newman algorithm <u>Other variables</u> Prostatectomy Other primary treatments for localised prostate cancer Patient characteristics Physician practice location	- Subgroups ranged widely in proportion of patients who were black and the lowest income category, for example in city B subgroups ranged from 19.6% to >90% white, and 17.5% to 78.6% in the highest income category. - Controlling for sociodemographic and clinical characteristics, network subgroup was significantly associated with likelihood that patient undergoes a prostatectomy in subgroups in each city (eg. In city A 14.1% to 47.1%). - Although providers in the same practice were often in the same subgroup, subgroups frequently had doctors from multiple practices.
14	Pollack 2013(14)	Physicians caring for patients aged 40yrs or older with congestive heart failure (patients n9,596) or diabetes (n52,688) in 2009 in the US.	- Physician patient-sharing networks constructed from the databases of five large commercial insurance plans, using IMS Health Plan Claims Database, in the US. <u>Network measures</u> - Care density –amount of patient-sharing among patient’s providers - Whether patient saw a PCP	- Patients with higher care densities (top quartile, indicating highest level of patient sharing between patient’s providers) had lowest average total, inpatient, and outpatient costs. - No clear patterns of association between care density and measures of care coordination. - High care density was associated with \$3,310

			• Total number of different providers per patient • Usual provider of care index • Brice Boxerman Continuity of Care Index – measuring dispersion of visits across providers <u>Other measures (in the year 2009)</u> • Total costs • Inpatient costs • Outpatient costs • Pharmacy costs • Total number of inpatient admissions per patient	annual total cost reduction for patients with CHF (compared to lowest quartile) and \$1,502 cost reduction for patients with diabetes. High care density was also associated with lower inpatient costs (\$2,563) for CHF patients, and lower inpatient (\$992) and outpatient (\$670) costs for patients with diabetes. • Adjusted rate of annual hospitalisation for high care density was 83.4% of the rate in the low density group for CHF, and 87.9% for diabetes.
15	Pollack 2014a(13)	Physicians caring for 2677 men who underwent radical prostatectomy for localised prostate cancer in five cities in the US.	• Physician patient-sharing networks constructed from Surveillance, Epidemiology and End Results-Medicare data of patients aged 65yrs and older with localised prostate cancer undergoing radical prostatectomy from five cities in the US. • Physician data extracted from American Medical Association master file. <u>Network variables</u> • Subgroups –using Girvan-Newman algorithm using betweenness scores • Degree (within each network subgroup) <u>Other variables</u> • 30-day surgical complications • Late urinary complications (31-365 days after surgery) • Long-term incontinence (18 months or more after surgery) • Patient characteristics • Proportion of non-white patients per physician network subgroup • Patient hospital assignment	• In each city, subgroups of doctors who were densely connected were identified. • Unadjusted rate of 30-day surgical complications varied by network subgroup and by city from 20.7% difference across subgroups in city 4 to 31.2% difference in city 5. (in regression model, statistically significant difference between subgroups in cities 2 and 3) • Differences in rates of late urinary complications ranged from 32.1% to 72.5% across network subgroups within cities. (in regression model, statistically significant difference between subgroups in cities 2, 3 and 5) • Differences in long-term incontinence ranged from 6.7% to 36.8%. (in regression model, statistically significant difference between subgroups in city 1, 2, 4 and 5) • ICCs indicate that network subgroups explained up to 13.5% variation in 30-day complications (city 3), up to 31.3% variation in late urinate complications (city 3) and up to 14.7% variation in long-term incontinence (city 1). • Average urologist degree significantly associated with 30-day surgical complications and long-term incontinence. • Proportion of non-white patients in a network

				subgroup significantly associated with long-term incontinence. Adjusting for hospital still found significant association between network subgroup and complications. Hospitals contributed up to 11.2% variation in 30-day surgical complication (city 3), 13.8% for late urinary complications (city 3) and 12.3% for long-term incontinence (city 2).
16	Pollack 2014b(16)	Physicians caring for patients (n8,661), after the first year following loco-regional breast, prostate or colorectal cancer diagnosis, in the US.	- Surveillance, Epidemiology and End Results (SEER)-Medicare linked database used to identify patients with loco-regional breast, prostate or colorectal cancer diagnosis who had survived at least 3yrs. Observation period was from day 366 to day 1095 post-diagnosis. - Three types of provider, based on speciality: primary care providers (PCPs), oncology providers, and other providers. <u>Network variables</u> - Care density – patient-level measure, describing the amount of patient-sharing among the patient's providers <u>Other variables</u> - Health care utilisation – hospitalisation or emergency department visit - Costs – total, outpatient and inpatient - Quality measures – indicators for the quality of comorbid condition care - Patient characteristics	- Patients in lowest care density quartile more likely to be female, non-white, without a PCP, and live in an urban area. - Patients in highest tertile of adjusted care density had lower odds of hospitalisation (OR 0.87, CI 0.75-1.00, p = 0.05) and higher odds of eye examination (not significant). - Patients who were treated by physicians who shared more patients with one another, had lower cost care, and some aspects of higher quality care.
17	Pollack 2015(17)	Surgeons caring for patients (n15,073) with early-stage breast cancer in the US.	Physician patient-sharing networks constructed using Surveillance, Epidemiology and End Results (SEER)-Medicare linked database in the US. Two time periods studied, to identify early adopters of brachytherapy in T1 (2003-2004) and later adopters in T2 (2005-2006). Patients aged 67-94yrs with non-metastatic, invasive stage I to III breast cancer diagnosed 2003 and 2004 included. Physicians had to share at least 2 patients to	- Patients were more likely to receive brachytherapy if their surgeon shared patients with a surgeon who was an early adopter of brachytherapy, compared to not (adjusted OR 3.40, CI 1.11-10.38). - Predicted probability of or receiving brachytherapy in patients whose surgeon did not have an early adopting alter was 1%,

			be “connected”. <u>Network variables</u> • Early-adopting peer (i.e. surgeon connected to an early adopting surgeon by sharing patients) <u>Other variables</u> • Surgeon adoption of brachytherapy treatment • Patient characteristics • Surgical volume, hospital	whereas if the surgeon had an early adopting alter it was 3.9% (difference significant).
18	Tannenbaum 2018(18)	Physicians caring for patients with stage 0-III breast cancer in the US, during 2004-2006.	• Physician patient-sharing networks constructed from Surveillance, Epidemiology and End Results (SEER) -Medicare database in the US, within hospital referral regions. Women aged 67-94yrs with and without breast cancer were used to construct patient-sharing networks. Use of perioperative MRI at two time points was collected (2004-2006 and 2007-2009), to identify early adopters T1 and later adopters T2 of perioperative MRI. SAS used in analysis. • Connections between 5 types of physicians mapped: surgeons, medical oncologists, radiologists, radiation oncologists, and PCP including obstetricians/gynaecologists. • Connections were defined as sharing at least 2 patients. <u>Network variables</u> • Network subgroups - using Girvan-Newman algorithm • Composition of subgroups • Degree of physicians in subgroups • Transitivity – measured by a clustering coefficient – how tightly knit a physician’s peers are • Betweenness centrality <u>Other variables</u> • Use of perioperative MRI (representing an equivocal evidence intervention) • Demographic characteristics	• About 10% higher surgeon transitivity associated with higher rates of MRI adoption (OR 1.29, CI 1.06-1.58). • Conversely, each 10% increase in % PCPs was associated with an OR of MRI of 0.81 (CI 0.71-0.93) • Patients treated by physicians who were in groups with >10% baseline MRI use were significantly more likely to receive MRI during T2 (OR 4.11, CI 2.42-6.97), compared to groups with no MRI use in T1.
19	Uddin 2013(19)	Physicians caring for patients undergoing	• Physician collaboration networks constructed using data from a large non-profit healthcare insurance	• Increased degree centralisation was associated with reduced readmission rate ($p<0.001$), but no

		total hip replacement in 85 hospitals in Australia.	organisation, the Hospital Contribution Fund (HCF), in Australia. Claims data for patients (n 2229) undergoing total hip replacement at 85 hospitals were used. - The 5 most expensive physician collaboration networks (PCNs) and the 5 least expensive PCNs, and the 5 PCNs that had the highest readmission rate and the 5 that had the lowest readmission rate, were particularly explore in the analysis. <u>Network variables</u> - Degree centralisation - Betweenness centralisation - Network density <u>Other variables</u> - Hospitalisation cost - Readmission rate - Patient age	association with hospitalisation cost. - Density was positively associated with both readmission rate and hospitalisation cost, with increases in both proportionate to the increase in density. - Betweenness centralisation negatively correlated with hospitalisation cost and readmission rate. This indicates that low betweenness centralisation not conducive for healthcare service providers or hospitals. - High cost PCNs found to be well-connected, but decentralised. As PCNs become more centralised, the performance of the network will increase compared to decentralised PCNs. - High readmission PCNs are more decentralised (no actor playing role of network hub). As networks become more centralised, performance will improve compared to decentralised PCNs.

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The social networks of hospital staff: a realist synthesis

Citation

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Review question

How, why, for whom, to what extent and in what contexts do the social ties of staff within a hospital influence quality of service delivery, including quality improvement?

Searches

Ovid MEDLINE; Ovid Embase; Ovid Global Health; Ovid PsycINFO; EBSCO CINAHL; ProQuest Sociological Abstracts; EBSCO Business Source Complete; ProQuest ABI/INFORM Global; ProQuest EconLit; ProQuest ASSIA; Social Sciences Citation Index (via Web of Science); Science Citation Index(via Web of Science); IDEAS (<https://ideas.repec.org/>); and LILACS (<http://LILACS.bvsalud.org/en/>).

No language or date restrictions on search

Types of study to be included

Include:

- Empirical study (i.e. both observation and intervention designs)
- Must use a form of social networks analysis in study methodology

Exclude:

- No empirical data collection
- No use of social networks analysis (SNA) in study methodology

Condition or domain being studied

Quality of service delivery. Quality improvement. Health systems. Social networks of staff

Participants/population

Include:

- Hospital staff (all staff working in a hospital, e.g. clinical, allied health professionals, non-clinical, administrative, managerial - see search terms for full list)

Exclude:

- Primary focus on patients, carers, relatives, lay health workers or students
- Community, primary care, public health, or health policy setting

Intervention(s), exposure(s)

Social networks of staff, i.e. the type, nature, purpose, function and quantity of social ties held by staff members within a hospital setting to others

Comparator(s)/control

Not applicable

Context

Include:

- Hospital settings

Exclude:

- Community, primary care, public health, or health policy setting

Main outcome(s)

- Service delivery (i.e. proximal and distal administrative and clinical processes or activities which contribute to health service function and patient care)
- Quality improvement (i.e. changes to improve service delivery)

Measures of effect

Additional outcome(s)

Not applicable

Measures of effect

Data extraction (selection and coding)

Study selection:

Titles and/or abstracts of retrieved articles will be screened for inclusion/exclusion by a principal reviewer (CB), using the criteria above. To identify any systematic screening errors in inclusion/exclusion during screening, a sample of 10% will be independently screened by a second reviewer (AD). Full text articles will subsequently be reviewed by CB, with 10% independently reviewed by AD. Any disagreements between the principal and second reviewers will be resolved by a third reviewer.

The final set of included studies will be based on relevance to theory building and the rigour of methods used to collect data. (see Wong et al. BMC Medicine 2013, 11:21)

Data extraction from included studies:

Data extraction (1) study characteristics and 2) realist coding) will be performed by a principal researcher (CB), with 10% of realist coding also repeated by a second researcher (AD). Disagreements will be resolved by discussion with one or more additional authors.

Coding of data relevant to building realist theory will be conducted using NVivo (v.12) software.

The following data will be extracted from included studies:

1) Study characteristics:

- Authors
- Year
- Study design
- Research question/Aim of study
- Setting of study – hospital size/function, country/region, time of data collection
- Method of social network analysis used
- Participants – role, cadre, number
- (Intervention - if applicable)
- Outcome measures: how defined, selected, collected
- Main findings

2) Coding of data relevant to building realist theory

Risk of bias (quality) assessment

Inclusion of studies will be based on relevance to theory building, and the rigour of methods used to collect data. (See Wong et al. BMC Medicine 2013, 11:21) Relevance and rigour will be assessed by the principal reviewer (CB), and by a second reviewer (AD) for 10%. Disagreements or uncertainties will be resolved by discussion with one or more additional authors.

Strategy for data synthesis

Data extracted from included studies which is relevant to theory building will be coded using NVivo. From coded data, CMO (context, mechanism, outcome) configurations will be built. Realist middle-range theory will be developed. All members of the research team will be involved during the realist synthesis process. Feedback and advice will also be sought during this phase of the review from the stakeholder group.

Analysis of subgroups or subsets

Realist CMO configurations relating to mid-level/ hybrid clinical managers will be specifically sought and findings built into middle-range theory, as appropriate.

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Piloting of the study selection process	Yes	No
Formal screening of search results against eligibility criteria	Yes	No
Data extraction	No	No
Risk of bias (quality) assessment	No	No
Data analysis	No	No

The record owner confirms that the information they have supplied for this submission is accurate and complete and they understand that deliberate provision of inaccurate information or omission of data may be construed as scientific misconduct.

The record owner confirms that they will update the status of the review when it is completed and will add publication details in due course.

Versions

23 January 2019

The social networks of hospital staff: A realist synthesis

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Abstract

Objectives: The social ties people have with one another are known to influence behaviour, and how information is accessed and interpreted. It is unclear, however, how the social networks that exist in multi-professional health care workplaces might be used to improve quality in hospitals. This paper develops explanatory theory using realist synthesis to illuminate the details and significance of the social ties between health care workers. Specifically we ask: How, why, for whom, to what extent and in what context, do the social ties of staff within a hospital influence quality of service delivery, including quality improvement?

Methods: From a total of 75 included documents identified through an extensive systematic literature search, data were extracted and analysed to identify emergent explanatory statements.

Results: The synthesis found that within the hospital workforce, an individual's place in the social whole can be understood across four identified domains: (1) social group, (2) hierarchy, (3) bridging distance and (4) discourse. Thirty-five context-mechanism-outcome configurations were developed across these domains.

Conclusions: The relative position of individual health care workers within the overall social network in hospitals is associated with influence and agency. As such, power to bring about change is inequitably and socially situated, and subject to specific contexts. The findings of this realist synthesis offer a lens through which to understand social ties in hospitals. The findings can help identify possible strategies for intervention to improve communication and distribution of power, for individual, team and wider multi-professional behavioural change in hospitals.

Background

The 'software' of a health system, that is, the ideas, interests, norms, values, power and relationships between staff, are important to its function, and contribute to the ongoing provision of quality patient care, alongside more tangible 'hardware'.¹ However, the social interactions and relational ties between staff in hospitals are often informal and difficult to apprehend.² They are complex, nuanced and fluid, with many of the important interactions for clinical decision making not occurring in the more structured and observable 'front stage' (in the presence of patients or carers) or 'planned back stage' exchanges. Instead they take place in the 'ad hoc back stage' world of corridors and other opportunistic spaces that offer the chance for focused inter-professional exchange, in relative privacy.³ Capturing these important informal and ad hoc interactions in a meaningful way presents a challenge, with methods such as social network analysis providing one way of doing so.⁴

The social ties that health care workers form with one another are an important and under-researched component

in understanding collective behaviours of staff and 'practical norms' in hospitals.⁵ Social ties and resultant social networks were found to reinforce resistant behaviours, or conversely can foster changes in collective behaviours and new ways of thinking.^{4,6–9} Understanding the roles of social networks in staff behavioural change, and the ability to apply such understanding in hospitals, is therefore an essential step in improving, maintaining and disseminating quality of patient care.

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There are established behavioural change theories within health care,^{10–13} but a holistic conceptual understanding of staff social ties in hospitals would offer an additional lens within this theoretical space, and an accessible ‘nuts and bolts understanding’ for practical application in quality improvement interventions.

In this paper, we used realist synthesis to explore how, why, for whom, to what extent and in what context the social ties of staff within a hospital influence quality of service delivery, including quality improvement. We used data from social network analysis studies in hospital settings to explore the different social ties and influence between individuals in the same network.^{4,9} Through realist synthesis and the development of abstracted theory, this paper seeks to understand what is common and can be applied to practice. ‘Sets of ideas’ or theory can offer transferability of findings between complex settings, where traditional quantitative approaches have struggled to offer solutions.¹⁴ This synthesis aims to develop a theoretical lens from the available evidence.

The analysis presented in this paper was part of a larger body of work on quality improvement in neonatal units in Kenya. Neonatal units are examples of multi-professional settings where care is provided to high numbers of complex patients, and where resilient behavioural norms and professional silos have been observed.¹⁵ Strategies to improve communication ties between neonatologists and senior neonatal nurses have already been implemented across different hospitals,¹⁶ but quality improvement through social networks is less well explored and this study seeks to contribute to filling this evidence gap in order to guide future empirical work in Kenya.

Methods

We used realist synthesis^{14,17–19} and followed reporting guidance according to the RAMESES standards.²⁰ In brief, realist research produces explanatory theory bound by common language and using an explicit approach

(i.e. context-mechanism-outcome configuration, CMOC). It seeks to explain causation, thereby identifying intervention strategies likely to effect change, based on targeted manipulation of the identified CMOC.¹⁹ Context refers to a specific aspect of a setting which triggers a specific mechanism, which in turn refers to a latent, often invisible property of a person, object, or institution, which is triggered or activated by exposure to a specific context and causes a specific outcome to occur.²¹

We used an initial programme theory, which was informed by established theory and practical experiences of working in a hospital setting, to develop the search strategy (see Online Supplement, Section A). A specialist health librarian (EH) helped to develop the search strategy and select relevant databases (Online Supplement, B), which were searched from inception to 17–18 December 2018 (EH) without language or date restrictions.

All retrieved citations were screened by CB, with 10% also screened independently by AD to check for systematic error in the inclusion or exclusion of documents. Titles and abstracts were screened, followed by full texts of relevant documents, against inclusion and exclusion criteria (Table 1). If two or more documents related to the same study, all additional reports were included only if novel data from the study were reported. Full included documents were imported into NVivo v12.0 for data extraction. Data of relevance to the research question were extracted and coded. Codes were assigned to sections of text within any included document, and 10% of refined iterative coding (stage 3 below) was checked for consistency by AD, with feedback given to CB; further stages of analyses were discussed with AD and the rest of the research team. The research team had expertise and experience, including realism, health systems research, global health, sociology, ethnography, health information, and clinical practice.

Data extraction and analysis were undertaken concurrently, using an immersive, iterative and refining approach.^{19,22} Iterative cycles were undertaken to help visualise, make sense of and configure the data, seeking to

Table 1. Inclusion and exclusion criteria.

Inclusion criteria	Exclusion criteria
• Empirical study (i.e. both observation and intervention designs) • Must use a form of social networks analysis in methodology • Hospital setting • Primary focus on social networks of hospital staff (i.e. clinical and non-clinical staff)	• No empirical data collection • No use of social networks analysis (SNA) in methodology • Community, primary care, public health, or health policy setting • Primary focus on social networks of patients, carers, relatives, lay health workers or students • Focus on online social networking • Studies using insurance claims-based data

further refine context-mechanism-outcome-configurations using repeated cycles of analysis (Online Supplement, C). We sought for semi-regular outcome patterns in the data²¹ and developed CMOCs from data contained within and across included documents in several stages: (1) We conducted iterative coding for 25 documents, coding relevant data using descriptive terms deemed to reflect the major theme of the data as interpreted by CB. Novel codes were created by CB whenever relevant data did not fit with an existing code derived from the initial programme theory. We did not set a limit for the number of new codes. (2) We reviewed and refined nodes by re-reading coded data and used manual visualisation/mind-mapping and summarising of data under each node on flip chart paper. Duplicated or equivalent meanings of codes were combined or collapsed, and similar codes were organised into groups along major themes identified from data extracted from the included documents, thus creating new refined nodes. (3) We used refined nodes alongside continued iterative coding to code 34 further reports. (4) Identified nodes were exported into Microsoft Word, and sorted manually in Word documents into more detailed sub-nodes to expand emerging thematic granularity in the data. (5) We followed this step by visualisation and summarising of coded data, using a series of large whiteboards for each higher-level node, to identify explanatory pathways from data within each code. This step sought to begin to move away from thematic coding towards constructing theoretical explanatory units from the data, which would be used as new codes. (6) Identified explanatory pathways were subsequently converted into abstracted explanatory statements from each higher-level node and transcribed from the whiteboards into Word. These explanatory statements were written in prose, allowing greater clarity in identification and absorption of all relevant supporting data. (7) All explanatory statements from the higher-level nodes were then integrated by manually cutting and sticking printed colour-coded text from transcribed statements onto a large piece of flip chart paper. This allowed any duplication and iteration of a common pathway to be identified, and combined. Identified statements could be visually sorted and ordered into domains in relation to one another, thus contributing to programme theory development. (8) From the processes described in steps 5–7, higher-level nodes were then created and further refined, and these refined nodes were used to subsequently code the data from the remaining documents. (9) Newly coded data were used to refine, expand and enrich existing explanatory statements. (10) We constructed CMOCs as written sentences with clear identification of the context, mechanism and outcome in each, to articulate the granularity and detail of explanatory statements and define these as distinct explanatory units of middle-range theory. (11) CMOCs

were further refined by discussion between authors, and by open discussion of methodology and emerging findings as part of a realist tutorial group, attended by CB and GW. (12) Data extracted from all included documents were finally re-read and assigned to each CMOC by CB, providing a further check that refined CMOCs were indeed representative of and arising from the data, and were sufficiently supported by evidence (Online Supplement, D). A final step used refined CMOCs to build realist programme theory.

Authors drew on their personal experience when discussing and interpreting findings from the literature, including clinical work in hospitals and primary care, clinical and academic work in the health systems in the UK and sub-Saharan Africa (particularly Kenya and Sierra Leone), and academic expertise including realism, medical sociology and health care information. Data interpretation and analysis were informed by feedback from six additional stakeholders from sub-Saharan Africa with relevant content expertise and experience to sense-check emerging explanations of phenomena within the programme theory (1, Sierra Leone, 5, Kenya), over a period of two years. Of these, four stakeholders (1, Sierra Leone, 3, Kenya) engaged in formal discussions with CB, providing feedback at different stages of the review. CMOCs were derived from the data, mostly from high income settings, and potential relevance to Kenya was considered as part of the larger project. Interim CMOCs were also discussed as part of a student realism seminar group (CB).

Results

The search retrieved 10,910 citations after deduplication, of which 365 underwent full-text assessment for inclusion. Of these, 75 documents were included in the review (Online Supplement, E). Included documents were from high income countries (92%, 69/75) or upper-middle income countries (8%, 6/75) (Online Supplement, F). About one quarter of studies centred on doctors (17/75), 17% on nurses (13/75) and the remaining on more than one professional group (45/75). Studies examined different types of communication ties from which to collect social network data, including general professional communication ties, medication advice ties and problem solving ties.

Box 1 presents the programme theory developed from the literature. It was developed from 35 unique CMOCs, which are given in Table 2. An expanded version of Table 2 is available in the Online Supplement, G, with illustrative quotes from the literature. The CMOCs are organised in four overarching theoretical domains that we identified: (1) social groups, (2) hierarchy, (3) bridging distance and (4) discourse.

Box 1. Programme Theory

Hospital staff prefer to communicate with colleagues who are similar to themselves, and with whom they share trust. However, this can create boundaries, silos and redundant information within pockets of the workforce, and different behavioural norms adopted by members of different groups, dominated by influential individuals. Tacit hierarchical rules also determine communication with others in the workplace based on status, forming a landscape of differential access to information and others. Fragmentation between different status groups can occur, and space for status-enhancing behaviours is created. Workplace silos and status boundaries can be bridged in the presence of trust, confidence and mutual understanding, or where need is urgent and immediate. The organisation can actively comply with or challenge social boundaries within the workforce by the formal processes endorsed, which allow day-to-day performances of relative power, based on identity and hierarchical status. Attempts to manage the discourse, and the effectiveness of formal workplace communication processes, act to construct or disassemble social boundaries in hospitals. Connections between staff influence access to information and other forms of capital, behavioural norms and perceived agency. Ties are continuously shaped and as such are amenable to intervention. The capacity of these connections and the overall structure of the workplace social network are vital to delivering quality patient care.

Social groups

Staff form or discover their own identity as they seek to place themselves relative to others within the social landscape of the hospital, wherein *identity work* (the ongoing process of forming and maintaining a sense of self) occurs.²³ For example, due to the long-established, rooted, tightly-held, defended and sometimes hidden objects which comprise a profession and its associated representations, group membership is strong and barriers are often very distinct between different professions.⁶ People tend to spend time and communicate with people who are like them in some way (*homophily*).⁴ As such, social groups form whose members share a way of seeing the world, or *representation*.²⁴ This builds trust between group members (Table 2, CMOC1).

Group representation, that is, a way of seeing, telling and interpreting the world, gives content, structure and boundaries to the social identity of the group and its

members, and meaning to purpose and behaviours. It is socially communicated by means of narratives.²⁵ Sense making of day-to-day experiences uses ordering and labelling to construct a continuous underlying explanatory narrative to life.²⁶ As an individual health care worker, or a group of workers experience some action or event (either first-hand, or through the observed experiences or reports of social peers), sense is made of the experience by measuring it against the group narrative and representation.²⁶ Therefore, those belonging to the same social group are more approachable to one another than outsiders (CMOC2a), whereas those who do not affiliate with the group's representation²⁴ are easily identified as 'other'. Assumptions and judgements are made regarding values, background and behaviours of the 'other'.²⁷ In the hospital workplace, othering can occur between health care workers and patients,^{27,28} and between different professions.²⁸ The labels, judgements and assumptions that are made about the 'other' can lead to communication barriers with those colleagues who are outside one's own immediate social group. Over time, individuals become increasingly easily identified as part of the group, or outsiders (CMOC2b).

Health care workers will preferentially communicate with peers with whom they have an existing reciprocal relationship, due to familiarity and trust. Reciprocation is associated with commonality and work tasks which require interdependence of colleagues, for example, administering drugs and manual handling of patients. Reciprocating peers are more likely to form strong ties with one another. As communication and reciprocation increases, trust is further enhanced.²⁹

Communication within a social group becomes more frequent and more insular over time, enhancing homophily of group members and hence trust and preferential communication.⁴ While the consequences may be positive in some instances, an unchallenged uniform outlook can develop and intensify over time. Insular communication can thus risk redundancy of information within the group, where individuals cannot access novel information and knowledge.⁴ A strong preference to communicate only with those who are like oneself can lead to unchallenged collective convictions, and social-tailoring of information acting to strengthen existing outlook and tacit knowledge, that is, groupthink,^{30,31} and echo^{30,32} (CMOC4).

Within a social group, individuals who most strongly identify with that group's representation, and act to defend its position in the wider field and discourse,²⁴ are usually most central to the process of information exchange within the group. As such, central members⁴ model the group's behavioural norms to its members, and are more influential over the behaviours of other group members than those in peripheral positions (CMOC5a). When an individual is less invested in mainstream group identity, their behaviours may deviate from the expected group norms, either due to

Table 2. Context-mechanism-outcome configurations (CMOCs).

Domain 1: Social Groups. Close social ties formed with others, based on identity and personal view of the world (representation), in relation to the individual	
CMOC1	When health care workers share a common identity (C), they will be more likely to trust one another (O), as they share an underlying representation (M)
CMOC2a	When health care workers share a representation (C), they will preferentially communicate with one another (M) leading to insular communication (O)
CMOC2b	When health care workers share a representation (C), outsiders are easily identified (M), leading to communication boundaries (O)
CMOC3	When a health care worker has an existing reciprocal relationship with a peer (C), they will preferentially seek advice or support from that person (O), because they trust the person (M1) and feel comfortable (M2)
CMOC4	When health care workers share a representation (C), this can lead to redundant information (O1), group-think (O2) and echo (O3), due to insular communication (M)
CMOC5a	When a health care worker is central within a social group (C), their personal behaviours will embody group norms (O) because they will hold tightly to group identity as own (M)
CMOC5b	When a health care worker is peripheral within a social group (C), they may deviate in behaviour from group norms (O1), and oppose/conflict with central members of the group (O2) because they may not wholly identify with the group representation (M)
CMOC6a	When a health care worker is central within a social group (C), they will have greater power over group norms (O), because they have greater influence over group narratives and representation (M)
CMOC6b	When a health care worker is peripheral within a social group (C), they will have little power over group norms (O), because they have little influence over group narratives and representation (M)
CMOC6c	When a health care worker is central within a social group (C1) and has power over material resources (C2), they will have additional power over group norms (O) because they own the distribution of material resources and decision-making authority (M)
CMOC7a	Where a health care worker requires diverse information to undertake their role effectively, for example, senior nurse, junior doctor (C), they will become more central in the workplace information-sharing network (O), because they must frequently seek information from others (M1) and others frequently seek information from them (M)
CMOC7b	When a health care worker is peripheral in the workplace information-sharing network (C), they risk isolation (O), because they are not actively engaged in information-seeking (M1) or information-sharing (M2) with colleagues
CMOC7c	When a health care worker needs legitimate/defensible information (C), they will speak to someone who embodies desirable group norms (O), because the information received will comply with social expectations (M)
Domain 2: Hierarchy. Social ties or barriers formed based on hierarchical status of the individual	
CMOC8a	When an individual is senior in the hierarchy (C1), or is a custodian of hierarchical status (C2), they have permission to approach both high and low status colleagues (O) because of understanding of the 'social rules of operation' (M)
CMOC8b	When an individual is lower in the chain-of-command/hierarchy (C), they lack permission to approach some colleagues directly so access new/external information through the established chain of command (O1), or through a broker (O2), because of understanding of the 'social rules of operation' (M)
CMOC9a	Where hierarchical control is paramount to the functioning of a social group (C) members will be more likely to accept and follow orders from a senior (O) due to concentration of authority (M)
CMOC9b	Where hierarchical control is not paramount to the functioning of a social group (C) members will need to be convinced to change behaviour (O) due to flattened structure and distributed authority (M)
CMOC10a	Where parallel hierarchies are operating within the same workplace (C), permission to approach colleagues outside one's own hierarchy structure will vary (O), according to the specific authoritative power over the individual and their understanding of the 'social rules of operation' between hierarchies (M)
CMOC10b	Where doctors have historically taken the role of leader in health care teams (C), they will assume a position of authority (O), because of their understanding of the 'social rules of operation' (M)

(continued)

Table 2. (continued)

Domain 1: <i>Social Groups</i> . Close social ties formed with others, based on identity and personal view of the world (representation), in relation to the individual	
CMOC11a	When there is a hierarchical structure (C), there is a risk of fragmentation into sub-groups based on status (O), because individuals identify more closely with peers of the same status (M1) and trust them more (M2)
CMOC11b	When an individual is higher up in the chain-of-command/hierarchy (C), they will preferentially communicate with other higher status staff (O), because they feel higher status colleagues will better understand their scope of work (M1), and will hold more useful information (M2)
CMOC11c	When an individual is lower in the chain-of-command/hierarchy (C), they will only expect specific types of support from colleagues of higher status (O), because of their understanding of the 'social rules of operation' (M1) and because they feel more comfortable with peers for usual support (M2)
CMOC12a	When an individual is higher up in the chain-of-command/hierarchy (C), they will preferentially communicate with other higher status staff (O), because they will further enhance their own status/power by association (M)
CMOC12b	When an individual is higher up in the chain-of-command/hierarchy (C), they will have power over information (O) by controlling the information and resources disseminated to low status colleagues (M)
Domain 3: <i>Bridging distance</i> . The ways in which an individual can be encouraged to communicate with others with whom they do not have a close social tie	
CMOC13	When a health care worker observes a non-peer colleague displaying they are being 'careful' (C), they will exchange required information with this colleague (O), because they feel trusting towards the colleague (M1) and feel comfortable approaching them (M2)
CMOC14	When a health care worker has a longstanding or multiplex relationship with a non-peer colleague (C), they will approach that colleague as a 'go-to person' (O), because of mutual understanding (M1), and trust (M2)
CMOC15	When a health worker needs information urgently (C), they will select a colleague from those who are physically present (O), because they will receive an immediate response (M)
CMOC16	When a health care worker can speak to a colleague face-to-face (C), information exchange will be enhanced (O), because they can better read and respond to verbal and non-verbal cues (M1) and is more confident that they will be understood (M2)
CMOC17	Information can be exchanged between disconnected groups (O), when there is an individual who can act as a broker (C), because they communicate with members of both groups (M)
Domain 4: <i>Discourse</i> . The totality of the different ways of seeing the world, both content but also how each relates to the other and is communicated, in terms of overall dominance and power	
CMOC18a	The pattern of ongoing exchange and negotiation between social groups in the hospital workforce (C) creates and maintains (O1) or challenges (O2) the dominant discourse in a hospital, by demonstrating and exerting the relative power of different group representations within the hospital workforce (M)
CMOC18b	For health care workers in an organisation, its rituals and norms (C) construct what an individual perceives is acceptable in the workplace (O), through the demonstration of social expectations and etiquettes (M)
CMOC19a	When a health care worker has to do or say something at work (C), they keep to within a 'bandwidth' of actions they perceive to be 'accepted' or 'permitted' (O), based on their understanding of what the dominant discourse is within a hospital and their relative personal position based on identity and hierarchical status (M)
CMOC19b	The perceived values of an organisation (C) facilitate the creation of status differentials within the workplace (O) because individuals benchmark their activities and identities against how much they embody these values (M)
CMOC20a	Where formal communication processes in hospitals are dysfunctional/unreliable (C), make-shift processes of informal information exchange dependent on social connections result (O) because individuals have to compensate to acquire necessary information (M)
CMOC20b	When informal information exchange becomes the norm in a hospital (C), access to information by specific individuals and groups is inherently skewed (O), because it will depend on how socially connected the individual or group is (M)

oversight or by intentional action. The opposition by central powerful members to such deviance from group norms by peripheral members can lead to conflict and even potential risks or threats (CMOC5b).

Group representations²⁴ and narratives are protected, shaped and propagated by those most central within the group with the most social power. Behavioural norms are established from group narratives, and group members experience social pressure to conform to expected norms (CMOC6a). Conversely, those in the group who are peripheral have little influence on the formation and stewardship of group representations and norms, but are expected to conform or face disapproval or remediation (CMOC6b). Material resources are more often controlled by central members, who are also more likely to be involved in decision-making within and on behalf of the group. The group centre-periphery structure is therefore maintained by the distribution of both physical and social capital within the social group and power can be enhanced when formal authority is aligned with social centrality (CMOC6c).

The entire multidisciplinary health care workforce also displays a macro centre-periphery structure in hospitals. In this macro centre-periphery structure, centrality of individuals is linked to job activity and status. In many hospital wards, junior doctors, senior nurses and some ward-based allied health professionals (e.g. ward pharmacist) occupy central positions, even though in the example of junior doctors the specific individuals filling these roles often frequently rotate (CMOC7a). Staff on the periphery of the macro communication network in the hospital workplace (e.g. senior doctors, junior nurses) can become isolated from information flowing from and between more central members. Fragmentation of the macro communication network can be exacerbated where ward activities are undertaken in isolation from other staff, or where staff are separated by shifts or physical proximity without adequate information sharing (CMOC7b). Since central individuals are seen to model and influence behaviours, advice or information received from a central colleague will have legitimacy. Indeed, seeking advice from a central colleague can hence be justified to others (CMOC7c).

Hierarchy

Health care workers operate within different hierarchies, each with a set of tacit social rules by which the workforce is expected to abide in daily workplace interactions. Such rules show respect and deference to status, and maintain lines of command. Those higher up in the hierarchy are permitted to communicate freely with colleagues of their choosing. By virtue of their 'custodial' hierarchical status³³ (p. 853) junior doctors also have direct access to colleagues who are of both higher and lower status to themselves

(CMOC8a). Hierarchical rules rarely permit direct communication by those lower down with those higher up the chain of command, instead risking offense or discipline. Lower status staff are therefore limited to communication with peers, direct seniors, or brokers (individuals positioned between two otherwise disconnected groups).^{4,34,35} Information and knowledge accessible to such staff is therefore limited, and risks lower status individuals becoming disenfranchised if information sharing is perceived to be inadequate (CMOC8b).

Hierarchical rules in hospitals provide a backdrop against which the behavioural norms of staff operate. The strength of influence of hierarchy on norms, compared with other factors (e.g. social groups), will differ by setting and by social group. In some instances, hierarchical control may be a principal determinant of norms, whereas in others hierarchy may play less of a role (CMOC9a and 9b). A health care worker's own professional hierarchy will also dictate with whom they are permitted to communicate from other professions. As such, profession-specific hierarchies not only create the rules of communication within professions, but also determine rules for communication with colleagues of other professions (CMOC10a). Social rules based on historical hierarchies between different professions (i.e. doctors historically senior to nurses) are also significant in some settings (CMOC10b).

A hierarchy can escalate differentiation and power imbalance without sensitive leadership and management skills and awareness, and risks alienation of lower status health care workers from those of higher status, and vice versa. This can occur when perceived commonality and mutual understanding across hierarchical bounds is lost and replaced by difference, distance, division and even conflict (CMOC11a). As well as line-management responsibilities over more junior staff, senior staff often undertake greater problem-solving and resource allocation work, compared to their juniors, who undertake a greater proportion of activity-driven work.³⁶ The workforce can therefore become internally differentiated by its dichotomous scope of work, by seniority (CMOC11b). Junior staff differentiate themselves from their seniors, with peer relationships at a common hierarchical level often preferred (e.g. among junior doctors).³⁷ Consequently, junior staff can become increasingly functionally independent of seniors, albeit for specific purposes of communication, legitimisation or support.³⁸ Peers within the same status group learn to primarily depend on one another for support and information, leading to redundancy and loss of information transfer between different levels of seniority (CMOC11c).

If an individual exchanges information or builds a relationship with a high-status colleague, their own status will increase by association.⁴ In addition, the individual may gain access to other forms of capital (e.g. material resources) from the high-status colleague, which will further increase

own status.^{7,39} (CMOC12a). When there is a strong chain of command structure, those lower down in the hierarchy will be dependent on their higher status colleagues for information and resources. Higher status staff therefore have power over the acquisition of capital by their lower status colleagues, by determining how information and resources are distributed (CMOC12b).

Bridging distance

The workplace allows health care workers to observe behaviours and attitudes of colleagues, including those not part of their immediate social peer group. They will use this learning to choose which non-peer colleagues to trust and feel comfortable to approach, that is, bridging distance, for exchange of information, based on the personal communication skills and behaviours they observe, that is, are they being 'careful'.⁴⁰ In addition to personal observations, the stories and accounts of others, particularly those of trusted peers, will allow an individual to assess whether to trust a non-peer colleague (CMOC13). Some health care workers build up relationships with non-peer colleagues over time, or through multiplex ties (when two individuals are connected by more than one type of interaction).⁴ Multiplex ties can form, for example, as the product of previous postings, or through knowing an individual through another means (e.g. being on same committee). If a health care worker works for a long time in the same place, understanding and commonality will accrue through collective experience and observation. The worker will become familiar with areas of expertise and resource capital of specific colleagues, and will understand how best to negotiate access to required information or resources (CMOC14).⁴¹

When information is required urgently, a health care worker will preferentially seek information or support from a colleague who is physically present to increase the immediacy at which their need is met. Colleagues who are physically present in the workplace are thus more likely to be approached by others (CMOC15). Face-to-face communication allows picking up on non-verbal communication cues and, as it is interactive,⁴² clarification of misunderstandings and reciprocal information sharing. Alternative forms of communication might include telephone, email or written notes (CMOC16).

Brokerage of information occurs when an individual who is independently accepted by two otherwise disconnected groups, transmits and mediates information between these groups.^{4,34,35} Acceptance as a broker can be gained by merit of interpersonal skills, other desirable attributes, for example, reputation for being hard-working, cross-cutting scope of work activities, or alternatively by a formal role, such as senior nurse. Information transferred by a broker is usually advantageous to the group and novel, however the broker must mediate information, which may lead to incomplete or selective information sharing. Significantly, the

broker is able to 'translate' the information for the specific and different 'languages' of both groups. The position of broker is fundamentally tied to power and status (CMOC17).^{4,34,35}

Discourse

Discourse is not only the summative but also the relational landscape of representations held within a hospital's entire workforce, both present and past.²⁴ Through the process of exchange over time, communication is dominated and characterised by certain representations.⁴³ Discourse maintains or challenges the dominant status quo.⁴⁴ By ordering the hospital workforce in relation to one another by means of representations, it is possible to understand the relative power of others compared to oneself, which can be important in framing and interpreting one's 'life space and the world at large'.⁴⁵ (p. 214) Similarly, the theory of fields describes a 'struggle'.⁴⁶ (p. 109) between different social groups, with powerful groups seeking to maintain their advantage, and challengers seeking opportunities to create 'a new order' (CMOC18a).⁴⁶ (p. 118) Rituals and norms communicate discourse, by embodying 'how things are done around here'.⁴⁷ (p. 1) Rituals and norms (e.g. ward rounds and handovers) communicate tacit power structures in the hospital workplace, sustaining workplace power structures by defining and reinforcing expectations and social rules (or 'etiquettes') (CMOC18b).

Discourse places people within the social whole, based on relative dominance of their held representation. However, representations also shape the discourse.^{7,24} Location and power of a specific representation within the discourse determines the agency of its members, through a process of comparison with others. Resultant agency is compounded by hierarchical status (CMOC19a). How a health care worker perceives organisational values is dependent on what is observed (either directly or through reputation from others) and then interpreted, through the lens of the representation held by their social group.²⁴ If an individual feels aligned with organisational values, they will assume greater legitimacy and confidence in the workplace, but they will not if they do not feel aligned. For example, some health care roles will attract greater esteem at institutional level, depending on their degree of embodiment of perceived organisational values. Clinical roles, particularly those associated with decision-making and cure (i.e. doctors), are often more highly esteemed. Conversely, roles such as cleaning, while of great importance, are less esteemed. Distribution of social capital and power in the workplace, and the identity work of individuals and different occupational groups within the hospital, are influenced as they act to continually construct a sense of self within the health care workplace (CMOC19b).⁴⁸

Where formal communication processes are inadequate, socially determined exchanges become essential for acquiring necessary workplace information. With time, informal exchanges can bypass or even replace formal processes, leading to their further deterioration (CMOC20a). While socially determined exchanges might be preferable for well-connected individuals, they inherently construct systematic inequalities in access to information. For those more peripheral or of lower hierarchical status, reliable information can become very difficult to access. This leads to skewed information access in the hospital workplace, determined by the social position of the individual worker as reflected in the theory of embeddedness (CMOC20b).²⁹

Discussion

This paper used realist synthesis of social network analysis studies to identify and understand social ties of staff in hospitals that act to influence behaviour. We started a process of developing middle-range theories, and propose that a health care worker's social position in a hospital is influenced by 35 explanatory pathways (CMOCs) across four overarching theoretical domains: social group, hierarchy, bridging distance and discourse. These domains should be further refined by ongoing theory-building and do not represent a final set of CMOCs.¹⁷ In essence, relative social position influences an individual's capital, influence, power and agency in the workplace. The social ties that exist between hospital staff are therefore fundamental to the targeting and success of quality improvement activities and behavioural change programmes.

Social ties of staff and quality improvement

Our findings offer an alternative lens through which to view social concepts associated with interpersonal communication, such as teamwork. For example, it is known that positive teamwork and good coordination within the health care team can act as a resource for team members in the provision of safe patient care, as well as enhancing staff wellbeing in the workplace, which in turn further improves patient safety and positive team working.⁴⁹ Conversely, a dysfunctional team environment does not provide a safety resource for health care staff, but can put additional strain on the individual over and above their existing workload, negatively impacting on patient safety.⁴⁹ We begin to develop explanations about how, why, for whom, to what extent and in what context the informal communication networks of health care workers form and might be influenced, thereby offering theory from which interventions aiming to effect aspects of 'software'¹ such as teamwork, can draw.

Quality patient care is synergistic and associated with multidimensional features, including staff social aspects.

Liberati et al.⁵⁰ identified seven features of safety, including teamwork, cooperation and positive working relationships, respectful relationships and reinforcing of safe, ethical and respectful behaviours. Our analysis has developed a way to identify relational concepts and begins to develop an explanation as to their importance, as well as linking concepts, adding to the existing evidence base. Specifically, our findings support the established theoretical importance of social ties in maintaining behavioural norms in the hospital setting,^{4,5} and in influencing behavioural change of individuals and groups of health care workers.^{4,7,8} We offer conceptual theory as a practical lens for understanding key social influences in these complex multi-disciplinary settings. The identified context-mechanism-outcome configurations offer an explanatory access-point to the concepts of how social ties influence action, which can inform interventions for quality improvement in hospitals. By explicitly mapping a causal pathway, context-mechanism-outcome configurations (CMOCs) are useful for identifying the possible reasons for workforce behavioural norms in a given setting, and what strategies might enhance adoption of new behaviours and quality improvement. Through abstraction, the conceptual becomes more amenable to practical application across unique hospital settings.^{14,19} Communication influences and distribution of power can potentially be identified. Barriers can be mitigated through targeted theory-driven interventions, and quality improved in different hospitals.

Strengths and limitations

Strengths of this synthesis included: a comprehensive search strategy with no language or date restriction, inclusion of documents studying different contents of ties within the workplace (e.g. from friendship, to medication advice ties), refining of analysis and interpretation in discussion with stakeholders, realist researchers, among authors with broad collective experience, and analogy and consilience with existing theory. However, the majority of studies were from high income countries and we sought to mitigate this by involving stakeholders from low income countries to provide feedback at different stages in the synthesis. Still, our findings should be further refined by data from low and middle-income countries to help understand issues that may be specific to low-resource settings. We also only carried out one search and did not update it because we judged our approach to provide sufficient relevant data.

Further work should explore the utility of the synthesis presented in this study to develop a theoretical framework for capturing learning from diverse quality improvement initiatives across different hospital settings, to enable transferability of learning by identification of common explanatory threads.

Conclusions

Health care workers are socially positioned relative to one another within the hospital workforce, which fundamentally determines their access to information, support from others and the possible actions available to them. Members of the workforce do not possess equal capital, or equal agency for change. Power to bring about collective behavioural change in the workplace is inequitable, socially situated and subject to specific identified contexts. Realist synthesis was useful for developing granular theory to understand social ties in hospital settings and the significance of these for behaviour. The findings can help identify areas for intervention to improve communication and distribution of influence and power, and thereby support behavioural change and quality improvement initiatives in hospitals.

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Declaration of conflicting interests

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Supplemental Material

Supplemental material for this article is available online.

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Appendix 2.1.3: Example search for realist synthesis

Reproduced from online supplementary material from:

Blacklock C, Darwin A, English M, et al. The social networks of hospital staff: A realist synthesis. *Journal of Health Services Research & Policy*. 2022;27(3):242-252. doi:10.1177/13558196221076699

Example search:

Medline (Ovid MEDLINE® Epub Ahead of Print, In-Process & Other Non-Indexed Citations, Ovid MEDLINE® Daily and Ovid MEDLINE®) 1946 to present

Search Strategy:

1 exp Personnel, Hospital/ (87424)

2 exp Health Personnel/ (471901)

3 exp HOSPITALS/ (257382)

4 2 and 3 (30656)

5 (staff or surgeon* or midwi* or nurs* or keeper* or porter* or supervisor* or pharmacist* or doctor* or physician* or manager* or leader* or technician* or therapist* or physiotherapist* or aide* or assistant* or officer* or administrator*).ti,ab. (1295006)

6 1 or 4 or 5 (1339519)

7 (SNA or "social network*").ti,ab. (16703)

8 6 and 7 (2136)

BMJ Open Protocol for the Pathways Study: a realist evaluation of staff social ties and communication in the delivery of neonatal care in Kenya

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ABSTRACT

Introduction The informal social ties that health workers form with their colleagues influence knowledge, skills and individual and group behaviours and norms in the workplace. However, improved understanding of these ‘software’ aspects of the workforce (eg, relationships, norms, power) have been neglected in health systems research. In Kenya, neonatal mortality has lagged despite reductions in other age groups under 5 years. A rich understanding of workforce social ties is likely to be valuable to inform behavioural change initiatives seeking to improve quality of neonatal healthcare.

This study aims to better understand the relational components among health workers in Kenyan neonatal care areas, and how such understanding might inform the design and implementation of quality improvement interventions targeting health workers’ behaviours. **Methods and analysis** We will collect data in two phases. In phase 1, we will conduct non-participant observation of hospital staff during patient care and hospital meetings, a social network questionnaire with staff, in-depth interviews, key informant interviews and focus group discussions at two large public hospitals in Kenya. Data will be collected purposively and analysed using realist evaluation, interim analyses including thematic analysis of qualitative data and quantitative analysis of social network metrics. In phase 2, a stakeholder workshop will be held to discuss and refine phase one findings.

Study findings will help refine an evolving programme theory with recommendations used to develop theory-informed interventions targeted at enhancing quality improvement efforts in Kenyan hospitals.

Ethics and dissemination The study has been approved by Kenya Medical Research Institute (KEMRI/SERU/CGMR-C/241/4374) and Oxford Tropical Research Ethics Committee (OxTREC 519-22). Research findings will be shared with the sites, and disseminated in seminars, conferences and published in open-access scientific journals.

INTRODUCTION

Despite significant reductions in mortality rates across other age groups among children under 5 in recent years, the neonatal

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ Realist evaluation is an appropriate methodology to develop middle-range programme theory, which will be useful for informing the practical design and implementation of quality improvement interventions in neonatal units.
- ⇒ The Pathways Study is the first to use social network analysis to explore the influence of staff social ties on the delivery and quality of neonatal care in Kenya.
- ⇒ Middle-range programme theory will be developed using a robust and transparent process, using an initial programme theory, involvement of stakeholders, substantive sociological theory and continual collaborative and reflexive working within a diverse research team.
- ⇒ The Pathways Study uses a mixed-methods approach to collect diverse data, but it is possible that some relevant data may still not be captured, particularly as some aspects of health systems ‘software’ are notoriously difficult to elicit.

mortality rate in Kenya has remained relatively unchanged.^{1 2} In response to this disparity, efforts are ongoing to improve the quality of neonatal care, the majority of which is delivered from public health facilities and mostly by nurses.³ Such improvement efforts have included the recent introduction of new technologies in selected neonatal units, establishing routine neonatal data collection and feedback systems, and ongoing investment in the neonatal workforce through training and workplace support.^{4 5}

However, a more detailed understanding of tacit human factors, or health systems ‘software’,⁶ that also influence the quality of neonatal care delivered in these hospitals is now needed, to inform better focused design and implementation of improvement efforts (eg, the relationships between staff, values,

norms and the social and cognitive skills that complement clinical technical skills).⁷ ‘Software’ in health systems (in contrast to ‘hardware’, such as drugs, equipment, number of staff, etc) has been defined as ‘the ideas and interests, values and norms, and affinities and power that guide actions and underpin the relationships among system actors and elements’.⁶ Indeed, such ‘software’ factors can profoundly influence acquisition of new knowledge and behaviours and norms at individual and group level,^{8–11} and thus are determinants of quality care.^{12 13} Moreover, individual health worker performance is shaped not only by technical clinical competencies and experiences, but also by social and cognitive skills (cognitive, social and personal resource skills such as communication, team work, leadership, situational awareness, assertiveness and decision making, coping with stress and managing fatigue, etc).¹⁴ Relational ties among the workforce and other ‘software’ aspects matter greatly in the delivery of quality neonatal care, for example, care pathways, clinical guidelines, knowledge and other competencies, including those that are transferred from an educational setting such as those gained during postbasic nurse training, to a clinical care environment.¹⁰ The impact of relational ties on clinical decision making was demonstrated in the landmark study by Coleman *et al*¹⁵ showing profound peer influence on prescribing of a new drug by physicians in the USA. More recent studies have likewise demonstrated peer group influence on both clinical practices and association with differences in patient outcome.^{16–18} Communication which impacts on health worker decision making may furthermore take place in ‘back stage’ ad-hoc opportunistic exchanges, for example, in hospital corridors,⁸ which can present challenges for capture in research. Despite these challenges for researchers, understanding the ways in which health workers communicate and work with one another is vital. Better understanding of health-care ‘software’ is particularly important in the neonatal unit, where patients often have multiple complex problems that require care by a multiprofessional team who are often working across different units (eg, maternity, neonatal unit, paediatrics).

Since the care of neonates is highly dependent on teams of staff working together, relational ties and social networks are likely to be central to the adoption of new or better care practices, such as those promoted in existing improvement interventions in Kenyan neonatal units. Understanding how and why communication occurs between health workers will help to unpack the many complex influences on staff behaviours and patient care. Furthermore, detailed understanding of causation with a focus on explanatory ‘mechanisms’ (box 1) will help to identify aspects of ‘context’ (box 1) amenable to intervention that are likely to result in desirable change in ‘outcome’ (box 1), perhaps overlooked by more traditional research approaches. Through developing explanatory middle-range programme theory (box 1), practical opportunities for improving software in neonatal care will be identified.^{19 20}

Box 1 Definitions of key terms^{19 23}

Context

⇒ A specific aspect of the setting/environment of study, which when present triggers the activation of a mechanism(s).

Mechanism

⇒ A latent (often invisible) property/entity, sensitive to variations in context, which when activated causes an outcome to occur.

Outcome

⇒ A desirable (or undesirable) event/occurrence, which is of interest by its presence or absence (or strength/degree of).

Context-mechanism-outcome configuration (CMOC)

⇒ A unit/statement/diagram which links and orders a context, mechanism and outcome, to provide causal explanation. It is often abbreviated to CMO or CMOC.

Middle-range programme theory

⇒ The product of realist enquiry—an abstracted theory derived from relevant and robust data, which is both testable, and transferable to other settings by application of abstracted learning.

Initial programme theory

⇒ A rough outline of a theory of causation pertaining to the question under study, to guide the process of investigation.

Demi-regularity

⇒ An observable pattern in the data, which occurs in certain circumstances.

Retroduction

⇒ Intentional consideration, exploration and identification of the hidden elements of causation that lie beneath observable data and logic.

In preparation for the current Pathways Study described in this manuscript, a comprehensive realist synthesis of the literature was undertaken to provide an initial programme theory,²¹ which was used to help guide the focus of scientific enquiry in the Pathways study, and inform the current protocol and study tools, through generation of an initial theory to be tested and further developed. The preparatory realist synthesis hence sought to answer: how, why, for whom, to what extent and in what contexts, do the social ties of hospital staff influence quality of care. Details of how the initial programme theory was developed can be found in the published realist synthesis—in brief, comprehensive literature searching, reviewing, data extraction, analysis and interpretation, was informed by engagement with stakeholders with relevant expertise and experience, from Sierra Leone and Kenya. The resultant theory comprised 35 context-mechanism-outcome configurations (CMOCs), organised under four emergent thematic domains: Social group, Hierarchy, Bridging distance and Discourse (see box 2). The Pathways Study will further develop and refine this initial programme theory for the specific setting of neonatal units in Kenya, using an open and explorative approach, cognisant that the majority of data used to produce the initial programme theory were from high-income settings.²¹

Box 2 Summary of initial programme theory—taken from Blacklock *et al*²¹

Initial programme theory, to be tested (confirmed, refuted, refined) in the Pathways Study.

Hospital staff prefer to communicate with colleagues who are similar to themselves, and with whom they share trust. However, this can create boundaries, silos and redundant information within pockets of the workforce, and different behavioural norms adopted by members of different groups, dominated by influential individuals. Tacit hierarchical rules also determine communication with others in the workplace based on status, forming a landscape of differential access to information and others. Fragmentation between different status groups can occur and space for status-enhancing behaviours is created. Workplace silos and status boundaries can be bridged in the presence of trust, confidence and mutual understanding, or where need is urgent and immediate. The organisation can actively comply with or challenge social boundaries within the workforce by the formal processes endorsed, which allow day-to-day performances of relative power, based on identity and hierarchical status. Attempts to manage the discourse, and the effectiveness of formal workplace communication processes, act to construct or disassemble social boundaries in hospitals. Connections between staff influence access to information and other forms of capital, behavioural norms and perceived agency. Ties are continuously shaped and as such are amenable to intervention. The capacity of these connections and the overall structure of the workplace social network are vital to delivering quality patient care.

The findings of the Pathways Study will make an important contribution to the ongoing work of KEMRI-Wellcome Trust Research Programme researchers in Kenya, particularly work focused on improvement, adoption of technologies and staff communication within the neonatal unit, and by exploring neonatal hospital care beyond the neonatal unit. The new understanding developed during the Pathways Study will be used for better designing and targeting interventions for quality improvement. Findings will also contribute to existing international literature on social networks of the healthcare workforce, the vast majority of which is derived from high-income settings.

Aims and objectives

The aim of the Pathways Study is to explore how, why, for whom and in what circumstances, features of health systems ‘software’ (eg, values, norms, relationships) between health workers of all cadres caring for neonates in Kenyan hospitals, influence quality of care being targeted by improvement efforts. The specific objectives are:

- I. To describe how health workers of all cadres work together to deliver care to newborn babies in Kenyan hospitals, and the kinds of networks, relationships, social ties and personal/team-related sociocognitive skills that exist within and between the different groups of health workers caring for newborn babies.
- II. To examine how these relationships, networks, social ties and related sociocognitive skills influence nurses’ clinical competencies in newborn care and

how these sociocognitive skills might be used to design recommendations to improve neonatal care in Kenyan hospitals.

METHODS AND ANALYSIS

The Pathways Study is a realist evaluation,^{20 22} which will employ a mixed-methods approach to collect relevant data, drawing on diverse methods.²³ Emergent semiregular patterns (ie, demi-regularities, [box 1](#)) and causative mechanisms will ultimately be identified from these data using a process of retroduction ([box 1](#)), to develop iterative explanatory theory for practical use. An initial programme theory derived from a realist synthesis of the literature²¹ has been used to guide design of data collection tools for the Pathways Study and will also form a starting point for analysis and data-informed theory refinement. The first phase of data collection will be from two hospital case study sites, and from a ‘nursing group’ (phase 1, [figure 1](#)). A stakeholder codesign workshop will then be convened following the initial analysis, to further refine middle-range programme theory, and to develop recommendations for practice (phase 2, [figure 1](#)).

Hospital case study sites

Data will be collected from two large urban public hospitals in Kenya. The study sites have been chosen in part due to ease of access, owing to the existing COVID-19 restrictions to movements. They are also facilities of contrasts with regard to setting (Hospital 1 and Hospital 2). The Pathways Study will collect data from eligible healthcare workers involved in the provision of care to neonates in the two hospital sites.

Hospital 1

Hospital 1 is a large teaching and referral hospital, with a large neonatal unit with a newborn intensive care unit, and is an implementing site for ongoing initiatives to improve care of neonatal service through the ‘NEST360,⁵ Delivering and Sustaining Newborn Technologies’ that seeks to integrate technological solutions within clinical care. The hospital is a training centre for basic diploma nursing and clinical medicine students, bachelor of science in nursing and bachelor of medicine and surgery undergraduate students, postgraduate diploma, higher diploma and master’s level training for paediatric nursing, neonatal nursing, paediatrics and child health and a fellowship in neonatology.

Hospital 2

Hospital 2 is a large county hospital, with a smaller neonatal unit. Unlike hospital 1, hospital 2 is a member of the ‘Clinical Information Network’ (CIN),²⁴ which seeks to improve clinical care of children by targeting better use of routine clinical data to inform policy and practice through providing audit and feedback mechanisms and supporting the work of clinical champions in participating network hospitals. Unlike hospital 1, hospital 2 is not an implementing site for NEST360.⁵

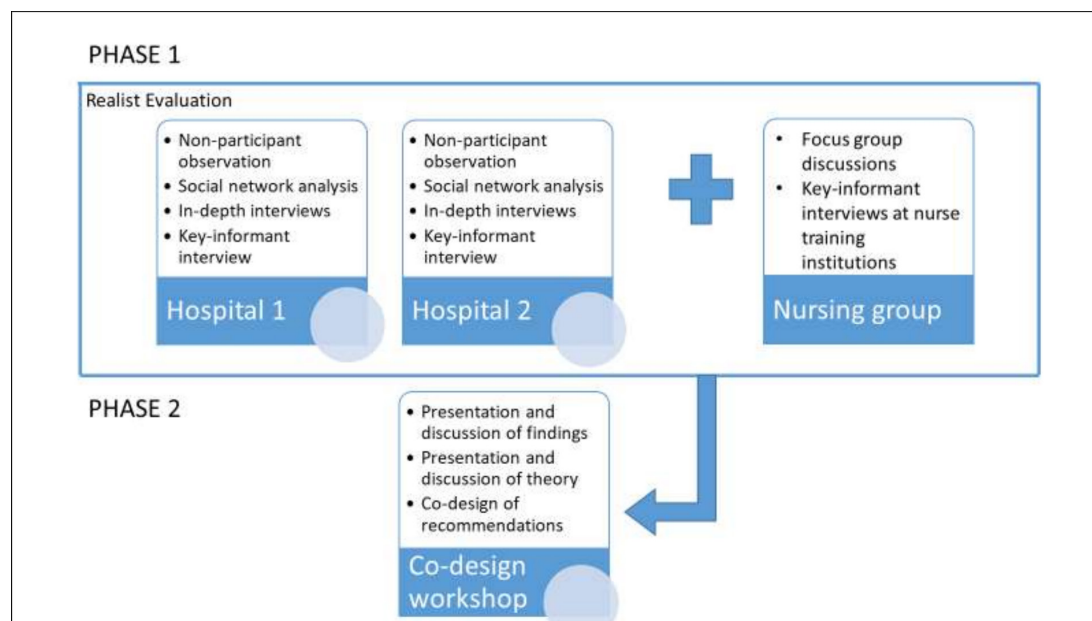


Figure 1 A summary of mixed methods used in the Pathways Study. The figure describes the methodological approach for data collection in phase 1 (in the first three horizontal boxes), which involve data collection from the two case study hospitals and additional data from a nursing interest group, which will comprise nurses providing neonatal nursing care in the two case study hospitals and possibly other hospitals within Kenya. During this phase 1 work, we will also form a technical group for defining a realist evaluation programme theory. The last box, below the three boxes, describes a phase 2 data collection, where study findings from the phase 1 study participants as well as the initially developed programme theory, will be discussed over a 1-day workshop by a group of prior nominated stakeholders. These stakeholders will be drawn from memberships of neonatal nurses, neonatal and paediatric consultants, neonatal and paediatric professional associations, Kenya's Ministry of Health, division of newborn care, Kenya's medical and nursing practice regulatory agencies and senior health systems researchers from KEMRI-Wellcome Trust Research Programme. It is the recommendations from these stakeholder group that will inform the design of interventions targeting behaviour change among health workers providing care to neonates in Kenya.

Nursing group

In addition to the hospital case studies, qualitative data relevant to exploring sociocognitive skills and the implementation of learnt knowledge and skills in the workplace, will be collected from a purposively sampled nursing graduate group and nurse educators from affiliated nurse training institutions.

Stakeholder group

A group of 8–12 relevant stakeholders will be invited to participate in a co-production event, following initial data collection and analysis. Coproduced outputs will be refined theory and associated recommendations for practice. The invited stakeholders will be chosen from among the eligible groups shown in [table 1](#), based on relevant knowledge and experience, and convenience.

Inclusion and exclusion criteria for participation are shown in [table 1](#) below.

Data collection procedures

We will conduct training for all researchers (including research assistants and study clinicians in the various study sites), including the requirements of their roles and how to collect the data using the study data collection tools (study tools attached as online supplemental appendix a-f). Development of the data collection tools (such as observation checklists, interview guides and social network questionnaire) was

informed by our previous realist synthesis of the literature.²¹

These data collection tools will be piloted among the study researchers and colleagues from KEMRI-Wellcome whose work includes some engagements with CIN hospitals, and adapted prior to the start of data collection. To give feedback on the ongoing research process itself, including the piloting and adapting data collection tools, we will also convene a steering group of invited experts.

During data collection and analysis procedures, researchers will adopt a reflexive approach, that is, all members of the research team will be encouraged to keep aware of their own positionality and biases. Sampling will be purposive, seeking relevant data. The research team will intentionally seek, share and discuss potential biases throughout the course of the Pathways Study, and will mitigate as much as possible through openness and transparent and well documented processes. Training will help to improve individual self-awareness of researchers. The principal investigator and assistant research officer will meet regularly to compare and discuss emerging findings.

Data collection methods are listed below, with additional details provided in [table 2](#).

Non-participant observation

In the two hospital case study sites, we will observe health workers in the units/departments they are working.

Table 1 Study inclusion and exclusion criteria

Data collection	Inclusion criteria	Exclusion criteria
▶ Non-participant observation ▶ Social network questionnaire ▶ In-depth interviews	▶ Must work in the delivery room, postnatal ward, neonatal unit or paediatric ward, or support the function of these units as part of their work within the wider hospital. ▶ Relevant staff of all cadres and grades will be included: nurse, doctor, midwife, nutritionist, clinical officers, non-clinical and support staff, hospital administration, nursing, midwifery and final year medical and clinical officer students in the mentioned units ▶ Must be aged 18 years or over, be able to provide informed consent and available to participate in the study	▶ Does not work in, or provide any support to neonatal care delivery in the hospital ▶ Aged under 18 years, unable to give informed consent or unable to participate in study, without participation adversely affecting care delivery
▶ Key Informant Interviews	Senior nurse/manager in the hospital: ▶ Must be above 18 years and be able to provide informed consent ▶ Must be duly registered and licensed to practice at diploma in nursing and above ▶ Must be an employee of the hospital under study ▶ Must have formal leadership roles in the neonatal or paediatric ward ▶ Must be available to participate in the study, without their participation adversely affecting to the functioning of the neonatal unit Nurse educator in the attached training facility: ▶ Must be above 18 years and be able to provide informed consent ▶ Must be duly registered and licensed to practice at diploma in nursing and above ▶ Must be an employee of the hospital under study ▶ Must have formal leadership roles in the neonatal or paediatric ward ▶ Must be available to participate in the study, without their participation adversely affecting to the functioning of the neonatal unit	▶ Junior nurses without leadership or management roles ▶ Nurses working on locum or other agencies ▶ Aged below 18 years, not willing or able to provide informed consent or unable to participate in the study due to work pressures. ▶ Junior teaching faculty without leadership or management roles ▶ Educators working on part time or are employees of other agencies ▶ Aged below 18 years or not willing or able to give informed consent ▶ Unable to participate in the study due to work pressures.
▶ Focus group discussions	Basic nursing graduates: ▶ Must have a diploma or degree in nursing and/or midwifery ▶ Must be registered and licensed by nursing council of Kenya to practice in Kenya ▶ Must be above 18 years and be able to provide informed consent ▶ Are working in hospitals in Kenya on full time, part time or locum basis ▶ Must be available to participate in the study Nursing graduates: neonatal and paediatric nurses or maternal-neonatal nurses ▶ Must have specialty training in neonatal or paediatric or maternal-neonatal nursing and registered/licensed by Nursing Council of Kenya ▶ Must be above 18 years ▶ Must be able to provide informed consent ▶ Are working in hospitals in Kenya on full time, part time or locum basis ▶ Must be available to participate in the study Nurse educators: ▶ Must have at a minimum, a postgraduate diploma in nursing/midwifery/medical education and registered and licensed by Nursing Council of Kenya ▶ Are working full time or part time at the schools of nursing for Kenya Medical Training College, Kenyatta National Hospital and University of Nairobi. ▶ Must be above 18 years, be able to provide informed consent and available to participate in the study	▶ Nurses with certificate or postgraduate specialty nurse training ▶ Not willing or able to provide informed consent ▶ Unable to participate in the study due to work pressures. ▶ Nurses without specialty neonatal, paediatric or maternal-neonatal nursing ▶ Not willing or able to provide informed consent ▶ Unable to participate in the study due to work pressures. ▶ Nurses with certificate or diploma training ▶ Nurses working in other institutes other than study sites or without teaching roles ▶ Not willing or able to provide informed consent or to participate in the study due to work pressures.
▶ Stakeholder workshop	▶ Must have relevant experience in healthcare (paediatric/neonatal care) delivery, research or healthcare policy/education/decision making (health systems researcher, policy maker, health service leader, educator, professional representative or employee of national or county ministry of health or international health agency as assessed by KWTRP) ▶ Must be familiar with key aspects of intervention design or implementation (as assessed by colleagues in extended research team in Kenya)	▶ Insufficient relevant experience or familiarity with key aspects of healthcare service delivery, research or policy/decision making (as assessed by KEMRI Wellcome Trust Research Programme, research colleagues)

Sampling of shifts (six per hospital) will be discussed with the unit manager and shifts will be purposively chosen to select a range of different shifts and to capture variation. A sample of relevant hospital meetings will also be observed at each hospital site. Consent will be sought from staff at the start of the shift, and observations by the researcher will continue throughout the entire shift to try to mitigate any possible changes in staff behaviour due to being observed. Six shifts will be observed per hospital, to also try to mitigate any potential changes in staff behaviour due to being observed. Though not the focus of observations, caregivers will also have the presence of the researcher explained to them and be given

the option to opt out of them/their baby being present in observations of staff.

Social network questionnaire

We will invite all health workers to participate (a complete network) who are involved in delivering neonatal care from relevant departments (ie, neonatal unit, paediatric and maternity wards, and the allied departments: laboratory, pharmacy, radiology, nutrition and patient support services). If the number of staff involved in delivering neonatal care exceeds 120, those staff who are most directly involved in the delivery of neonatal care by their place of work being on the neonatal unit, paediatric or

Table 2 Data collection procedures

Method	When	Average time taken	Justification
1. Non-participant observation	Observations of 6 shifts per hospital site, as discussed with unit manager, to aim for maximum variation. A sample of hospital meetings will also be observed.	6–8 hours per shift on average, plus 6–8 hours of meetings (total 42–56 hours of non-participant observation per site)	Observational data will be used to explore social ties and networks in the hospitals, and influence on provision of neonatal care Objective 1
2. In-depth semistructured interviews	One interview per participant (up to total 35 in each of 2 hospital sites)	45–60 min	In-depth interviews will explore the personal experience and reflections of staff as to how social ties are formed, with whom, and their role and influence in neonatal care provision Objective 1
3. Social network questionnaire	One questionnaire per participant (total 40–120+ participants per hospital site, depending on size of networks)	30–45 min	Social network data will help to explore the structure of staff communication networks and network characteristics Objective 1
4. Key informant interview	One person per each hospital and one person per each attached training facility (total of 5–7 persons)	30–45 min	Key informant interviews will provide additional contextual information Objective 1
5. Focus group discussions	Three focus groups (each group of 5–9 members): 1. Basic nursing graduates (diploma and degree) 2. Specialist neonatal and paediatric nursing graduates 3. Nurse educators for both basic and specialised postbasic neonatal or paediatric nursing programmes.	Each focus group lasting 60–90 min	Focus group discussions will explore sociocognitive aspects of using knowledge and skills in the workplace Objective 1
6. Stakeholder Workshop	One session following the data analysis from methods 1–3. Total of 8–12 participants	One day (either in-person or online) lasting 5–7 hours	The stakeholder workshop will provide data and use elements of codesign, to develop recommendations for how understanding of social ties could enhance efforts to improve quality of care for newborn babies Objective 2

maternity wards, will be invited to participate in the social network questionnaire in the first instance.

A complete staffing list will be compiled by speaking to the management of the hospital/units and relevant student representatives (list will include names of staff of all cadres, students and all shifts). The researcher will assign a random ID code to each member of staff on the list, using a random sequence generator. Participants will be asked to identify colleagues they would speak to from a staffing list, and the researcher will use a separate research list to locate a corresponding ID code for each member of staff/student named during the social network questionnaire. Demographic data will be collected to identify and better understand homophily (those with similar demographics forming preferential ties with one another) within the network and where it occurs.⁹ This will help to understand for example, whether cadre/gender/academic training is associated with connections in the workplace. If conducted online, participants will be asked to name colleagues without using the roster prompt, to avoid electronic sharing of staff lists.

In-depth interviews

We will conduct purposive sampling to obtain data from approximately 35 study participants from each of the

participating hospitals (total of approximately 70). We will seek variation of interview participants to identify and explore diversity of views and experience, for example, variation in cadres, units and demographics.

Key informant interviews

One representative from management will be invited to participate in a key informant interview, from each of the two hospitals and from associated training institutions.

Focus group discussions

Multistage sampling (convenience and snowballing then stratified sampling) will be used for focus group discussions of basic diploma and/or degree nursing graduates, specialist paediatric/neonatal nursing graduates and nursing educators. Participants from training institutions (nursing educators) will be recruited purposively. For nurse graduates, informal/formal professional nursing graduate social media group fora, such as WhatsApp and Telegram, will be used to invite individuals to participate in the study, followed by snowballing to reach those who are not on the social media platforms. This will be followed by stratification (1:1:1) to represent the various professional cadres, training programmes and facilities where they practice.

Stakeholder workshop

We will conduct purposive sampling to obtain data from at least one representative among the various stakeholders, to achieve a sample size of 10–15.

Analyses

The research objectives of the Pathways Study which aim to build theory, and the mixed-methods approach to data collection, make realist evaluation an appropriate scientific approach for analysis and interpretation.

A refined middle-range programme theory (box 1) and subsequent recommendations for practice will ultimately be codeveloped as the main outputs of the Pathways Study. The initial programme theory developed from literature (22, and box 2) will be refined and expanded through examination and analysis of data collected during the Pathways Study, by seeking out semi-regular patterns (demi-regularities, box 1) of outcomes that occur within the programme theory and then developing causal explanations for these outcomes in the form of CMOs (box 1) using retrodution (box 1).^{19 23} Hence, the initial programme theory derived from the literature will provide a series of causal explanations that can be ‘tested’ (confirmed, refuted or refined) against the primary data collected during the Pathways Study.²⁰ Where indicated by our interpretations of the primary data, new, expanded or revised CMOs will be used to refine the initial programme theory for use in neonatal units in Kenya—thus further improving the level of understanding captured in the resultant middle-range programme theory (figure 2).

Prior to the application of the realist logic of analysis, we will do some additional data analysis, for example, thematically analysing the qualitative data and using social network approaches to analyse the quantitative data:

- Qualitative data from the study collected during non-participant observations, in-depth interviews and

focus groups, and the stakeholder codesign event will initially be analysed thematically using NVivo software. This will lead to inductively developing a theoretical framework. Qualitative data on sociocognitive aspects of the study (key informant interviews and in-depth interviews) will be iteratively analysed using a grounded theory approach following an Open-coding →Axial-coding →Selective-coding approach to develop an explanatory theoretical framework on the role of sociocognitive skills in the utilisation of clinical competencies by nurses.

- Quantitative data collected from a Social Network Questionnaire will be analysed with standard social network analysis (SNA) metrics (eg, density, centrality) using Gephi free software and/or R to develop sociograms and a set of network measures.

Following the initial phase of realist analysis and theory building (phase 1, figure 1), a group of stakeholders will be invited to review and further refine the theory, based on their expert knowledge and experiences (phase 2, figure 1). Through engagement with these stakeholders, explanatory theory will be further refined, and used to develop a set of recommendations for practice.

Patient and public involvement

The Pathways Study research team includes a representative from each of the two hospital study sites and training institutions as study collaborators. The role of study site collaborators is to provide useful linkages for facility engagements before, during and after the study as well as facilitate the smooth conduct of the research by contributing to data collection through arranging for meetings with study participants. During the study, an advisory steering group will be formed of relevant coinvestigators who are not directly involved in data collection or ongoing analysis as well as extended colleagues working on relevant projects, to review study findings and provide

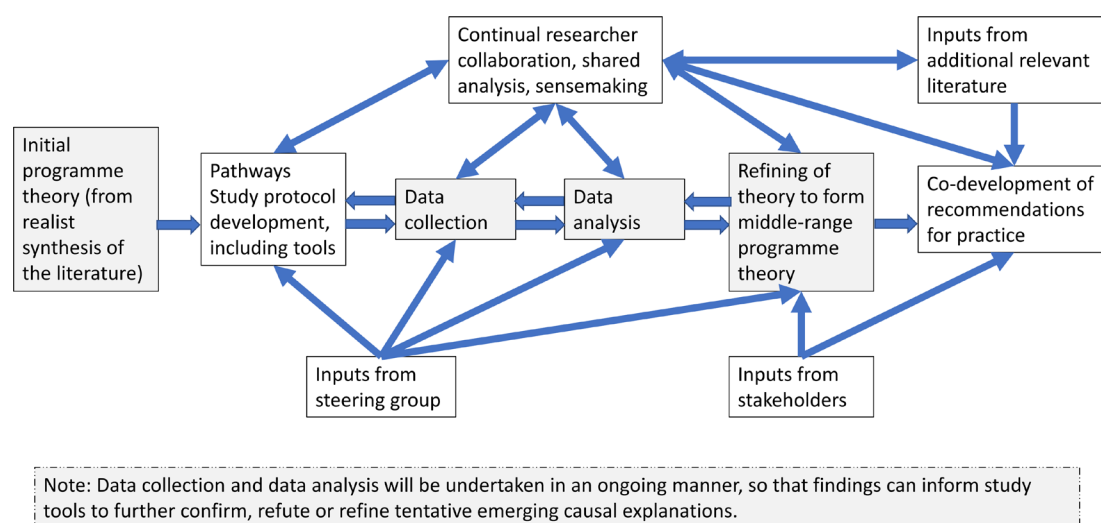


Figure 2 Programme Theory Development in the Pathways Study. The figure shows the dynamic and iterative process of theory development and refinement in the Pathways Study, starting from the initial programme theory, to the development of middle-range programme theory and recommendations for practice, using study data, steering group and stakeholder inputs, continual researcher collaboration and relevant literature.

useful comments and expert advice on study data analysis procedures and interpretation of the study findings.

ETHICS AND DISSEMINATION

Ethical approval for the Pathways Study has been received from Kenya Medical Research Institute (KEMRI/SERU/CGMR-C/241/4374) and Oxford Tropical Research Ethics Committee (OxTREC 519-22).

Insights from the Pathways Study will add new understanding and a different theoretical lens to ongoing work by KEMRI-Wellcome Trust Research Programme in Kenya, particularly work focused on health workforce communication in neonatal care. Findings will also provide a useful addition to the existing body of literature on social networks of the hospital workforce, which is almost entirely derived from high income settings. The explanatory power of realist programme theory in specifically developing new understanding around the chains of causation associated with social ties of hospital staff, will be useful for designing and targeting interventions to enhance how such ties might positively contribute to change efforts in the neonatal unit. In addition, SNA is a relatively new methodology in healthcare research, and so the practical learning gained during the research process will be shared with KEMRI-Wellcome Trust Research Programme colleagues and others and will be useful for those intending to use SNA in future research.

Findings will further open-up the window of sociocognitive skills to policy makers and other stakeholders in Kenya, their role in service delivery quality and by way of interventions influence health workforce sociocognitive skills strengthening agendas. Findings relating to the role of non-technical sociocognitive skills in the use of learnt clinical competencies in neonatal care, will be used to develop recommendations for nurse educational interventions. Recommendations are likely to include how and when these skills can be incorporated into basic and specialised nursing programmes and in-service continuous professional development training activities. We anticipate that these findings might also be applicable to wider healthcare training programmes.

Findings will be shared with the two study hospitals, relevant educational institutions, and KEMRI-WELLCOME Trust Research Programme and the University of Oxford. Study findings will also be disseminated in seminars, local and international conferences, and as academic theses and research articles published in open-access scientific journals.

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Contributors This protocol was codeveloped by CB and CW as joint authors/coprincipal investigators. ME, PMM, MB, GW and LH contributed to the development of the protocol, and JJ, SM and JJM contributed to the refining of the protocol and study tools for implementation.

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KEMRI/RD/22

February 27, 2024

**TO: MR. CONRAD WANYAMA,
PRINCIPAL INVESTIGATOR.**

**THROUGH: THE DEPUTY DIRECTOR, CGMR-C,
KILIFI.**

Dear Sir,

**RE: KEMRI/SERU/CGMR-C/241/4374 (REQUEST FOR ANNUAL RENEWAL AND
DEVIATION): UNDERSTANDING HEALTH WORKER SOCIAL TIES AND
COMMUNICATION, AND THEIR INFLUENCE IN NEONATAL CARE.**

Thank you for the continuing review report for the period **March 16th, 2023, to January 30th, 2024.**

The Expedited Review Team received and reviewed the following documents:

1. SERU approved protocol (version 1.3 of Feb 14th, 2022)
2. Last SERU ethics approval (dated March 16th 2023)
3. Continuing Review Report form for the period 2023-2024
4. Manuscript under development (draft)

This is to inform you that the Expedited Review Team of the KEMRI Scientific and Ethics Review Unit (SERU) was of the informed opinion that the progress made during the reported period is satisfactory. The study has therefore been granted **approval** for continuation.

This approval is valid from **March 16, 2024** through to **March 15, 2025**. Please note that authorization to conduct this study will automatically expire on **March 15, 2025**. If you plan to continue data collection or analysis beyond this date, please submit an application for continuation approval by **February 2, 2025**.

You are required to submit any amendments to this protocol and any other information pertinent to human participation in this study to the SERU for review prior to initiation. You may continue with the study.

Yours faithfully,

**ENOCK KEBENEI,
THE ACTING HEAD,
KEMRI SCIENTIFIC AND ETHICS REVIEW UNIT**

Oxford Tropical Research Ethics Committee

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Claire Blacklock
Health Systems Collaborative
Peter Medawar Building
South Parks Road
Oxford OX1 3SY

4 September 2023

Dear Claire,

Full Title of Study: Pathways Study: Understanding health worker social ties and communication, and their influence in neonatal care

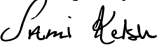
OxTREC Reference: 519-22

Thank you for your letter of 12 August 2023 requesting an amendment to the above study. The revised documents that you have submitted for consideration are as follows:

Documentation:	Version:	Date:
Minimal risk form		12/08/23

I am pleased to inform you that this amendment has been approved.

Yours sincerely,

DocuSigned by:

B4D7A3EB6876444...

Sami Kelsh
Research Ethics Administrator, OxTREC

for
Dr Rosemary Musesengwa
Research Ethics Manager, OxTREC

Appendix 2.2.3. Ethical review submission, data collection tools, consent forms, information sheets

Pathways Study: Application for SERU ethical approval

Study title: Pathways Study: Understanding health worker social ties and communication, and their influence in neonatal care.

Lay Title: Understanding how health worker interactions influence the care of newborn babies.

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Lay Summary

Formal title

Pathways Study: Understanding health worker social ties and communication, and their influence in neonatal care.

Lay title

Understanding how health worker interactions influence the care of newborn babies.

What is the problem?

Interventions to improve the care of newborn babies often need good teamwork, coordination and communication among the healthcare staff. An example of this is when certain health workers have special knowledge and skills in caring for newborns (e.g. through training), which need to be put into practice by the wider health worker team on the unit. Informal relationships and social ties (i.e. ways that people are connected to one another) among health workers are known to be complex, with communication in hospitals occurring in different places, at different times, and between different people. Social ties tend to influence how different individuals and groups behave and how they make decisions, including decisions about the care of newborn babies. Studies from high income countries have explored what influences how these ties are developed, and how they shape the behaviour of health workers. However, it is not clear how ties are developed and what is their effect on the care given to newborn babies in Kenyan hospitals. It is therefore important to clearly understand which informal relationships and social ties exist, how they are formed and how they influence health workers' behaviours and decisions around the care of newborn babies.

What questions are we trying to answer?

We aim to conduct research to understand

1. How health workers of all cadres work together, to deliver care to newborn babies in Kenyan hospitals, and the kinds of informal relationships and social ties which exist within and between the different groups of health workers caring for newborn babies
2. How understanding these networks of relationships and social ties might help us enhance efforts for improving quality of care for newborn babies.

Where is the study taking place, how many people does it involve, and how are they selected?

The study will take place at 2 hospitals within [name] County: [name] Hospital and [name] Hospital. We will also hold discussions with staff at nurse training facilities and a sample of recent graduates of their programmes (total around 30-40 people).

Research activities in each of the two hospitals will include: observation of staff whilst they are undertaking their usual work (6 shifts and 4 meetings in each hospital), staff questionnaires (40-120+ in each hospital), one-to-one interviews with a sample of staff (approximately 35 in each hospital), and an interview with a member of the management team (1 in each hospital). Also, we will hold a workshop with 8-12 stakeholders such as senior health workers (neonatal and paediatric nurses and paediatricians), health researchers (scientists), trainers of health workers (lecturers/tutors), graduates of basic and specialist neonatal and paediatric nursing programmes, and those who regulate the training and practice of healthcare in Kenya.

What does the study involve for those who are in it?

For staff:

We will observe the care they provide to newborn babies, the communication ties they create with one another and their behaviours and take note of the content of the verbal communication (what is said, how is said, how often it is said, who says it, to whom it is said and when it is said) and non-verbal cues. We will observe these during patient care but ensure that observations do not interfere with ongoing work by committing to adhere to non-participant observation guidelines. We will follow local health regulatory procedures in appropriately reporting any obvious or potentially unsafe practices that pose danger to patients, should this occur. More information will also be collected using questionnaires, one-on-one in-depth interviews, and key informant interviews as well as through focus group discussions.

For the stakeholders

We will hold a one-day workshop (either in person or online) of 10-15 people to understand the stakeholders' experiences on these social networks and ties in hospitals. We will then develop recommendations for how understanding social networks can be used to improve care of newborn babies.

What are the benefits/risks costs of the study for those involved?

There will be no direct benefit to study participants. We will, however, reimburse study participants with an out-of-pocket allowance (Ksh.1000 per person) if they participate in any research activity lasting 3 or more hours (such as the stakeholder workshop). Also, where study participants attend face-to-face physical research activities away from their workstations or during their off or leave days, we will reimburse their transport costs (Ksh. 600 per person). For all research activities conducted online, we will reimburse the costs of data bundles of between Ksh.250-500, based on KEMRI WTRP guidelines for study benefits and allowances. The planned research activities include non-participant observation of 6 shifts per hospital (each shift lasting 6 to 8 hours), a questionnaire lasting 30 to 35 minutes per person, in-depth interviews lasting 45 to 60 minutes per person, key informant interviews lasting 30-45 minutes per person, focus group discussions lasting 60-90 minutes per group and one stakeholder workshop lasting 5 to 7 hours. Study participants will be protected from the risks of sharing possibly sensitive information by our careful handling of their information and making sure their names are never revealed. All information from the study will be stored in password protected company computers, be accessible only to the researchers involved in this study and be used for research purposes only.

How will the study benefit society?

Findings from both the staff and stakeholders' meetings will be used in co-designing a package of recommendations on how knowledge and information sharing based on an understanding of social networks should be practiced in hospitals and how this can improve care of newborn babies. Understanding how soft skills such as communication skills and teamwork affect the way health workers provide care to newborn babies will help health educators, managers and regulators to design more effective educational programmes that are linked to patient care outcomes.

When does the study start and finish?

180 The study is planned to start once ethical approval is provided and will take 20 months to
181 complete.
182

183 **List of abbreviations and definitions of key terms**

184	CIN	Clinical Information Network
185	COVID-19	Corona Virus Disease 2019
186	ID	Identification
187	KEMRI	Kenya Medical Research Institute
188	KWTRP	Kenya Medical Research Institute-Wellcome Trust Research Programme
189	MOH	Ministry of Health
190	NBU	Newborn Unit
191	NEST 360°	Newborn Essential Solutions and Technologies research study
192	OXTREC	Oxford University Research Ethics Committee
193	SERU	Scientific Ethics Review Unit (of Kenya Medical Research Institute)
194	SNA	Social Network Analysis
195	Software	The tacit, social components of a health system (e.g. relationships, norms,
196		values)
197	SONIC	A System Strategy to Optimise Neonatal Inpatient Care in Kenyan Hospitals

198

199

200

201 **Title of the Project**

202 Understanding health worker social ties and communication, and their influence in neonatal
203 care.

204 **Investigators and Institutional Affiliations**

205

206 Principal Investigator: Conrad Wanyama ¹

207

208 Co-Principal Investigator: Dr. Claire Blacklock²

209 Co-Investigators: Prof. Mike English ^{1,2}

210 Mwanamvua Boga¹

211 Prof. Sassy Molyneux¹

212 Dr. Aluvaala Jalemba^{1,3}

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215 Juliet Jepkosgei¹

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219 Collaborators: Prof. Lisa Hinton⁴

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223 Hilary Edgcombe¹⁰

224 [removed]

225

226

227

228

229

230

231 Affiliations:

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235 3 Department of Paediatrics, University [name]

236 4 Nuffield Department of Primary Care Health Sciences, University of Oxford

237 5 School of Nursing, University [name]

238 6 [name] Training College Department/School of Nursing

239 7 [name] Hospital

240 8 [name] Hospital
241 9 Oxford Internet Institute, University of Oxford
242 10 Nuffield Department of Anaesthetics, University of Oxford
243 11 [name] School of Nursing
244

245 Abstract

246 Initiatives to improve the quality of neonatal care in low and middle income countries are vital
247 to meet the sustainable development goal 3 of reducing to at least 12 neonatal deaths per
248 1,000 by the year 2030. These initiatives have included enhancing human resources for health
249 (HRH), including investing in post-basic neonatal nurse training. However, the informal social
250 ties that health workers form with their many different colleagues and how these influence
251 individual and group behaviours and norms in hospitals and specifically neonatal care, have
252 been relatively neglected in health systems research. This study seeks to understand these
253 relational ‘software’ components of hospitals and how such knowledge can be used for
254 designing and implementing quality improvement interventions targeting health workers’
255 behaviours. The overall aim will be to conduct a realist evaluation of the study findings to
256 develop abstracted theory to better understand how health workers of all cadres delivering
257 neonatal care in Kenyan hospitals work together, including the structure and influence of
258 informal social ties that exist within and between the different cadres caring for neonates, and
259 how these relational networks might be utilised to enhance quality improvement efforts. We
260 will collect data at two phases: Phase one will involve a case study of 2 hospitals, [name]
261 Hospital and [name] Hospital. In these 2 hospitals, we will conduct a non-participant
262 observation of social ties and connections among hospital staff during patient care and during
263 hospital meetings followed by obtaining further information from conducting in-depth
264 interviews, key informant interviews, a social network questionnaire and focus group
265 discussions. Mixed methods data analysis will be used: thematic analysis of qualitative data
266 and, for quantitative data, descriptive data analysis as well as analysis of standard social
267 network metrics and realist evaluation. Phase two will include conducting a stakeholder
268 workshop meeting to explore social ties in hospitals and co-design a toolkit or framework of
269 interventions guiding how social networks might be used to enhance quality improvement
270 efforts in Kenyan hospitals. These recommendations will feed into the ongoing work of the
271 Clinical Information Network (CIN) that supports and improves strategies for audit and health
272 service evaluation (SERU number 3459).

273
274
275

Introduction

Defining the problem

The neonatal mortality rate in Kenya has remained relatively unchanged despite significant reductions in mortality rates across other age groups under-5 in recent years (1,2). Therefore, efforts have been made to improve the quality of neonatal care, the majority of which is delivered from public health facilities and mostly by nurses (3). Such improvement initiatives have included the recent introduction of a package of new technologies in some neonatal units, establishing routine data collection and feedback, and ongoing investment in the health workforce through training and workplace support (4,5). However, more detailed understanding of the health system 'software' (e.g. the relationships between staff, values, norms and the social and cognitive skills that complement clinical technical skills) influencing the quality of neonatal care would be helpful. Such an understanding offers additional depth to future design and implementation of improvement efforts. Indeed, the ways in which health workers communicate and work with one another is vital in the delivery of quality patient care - even more so in the neonatal unit where patients often have multiple complex problems that require care by a multi-professional team, who are often working across different units (e.g. maternity, neonatal unit, paediatrics). Understanding how and why communication (and other social and cognitive skills) occurs between different health workers would help to unpack the complex influences on health worker behaviours and patient care.

It is known that individual and group norms and behaviours are influenced by peers (7,8). How health workers are connected to one another (i.e. social ties) therefore has an impact on the practical implementation of care pathways, clinical guidelines, knowledge, and other competencies, including those that are transferred from an educational setting to a clinical care environment (8). Understanding the structure and influence of social ties between health workers involved in the hospital care of neonates in Kenya will lead to new understanding around the form and influence of relational networks in Kenyan hospitals for enhancing quality improvement efforts. A wider stakeholder engagement and abstraction process will lead to the co-design of recommendations for those working in hospitals in Kenya, particularly in neonatal care. The co-designed recommendations will include a proposed framework or toolkit describing (I) how social ties between health workers can be better understood in practical terms, (II) how social ties can be used to enhance quality improvement efforts in neonatal care (III) where social ties fit within the larger quality improvement efforts, for example the clinical social learning intervention package for work being undertaken by the SONIC study (SERU #3852).

Social Network Analysis

Communication between staff in healthcare settings has been found to occur in both 'front stage' (i.e. in front of patients or carers), 'back stage' (i.e. away from patients or carers), and planned (e.g. ward rounds) and ad-hoc (e.g. coffee room), exchanges. Indeed, many exchanges which impact on decision making take place in 'back stage' ad-hoc opportunistic exchanges, such as in hospital corridors (9). Hence, many of the complexities of staff exchange have remained elusive and difficult to capture using traditional research methods. Alternative methods such as Social Network Analysis offer a way to measure and describe relational data which may otherwise be difficult to observe and can offer many advantages (7). Social Network Analysis (SNA) uses a set of standard metrics to describe and quantify social ties (or 'edges' in SNA terminology) between health workers (or 'nodes'). As such, using this methodology, networks of staff communication patterns can be constructed and visualized, and properties of these networks can be measured and reported using a series of standard well-defined metrics. Social Network Analysis has been used in settings both inside and outside of healthcare (10). A recent literature review (under review, JHSRP-21-263.R1) did not identify any Social Network

Analysis studies that had been undertaken to study the communication ties of staff in Kenyan hospitals, or in African hospitals. Social Network Analysis will be used in the Pathways Study to explore the communication ties that staff have with one another, who are involved in the care of neonates in two Kenyan hospitals. This will allow us to better capture 'backstage' and ad-hoc exchanges, as well as 'front stage' and planned exchanges (9). The quantitative social network data will contribute to the realist evaluation, alongside qualitative data which we will gather from interviews, observations, and the stakeholder workshop, which will provide greater depth to understanding the quantitative data and will allow us to explore the detailed and nuanced reasons for and effects of social ties in the workplace.

Social and cognitive skills

Performance at workplace is shaped by various factors: context/workplace/organisation-related, patient/task-related, individual/team-related factors (10). Specific to individual and team related factors, performance is now known to be shaped by both technical clinical competencies and experiences as well as social and cognitive skills (cognitive, social and personal resource skills such as communication, team work, leadership, situational awareness, assertiveness and decision making, coping with stress and managing fatigue etc). Social and cognitive skills have been identified as critical contributors to the performance of technical clinical skills, and the improvement of patient outcomes particularly in complex acute care settings such as resuscitation and emergency response with increasing interest in other disciplines and contexts including in low-middle income country contexts (11,12).

Justification

Ongoing initiatives to reduce neonatal mortality rate (3,4,5) to the sustainable development goal of less than 12 per 1,000 by the year 2030(13) have been hampered by complex health system difficulties (2). One of these difficulties is access to high quality neonatal service delivered by competent and highly motivated health workers in a safe, well-resourced, and functional hospital environment (3). This healthcare environment is often shaped not just by 'hardware' components such as numbers of staff, but also by 'software' aspects (14), including informal social ties, networks and connections and individual/team social and cognitive skills which subsequently influence health worker's acquisition of new knowledge and behaviours and norms at individual and group level (4,5). The care of neonates is highly dependent on teams of staff working together and social ties and networks make up the relational 'software' that is likely to influence how decisions are made (9), and for whom, what decisions are made (or not), who makes these decisions, how these decisions are/not implemented. (6) Thus, social networks are likely to be central to the adoption of new or better care practices. This work will contribute to ongoing work by KEMRI-Wellcome Trust Research Programme researchers in Kenya, particularly work focused on improvement, adoption of technologies and staff communication within the neonatal unit. It will also explore neonatal hospital care both within and beyond the neonatal unit by including health workers caring for neonates in the delivery room and post-natal unit, in the hospital case studies. The understanding developed will be useful for better designing and targeting interventions around quality improvement and potentially for health worker training. Findings will also provide a useful contribution to existing international literature on social networks of the healthcare workforce, which is almost entirely derived from high income settings, helping researchers develop new skills in social network analysis and use of realist evaluation methods.

Null Hypothesis

This is an inductive exploratory study to understand informal networks and social ties (relational 'software') using a case study approach involving 2 hospitals and using realist evaluation (13). Though programme theory will be developed during the study, a null hypothesis is not appropriate for the methods.

Objectives

Broad objective:

The broad objective of this study is to explore how, why, for whom and in what circumstances, features of health systems 'software' (e.g. values, norms, relationships) between health workers of all cadres caring for neonates in Kenyan hospitals, influence quality of care being targeted by improvement efforts.

Specific Objectives:

- I. To describe how health workers of all cadres work together to deliver care to newborn babies in Kenyan hospitals, and the kinds of networks, relationships, social ties and personal/team-related socio-cognitive skills that exist within and between the different groups of health workers caring for newborn babies.
- II. To examine how these relationships, networks, social ties and related socio-cognitive skills influence the use of nurses' clinical competencies in newborn care and how these socio-cognitive skills might be utilised to design recommendations to improve neonatal care in Kenyan hospitals.

Literature review

In preparation for this work a realist synthesis of the literature was undertaken. (14) The realist synthesis has been accepted for publication in the Journal of Health Services Research and Policy and is in press (JHSRP-21-263.R1). From the literature we sought to answer the question: *How, why, for whom, to what extent and in what context do the social ties of staff within a hospital influence quality of service delivery, including quality improvement?*

Using a comprehensive search strategy, which was developed and executed with the assistance of a medical librarian, 10,910 citations were identified from the literature, from which a total of 75 documents were included in the analysis after the review process. These included documents reported social network analysis studies of hospital staff. Most were from high income settings, and none from Africa. They investigated a range of interpersonal ties in the workplace of hospital staff, from medication advice-seeking to decision-making and social support. The analysis sought semi-regular patterns of causative explanation from the data through a process of inductive coding, then developed and refined context-mechanism-outcome configurations (CMOCs), for building of programme theory, which was also informed by substantive sociological theory. In total, 35 CMOCs were identified from the data, organized under four emergent domains: 1) Social groups, 2) Hierarchy, 3) Bridging distance, and 4) Discourse. The programme theory is shown in summary in the box below.

Box 1: Programme theory (taken from Blacklock et al. The social ties of hospital staff: a realist synthesis. JHSRP-21-263.R1)

Hospital staff prefer to communicate with colleagues who are similar to themselves, and with whom they share trust. However, this can create boundaries, silos and redundant information within pockets of the workforce, and different behavioural norms adopted by members of different groups, dominated by influential individuals. Tacit hierarchical rules also determine communication with others in the workplace based on status, forming a landscape of differential access to information

and others. Fragmentation between different status groups can occur, and space for status-enhancing behaviours is created. Workplace silos and status boundaries can be bridged in the presence of trust, confidence, and mutual understanding, or where need is urgent and immediate. The organisation can actively comply with or challenge social boundaries within the workforce by the formal processes endorsed, which allow day-to-day performances of relative power, based on identity and hierarchical status. Attempts to manage the discourse, and the effectiveness of formal workplace communication processes, act to construct or disassemble social boundaries in hospitals. Connections between staff influence access to information and other forms of capital, behavioural norms and perceived agency. Ties are continuously shaped and as such are amenable to intervention. The capacity of these connections and the overall structure of the workplace social network are vital to delivering quality patient care.

415

416 The findings from this realist synthesis of the literature informed the protocol and study tools
417 for the Pathways Study.

418

419 Since the data used in the realist synthesis were mostly from high income settings, with no
420 included studies from Africa and only one included study focused on neonatal care, a realist
421 evaluation is required to understand how the programme theory needs to be further refined
422 and adapted, for application to the realities of delivering neonatal care in Nairobi.

423

424 **Design and Methodology**

425 The Pathways study utilizes realist evaluation of data derived from an open inductive
426 exploratory design with a case study approach of 2 hospitals, to identify and describe workplace
427 relational ‘software’. The study findings will eventually be used to develop realist programme
428 theory and a set of recommendations for practice. Theory developed from an existing realist
429 synthesis (under review, JHSRP-21-263.R1), using literature from mostly high income settings,
430 has been used to guide exploratory work, by informing the design of data collection tools.

431
432 **Study site**

433 We aim to conduct a case study of 2 hospitals, [name] Hospital and [name] Hospital. The study
434 sites are chosen because of ease of access within [name] region, owing to the existing COVID-
435 19 restrictions to movements. They are also facilities of two contrasts; [name] Hospital is
436 [details removed as identifying]. The hospital has a large neonatal unit, with a Newborn
437 Intensive Care Unit and currently a training centre for Basic Diploma Nursing and Clinical
438 Medicine students, Bachelor of Science in Nursing and Bachelor of Medicine and Surgery
439 undergraduate students, Post-Graduate Diploma, Higher Diploma and Master’s level training
440 for Paediatric Nursing, Neonatal Nursing, Paediatrics and Child Health and a Fellowship in
441 Neonatology. [name] is an implementing site for ongoing initiatives to improve care of neonatal
442 service through the Newborn Essential Solutions and Technologies (NEST 360°) that seeks to
443 integrate technological solutions within clinical care. [name] Hospital is a level 5 county hospital
444 run by [name]. Located about 2-3 kilometers away from [name], the hospital is a member of
445 the Clinical Information Network, although not an implementing site for NEST 360°. CIN seeks
446 to improve clinical care of children by targeting better use of routine clinical data to inform
447 policy and practice through providing audit and feedback mechanisms and supporting the work
448 of clinical champions of participating network hospitals.

449 **Study population:** Table 1 below describes the study population:

Table 1: Study Population

Facility	Procedure	Study population	Targeted number or Sample size
[name] Hospital	Non-participant observation	- Staff directly involved in delivering neonatal care: Student nurses, medical students, clinical medicine students, clinical officer students, neonatal nursing students, paediatric nursing students, midwifery students, paediatric residents, post-basic clinical medicine students, general nurses, neonatal nurses, midwives, clinical officers, medical officers, paediatricians, fellows in neonatology, neonatologists and clinical teachers - Allied health workers supporting neonatal care: Laboratory, pharmacy, radiology, nutrition, management, administration, health records and patient support services	6 shifts over 2-3 days for non-participant observation at clinical areas.
	In-depth interviews		4 hospital/unit meetings for non-participant observation of meetings.
	Social network questionnaire		35 individuals for In-depth interviews stratified to represent various cadres and units
	Key Informant Interview	- One senior nurse as Shift team leader or Unit/ward manager equivalent from the hospital - An additional one member of staff managing the nursing programme or equivalent from each of the attached training institutions (Kenya Medical Training College, University of Nairobi and Kenyatta National Hospital Training School)	A complete social network of 40-120+ staff members.
[name] Hospital	Non-participant observation	- Staff directly involved in delivering neonatal care: Student nurses, medical students, clinical medicine students, paediatric residents, post-basic clinical medicine students, general nurses, neonatal nurses, clinical officers, medical officers, paediatricians, neonatologists and clinical teachers - Allied health workers supporting neonatal care: Allied health workers from Laboratory, pharmacy, radiology, nutrition, management, administration, health records and patient support services	1 individual per clinical unit/ward
	In-depth interviews		1 individual from each of the training institutions (total of 3)
	Social network questionnaire		
	Key Informant Interview	One senior nurse as Shift team leader or Unit/Ward manager or equivalent from the hospital.	
[name] Hospital	Non-participant observation	- Staff directly involved in delivering neonatal care: Student nurses, medical students, clinical medicine students, paediatric residents, post-basic clinical medicine students, general nurses, neonatal nurses, clinical officers, medical officers, paediatricians, neonatologists and clinical teachers - Allied health workers supporting neonatal care: Allied health workers from Laboratory, pharmacy, radiology, nutrition, management, administration, health records and patient support services	6 shifts over 2-3 days for non-participant observation at clinical areas.
	In-depth interviews		4 hospital/unit meetings for non-participant observation of meetings.
	Social network questionnaire		35 individuals for In-depth interviews stratified to represent various cadres and units
	Key Informant Interview	One senior nurse as Shift team leader or Unit/Ward manager or equivalent from the hospital.	A complete social network aiming for 40+ staff members.
Sample selected from across facilities/faculties	Focus Group Discussion	- Nursing graduates (basic diploma and degree nurses) - Specialist post-basic nurse graduates (higher diploma/post-graduate diploma, MSc) - Nurse educators	1 per unit
			15-27 (made up of 5-9 basic graduate nurses, 5-9 specialist neonatal/paediatric nurses and 5-9 nurse educators).

Hospital management for [names] Hospital, KEMRI-WTRP, MOH-Kenya, [name] County Health department, 2 Kenyan Health regulators, WHO/UNICEF-Kenya country office, University [name], [name] Training College, Professional Associations	Stakeholder workshop	Invited representatives from among: • Unit/departmental managers of the two hospitals • Researchers from KEMRI-Wellcome Trust Research Programme • Division of Neonatal, Child and Adolescent health • County child focal health persons • Hospital CIN focal persons • Hospital NEST clinical champions • Nursing Council of Kenya • Kenya Medical Practitioners' and Dentists' Council • Kenya Paediatric Association/Kenya Paediatric Research Consortium • University of Nairobi Faculty of Health Sciences (department of Paediatrics) • University of Nairobi Faculty of Health Sciences (department of Nursing sciences) • Kenya Medical Training College • Kenyatta National Hospital School of Nursing • Association of Neonatal Nurses-Kenya/Kenya Paediatric Nurses' Chapter • WHO-UNICEF Kenya	10-15

Sampling procedures

The study will aim to use the following approaches in sampling

- i. Non-participant observation: We will aim to observe all health workers on the units/departments they are working. Sampling of shifts (6 per hospital) will be discussed with the unit manager and shifts will be purposively chosen to select a range of different shifts to capture variation. A sample of hospital meetings will also be observed in each hospital.
- ii. In-depth interviews: We aim to conduct a purposive sampling to obtain data from approximately 35 study participants from each of the participating hospitals (total of approximately 70). Each of the study participants will have at least one of the identified characteristics on the study population. We will seek variation among interview participants, e.g. varied cadres, units, demographics, to identify and explore diversity of views and experience.
- iii. Social network questionnaire: We will aim to include all health workers (a complete network) who are involved in delivering neonatal care from the various departments (neonatal unit, paediatric and maternity wards, and the allied departments: laboratory, pharmacy, radiology, nutrition and patient support services). We anticipate a staff establishment for direct and indirect newborn care of up to 40 to 120 with [name] having a smaller staff establishment than [name]. However, where the number of staff involved in delivering neonatal care exceeds 120 (such as in [name] where we anticipate a larger workforce), those staff who are most directly involved in the delivery of neonatal care by their place of work being on the neonatal unit, paediatric and maternity wards, will be invited to participate in the social network questionnaire in the first instance.
- iv. Key Informant Interviews: One representative with a management role will be invited to participate in the key informant interview, from each of the two hospitals and one representative from each of the attached training institutions ([names]).
- v. Focus group discussions: multi-stage sampling (convenience and snowballing then stratified sampling) will be used for focus group discussion of basic diploma and/or degree nursing graduates, specialist paediatric/neonatal nursing graduates and nursing educators. Participants will be conveniently recruited from training institutions (nursing educators). For nurse graduates, informal/formal professional nursing graduate social media group forums, such as WhatsApp and Telegram, will provide a useful sampling frame for most graduates and where possible, followed by snowballing to reach those who are not on the social media platforms. This will be followed by stratification (1:1:1) to represent the various professional cadres, training programmes and facilities where they practice.
- vi. Stakeholder Workshop: We will conduct purposive sampling to obtain data from at least one representative amongst the various stakeholders, to achieve a sample size of 8-15.

Inclusion and exclusion criteria are shown in **Table 2**.

Data collection procedures (table 3 below)

We will initially conduct a training of all researchers (including research assistants and study clinicians/collaborators in the various study sites) to familiarise them on their roles and how to collect the data using the various data collection methods/tools. We will then aim to pilot the study tools amongst the study researchers and colleagues from KEMRI-Wellcome whose work includes some engagements with CIN hospitals. We will also convene a steering group of invited experts to give feedback on the research process itself, including piloting and adapting data collection tools.

Table 2: Inclusion and exclusion criteria

Methods of data collection	Inclusion criteria	Exclusion criteria
- Non-participant observation - Social network questionnaire - In-depth interviews	- Must work in the delivery room, post-natal ward, neonatal unit, or paediatric ward, or support the function of these units as part of their work within the wider hospital. - Staff of all cadres and grades will be included, for example nurse, doctor, midwife, nutritionist, clinical officer, patient care attendant, housekeeping, physiotherapist, orthopaedic technician, mortician, kitchen staff, laboratory staff, pharmacy staff, hospital administration. - Nursing and midwifery students and final year medical and clinical officer students will also be included, to reflect their role in service provision. - Must be aged 18 years or over - Must be able to provide informed consent - Must be available to participate in the study, without their participation adversely affecting to the functioning of the neonatal unit (e.g. before/after shift or during break)	- Does not work in, or provide any support to neonatal care delivery in the hospital - Aged under 18 years - Unable to give informed consent - Unable to participate in study, without participation adversely affecting the delivery of neonatal care
Key Informant Interviews	Senior Nurse/manager in the hospital: - Must be above 18 years - Must be duly registered and licensed to practice at the level of Diploma in Nursing and above - Must be an employee of the hospital under study - Must have formal leadership roles (unit manager, team leader, shift leader etc) in the neonatal or paediatric ward - Must be able to provide informed consent - Must be available to participate in the study, without their participation adversely affecting to the functioning of the neonatal unit	- Junior nurses without leadership or management roles - Nurses working on locum or employees of other hospitals/agencies - Aged less than 18 years - Not willing or able to provide informed consent - Unable to participate in the study due to work pressures.

	Nurse Educator in the attached training facility: • Must be above 18 years • Must be duly registered and licensed to practice at the level of Post-basic Diploma in Nursing and above • Must be an employee of the training institution • Must have formal nursing programme administration/management role (head of academic programme, head of nursing thematic programme, But not the college principal or dean or director) • Must be able to provide informed consent • Must be available to participate in the study.	• Junior teaching faculty without programme leadership or management roles • Educators working on part-time or are employees of other hospitals/agencies • Aged less than 18 years • Not willing or able to provide informed consent • Unable to participate in the study due to work pressures.
• Focus group discussions	Basic nursing graduates: • Must have a diploma or degree in nursing and/or midwifery • Must be registered and licensed by Nursing Council of Kenya to practice in Kenya • Must be above 18 years • Must be able to provide informed consent • Are working in hospitals in Kenya on full-time, part-time or locum basis • Must be available to participate in the study	• Nurses with certificate or post-diploma/post-graduate qualifications in specialty nursing • Pre-service nursing students • Not willing or able to provide informed consent • Unable to participate in the study due to work pressures.
	Nursing graduates: Neonatal and Paediatric Nurses or Maternal-neonatal nurses • Must have a post-basic diploma/post-graduate diploma or MSc in nursing (neonatal or paediatric nursing or maternal-neonatal nursing) • Must be registered (or due for registration) and licensed (or due for licensure) by Nursing Council of Kenya to practice Neonatal or Paediatric Nursing in Kenya • Must be above 18 years • Must be able to provide informed consent • Are working in hospitals in Kenya on full-time, part-time or locum basis • Must be available to participate in the study	• Nurses without specialist training in neonatal, paediatric or maternal-neonatal nursing • In-service nursing students not yet due for registration or licensure as neonatal, paediatric or maternal-neonatal nurses • Not willing or able to provide informed consent • Unable to participate in the study due to work pressures.

	Nurse educators: • Must have at a minimum, a post-graduate diploma in nursing and/or midwifery and/or nursing/medical education. • Must be registered and licensed by Nursing Council of Kenya to practice in Kenya • Are working at various levels (full-time, part-time or locum basis) at the schools of nursing for [names]. • Must be above 18 years • Must be able to provide informed consent • Must be available to participate in the study	• Educators with certificate or diploma qualifications • Educators working in other colleges/institutes other than those mentioned. • Senior managers without teaching roles • Not willing or able to provide informed consent • Unable to participate in the study due to work pressures.
• Stakeholder workshop	• Must have relevant experience in healthcare (particularly paediatric/neonatal care) delivery, research or healthcare policy/education/decision making, e.g. healthcare worker, health systems researcher, policy maker, health service leader, educator, professional representative, or employee of national or county ministry of health or international health agency (as assessed by KWTRP research colleagues) • Must be familiar with key aspects of intervention design or implementation (as assessed by colleagues in extended research team in Kenya)	• Insufficient relevant experience or familiarity with key aspects of healthcare service delivery, research or policy/decision making (as assessed by KWTRP research colleagues)

Table 3: Data collection procedures

Stage	When	Average time taken	Justification
1. Non-participant observation	Observations of 6 shifts per hospital site, as discussed with unit manager to aim for maximum variation. A sample of hospital meetings will also be observed.	6-8 hours per shift on average, plus 6-8 hours of meetings (total 42-56 hours of non-participant observation per site)	Observational data will be used to explore social ties and networks in the hospitals, and influence on provision of neonatal care Objective 1
2. In-depth semi-structured interviews	One interview per participant (up to total 35 in each of 2 hospital sites)	45-60 minutes	In-depth interviews will explore the personal experience and reflections of staff as to how social ties are formed, with whom, and their role

			and influence in neonatal care provision Objective 1
3. Social network questionnaire	One questionnaire per participant (total 40-120+ participants per hospital site, depending on size of networks)	30-45 minutes	Social network data will help to explore the structure of staff communication networks, and network characteristics Objective 1
4. Key Informant Interview	One person per each hospital and one person per each attached training facility (Total of 5-7 persons)	30-45 minutes	Key informant interviews will provide additional contextual information Objective 1
5. Focus group discussions	Three focus groups (each group of 5-9 members): 1) Basic nursing graduates (diploma and degree) 2) Specialist neonatal and paediatric nursing graduates 3) Nurse educators for both basic and specialized post-basic neonatal or paediatric nursing programmes.	Each focus group lasting 60-90 minutes	Focus group discussions will explore socio-cognitive aspects of utilizing knowledge and skills in the workplace Objective 1
6. Stakeholder Workshop	One session following the data analysis from methods 1-3. Total of 8-15 participants	One day (either in-person or online) lasting 5-7 hours	The stakeholder workshop will provide data and use elements of co-design, to develop recommendations for how understanding of social ties could enhance efforts to improve quality of care for newborn babies Objective 2

Explanatory notes on data collection procedures

In all data collection and analysis procedures, researchers will be reflexive, i.e. all members of the research team will be encouraged to be aware of their own positionality and biases. The research team will intentionally identify/recognise, share and discuss these potential biases throughout the course of the Pathways Study during debrief meetings, and will try to mitigate through openness and transparent and well documented processes. Training will also help to improve self-awareness. To mitigate against systematic bias, the Principal Investigator and Assistant Research Officer will meet regularly to compare and discuss observed findings.

A. Non-participant observation (see Appendix C)

Observations will be conducted by the Principal Investigator and/or the Assistant Research Officer for the Pathways Study. The non-participant observation process will be explained to the unit shift manager and verbal consent obtained. Available staff members will then be approached and invited to participate in the study. Prior visits to the facilities (1-2 shifts) will be used to create familiarity with the staff members. Consent will be sought at the start of the shift, and observations will continue throughout the entire shift (up to 6 shifts) to try to mitigate any potential changes in staff behavior due to being observed. Six shifts will be observed per hospital, to also try to mitigate any potential changes in staff behavior due to being observed. If the researcher is observing a hospital meeting, verbal consent will be obtained from the attendees of the meeting. A checklist of items to observe will be referred to during the entire observation and field notes will be taken. In order to minimize additional infection risk, especially to neonates, posed by the presence of the researchers as non-participant observers, the Ministry of Health COVID-19 protocols and site-specific hospital infection prevention protocols will be adhered to, for example requirements for wearing of masks, hand hygiene, and personal responsibility to isolate when appropriate. In the event of an emergency occurring on the unit during the non-participant observation, KEMRI-WTRP procedures will be followed to guide appropriate conduct of researchers. At the end of the observation, field notes will be typed and saved on a password protected computer.

B. In-depth semi-structured interview (see Appendix D)

A complete staffing list for eligible staff will be compiled by speaking to the management of the hospital/unit and student representatives (list will include names of staff of all cadres, students, and all shifts) The researcher will assign a random ID code to each member of staff on the list, using a random sequence generator (see Data Management section). Purposive sampling will be used to recruit diverse staff members so that each cadre is represented in the interview data. All participants will be given the study information sheet before making an informed consent, in order to read and understand the purpose of the study and what is required of participants. If conducted face-to-face, the Ministry of Health COVID-19 protocols will be adhered to. If running online, information on the online meeting platform to be used will be communicated plus a nominated date/time.

C. Social Network Analysis Questionnaire (see Appendix E)

A complete staffing list will be compiled by speaking to the management of the hospital/units and relevant student representatives (list will include names of staff of all cadres, students, and all shifts). The researcher will assign a random ID code to each member of staff on the list, using a random sequence generator. Participants will be asked to identify colleagues they would speak to, from a staffing list and the researcher will use a separate research list to locate the corresponding ID code for each member of staff/student named during the social network questionnaire. The researcher copies of the staffing list, including corresponding ID codes will be kept on a password-protected laptop. ID codes will be recorded instead of names on the participant questionnaires, both for the participant, and for all colleagues named by the participant in response to questions. Any individuals who are added to the staffing list during data collection, will be assigned to an already-generated ID code on the researcher list. In anticipation of additional names being added during data collection, 100 extra codes will be generated before data collection. Staff will be invited to read the study information sheet before giving informed consent to participate in the study. Special category data in the social network questionnaire (Appendix B) will be collected to identify and better understand homophily (those with similar demographics forming preferential ties with one another) within the network, and where it occurs. This will help to understand for example, whether cadre/gender/academic training is associated with who hospital staff and students choose to speak to in the workplace. The Ministry of Health COVID-19 protocols and site-specific hospital infection prevention protocols will be adhered to. If running online, information on the online meeting platform to be used will be communicated plus a nominated date/time, the researcher will complete the questionnaire in real time during the interaction using study ID numbers, but the online interaction will not be audio/video recorded, so as not to record personally identifiable responses. If conducted online, participants will be asked to name colleagues without using the roster prompt, to avoid electronic sharing of staff lists.

D. Key Informant Interviews (see Appendix F)

Hospital Nurse Managers (F1)

Eligible nurses will be sought from the hospitals' ward/unit daily/weekly rota. The eligible nurse will be invited to participate in the key informant interview. Each participant will be assigned a unique ID code then a participant information sheet will be shared with them, and an agreement made on whether to conduct the interview face-to-face or online. Once consent has been entered, the interview will be started, and audio recorded. If conducted face-to-face, the Ministry of Health COVID-19 protocols will be adhered to.

Nurse educators/teaching faculty (F2)

Eligible nurse educators will be sought from the school/college/university senior management (such as college principal). The eligible nurse educators will then be invited to participate in the key informant interview. Each participant will be assigned a unique ID code then a participant information sheet will be shared with them, and an agreement made on whether to conduct the interview face-to-face or online. Once consent has been entered, the interview will be started, and audio recorded. If conducted face-to-face, the Ministry of Health COVID-19 protocols will be adhered to.

E. Focus group discussions (see Appendix G)

Nurse graduates (basic) G1

A complete list of eligible nurses will be compiled from the various neonatal/paediatric/maternity units in the two hospitals. 3-4 nurses will be nominated (based on availability and willingness to participate in the study) from each hospital, making a total of 5-9 members. They will be invited to a central location for an FGD (if running this face-to-face) on a nominated date/time. If running online, information on the online meeting platform to be used will be communicated plus a nominated date/time. Before the meeting (online or face-to-face), each participant will be assigned a unique ID code then a participant information sheet will be shared. The process will be explained, including 'house rules' such as keeping contributions of others confidential outside the meeting. Once consent has been received, the FGD date/time will be confirmed. During the FGD, consent will be obtained for audio recording for the interview to start. If conducted face-to-face, the Ministry of Health COVID-19 protocols will be adhered to.

Nurse graduates (specialist neonatal and paediatric nurses) G1

A complete list of eligible nurses will be compiled from the various neonatal/paediatric WhatsApp groups in Kenya. 3-4 nurses will be nominated (based on availability and willingness to participate in the study) from specialty group, making a total of 5-9 members. They will be invited to a central location, if within Nairobi for a face-to-face FGD and a nominated date/time shared. If running online, information on the online meeting platform to be used will be communicated plus a nominated date/time. Before the meeting (online or face-to-face), each participant will be assigned a unique ID code then a participant information sheet will be shared. The process will be explained, including 'house rules' such as keeping contributions of others confidential outside the meeting. Once consent has been received, the FGD date/time will be confirmed. During the FGD, consent will be obtained for audio recording for the interview to start. If conducted face-to-face, the Ministry of Health COVID-19 protocols will be adhered to.

Nurse educators (G2)

A complete list of eligible educators from the training institutions will be compiled from the training managers (such as college principal). 2-3 educators will be nominated (based on availability and willingness to participate in the study) making a total of 5-9 members. They will be invited to a central location, as all are within Nairobi for a face-to-face FGD and a nominated date/time shared. If running online, information on the online meeting platform to be used will be communicated plus a nominated date/time. Before the meeting (online or face-to-face), each participant will be assigned a unique ID code then a participant information sheet will be shared. The process will be explained, including 'house rules' such as keeping contributions of others confidential outside the meeting. Once consent has been received, the FGD date/time will be confirmed. During the FGD, consent will be obtained for audio recording for the interview to start. If conducted face-to-face, the Ministry of Health COVID-19 protocols will be adhered to.

F. Stakeholder workshop (see Appendix H)

A complete list of key stakeholders will be identified and compiled from the list of the study population. Individual stakeholders will be invited to participate in the study via email and the participant information sheet shared with them. A date and proposed format/medium (i.e. online or face-to-face) will also be shared, and responses will be received. At the start of the stakeholder meeting, consent to start and audio-record the meeting will be obtained from participants. The process will be explained, including 'house rules' such as keeping contributions of others confidential outside the meeting. The meeting will be audio-recorded (and/or video recorded if online) and field notes will also be written by researchers. At the end of the meeting, audio-recordings (and/or video recordings) will be transcribed verbatim, de-identified, and saved on a password protected computer. Field notes will be typed and saved on a password protected

computer. If conducted face-to-face, the Ministry of Health COVID-19 protocols will be adhered to. If running online, information on the online meeting platform to be used will be communicated plus a nominated date/time.

Analysis

Quantitative data

Quantitative data collected from the Social Network Questionnaire will be analysed with standard SNA metrics (e.g. density, centrality, etc.) using Gephi free software and/or R, Python, NodeXL.

Qualitative data

Qualitative data from the study collected during non-participant observations, in-depth interviews and focus groups, and the stakeholder co-design event will initially be analysed thematically using NVivo software. This will lead to inductively developing a theoretical framework.

Qualitative data on socio-cognitive aspects of the study (key informant interviews and in-depth interviews) will be iteratively analysed using a grounded theory approach following an Open-coding → Axial-coding → Selective-coding approach to develop an explanatory theoretical framework on the role of socio-cognitive skills in the utilization of clinical competencies by nurses.

Realist evaluation and developing recommendations for practice

Mixed methods qualitative and quantitative data will together be analysed iteratively and used to build explanatory pathways in the form of context-mechanism-outcome configuration (CMOC) units of analysis, from which abstracted realist programme theory will be developed and refined.

Realist evaluation will be used in the Pathways Study to bring together the qualitative and quantitative data, and to build explanatory theory. Demi-regularities (phenomenon that are found to occur 'some of the time')(14) will be iteratively sought out from the data collected from the two case studies. Other relevant data collected from the two sites will be analysed to explain what has caused these demi-regularities. These causal explanations will be in the form of context-mechanism-outcome configurations (CMOCs) and will be incorporated into an overarching programme theory (13). Context here refers to the specific aspect of the setting which triggers a specific mechanism. A mechanism is a latent and often invisible entity (e.g. trust) which is triggered by specific contexts but not by others, and causes an outcome to occur. Outcomes are the product of the specific mechanism being triggered by the specific aspect of the context (14). By developing theoretical understanding of causation we will be able to explore difficult to capture phenomena using more traditional methods, but also helps to focus the target of possible interventions that seek to trigger alternative mechanisms. The mixed methods data in this study and the research objectives make realist evaluation an appropriate scientific approach for analysis and interpretation. Through engagement with stakeholders, explanatory theory will be used to develop a set of recommendations for practice.

In advance of this realist evaluation, a realist synthesis was undertaken using data derived from the literature, mostly from high-income settings. Findings from this synthesis have been used to help guide the focus of scientific enquiry in the Pathways study.

Data Management

Data Storage

Only KEMRI-Wellcome Trust Research Programme study personnel or other listed investigators will be responsible for data collection management and analysis of the data. All data and consent forms will be stored in secure KEMRI-Wellcome Trust Research Programme servers. Data held on these servers are backed-up in mirror servers also within the KEMRI-Wellcome Trust Research Programme. Data shared with specified researchers in Oxford will also be on password protected servers. De-identified electronic data will be shared using a secure institutional Microsoft OneDrive Cloud sharing platform (available for both KEMRI-WTRP and University of Oxford). Audio files will be archived and destroyed after the study is complete and all the data verified. The minimum storage time will be 5 years.

Those wishing to participate in the research will return a signed consent form to the researcher, who will collect them in a folder and take them in person to the KEMRI-Wellcome Trust Research Programme office, where they will be kept in a locked filing cabinet. Consent forms will not include the participant's study ID code. For consent forms shared via e-mail, only institutional emails will be used to send and receive informed consent forms. Since feedback from study participant may only be in the form of a signed consent form or a reply to the e-mail as consent, scanned copies of the

participant signed consent forms or the entire email with an affirmative statement as evidence of consent will be printed at the KEMRI-Wellcome Trust Research programme office, where they will be kept in a locked cabinet.

Completed hard-copy questionnaires, and other hard copies of data, will be taken by the researcher in person to the KEMRI-Wellcome Trust Research Programme office, where they will be kept in a locked filing cabinet. Electronic versions of the questionnaire data will be kept on a password-protected laptop.

The researcher copies of the staffing list, including corresponding ID codes will be kept on a password-protected laptop. ID codes will be recorded instead of names on the study tools. If a hard copy of the staffing/ID list needs to be used by the researcher during the interviews, this will be kept on the person of the researcher at all times during use and will be taken by the researcher in person to the KEMRI-Wellcome Trust Research Programme office, where it will be kept in a locked filing cabinet. Once it is no longer needed by the researcher, this hard copy of the staffing/ID list will be securely destroyed.

Data Management during Analysis

We plan to mainly collect qualitative data: These data will be collected in the form of audio files (or alternatively audio or video files if conducted online) and field notes from in-depth interviews, stakeholder engagement and non-participant observations (field notes only). Audio data will be recorded using KEMRI-Wellcome Trust Research Programme audio recorders.

Transcription will be done either by the researchers involved in the study, or by a trusted 3rd party transcriber, contracted by the KEMRI-Wellcome Trust Research Programme (KWTRP):

KWTRP conducts pre-qualification evaluation and award of tenders to provide transcription services. The vendors are evaluated against specific criteria, including compliance to the National Data Management Act (NDMA), statutory documents and CVs of expert transcribers. Those who qualify are awarded a formal contract with KWTRP. The last award was in 2021 and the next one is due this calendar year (renewed every 2 years). The vendor (transcription company), once they are prequalified, sign a formal contract that includes a data privacy and confidentiality agreement for all files they receive. The data privacy and confidentiality agreement are both in line with KWTRP data management policy and the NDMA. Audio files are initially sent by PI/researcher to the KWTRP Head of Supplies via OneDrive, then are further shared to the vendor via OneDrive and transcribed to text on OneDrive and then shared back to the KWTRP Head of Supplies via OneDrive and back the PI/researcher via OneDrive. Audio files are sent with description of the file using the participant ID as the name of the file, and not the name of the individual. Once received, all audio files are listened to against the text transcription by PI/researcher to determine accuracy of audio-text transcription as well as language translation (such as Swahili to English, where necessary).

Field notes will be typed into a standard computer word processing package. These files will then be kept in a secure folder on a password protected computer. The data from both observations and interviews will be anonymized; all identifiers will be removed, and participants will be given unique study codes. The audio-recorded in-depth interviews /stakeholder engagement discussions that have been transcribed and the data from field notes will be imported into NVIVO 12 software (QSR International, Australia). Each transcript will have a unique identifier comprising of hospital code, date, and whether the data are from an interviewee, a group or from field-notes to enhance anonymity and facilitate informed analysis. Data analysis will involve open coding and categorization according to emerging themes. Emergent realist explanatory pathways will also be developed in the form of context-mechanism-outcome configurations to build abstracted programme theory from qualitative and quantitative data. Interpretation of data will be informed by a pre-study realist synthesis and wider existing substantive sociological theory and other relevant literature. A set of theory-informed recommendations will be developed following co-design activities with stakeholders.

Quantitative data generated from social network questionnaire will be managed using Gephi and/or R software, Python, NodeXL, as well as in a MySQL database maintained by professional KEMRI-Wellcome Trust data managers according to existing standard operating procedures. Named analysts will be provided with access to appropriate quantitative data collected during the project to help create institution-specific summary reports using the statistical package 'R'. Analysis will include describing the socio-cognitive (human) skills and how this influence workplace utilisation of knowledge, skills and competencies acquired at nurse training programmes. Any changes observed will be interpreted in the light of the emerging qualitative work and in line with our plausibility framework.

Realist Evaluation: Both qualitative and quantitative data will be used to identify explanatory pathways using the context-mechanism-outcome configurations, build explanatory arguments, and develop abstracted programme theory, whilst also drawing from existing substantive sociological theory and relevant literature.

Intellectual property

Any Intellectual property rights that arise from the work will be safeguarded according to the KEMRI IPR Policy of 2015 and the Industrial Property Act of 2001, sections 32, 58 and 80. The scientific and intellectual contributions of all persons involved in the research will be appropriately acknowledged in all publications and presentations arising from the work

Time frame/Duration of the project

The study will take 20 months as shown in the Gantt chart below after ethical approval

Tables 3 below showing the projected project time and various activities.

Table 3: Study timeline

Year	2021	2022											2023									2024															
Month	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Ethics (SERU)																																					
NACOSTI permit																																					
Pilot testing/ adapting tools																																					
Data collection																																					
Analysis																																					
Writing up																																					
Dissemination of results																																					

Ethical consideration

Ethical approval will be sought from KEMRI Scientific and Ethical Review committee (SERU) and the Oxford Tropical Research Ethics Committee (OXTREC). An additional institutional Ethical approval from [name] Hospital Ethics Committee as well as permission for conducting a study at [name] Hospital will be sought from the [name] County Health Department/[name] Metropolitan Services. Permit to conduct this study will be obtained from Kenya National Commission for Science, Technology and Innovation (NACOSTI).

Human subjects

Potential risks

There are no therapeutic or diagnostic interventions included in this study. However, we anticipate the following adverse effects:

- Inconvenience of speaking to a researcher, before or after shift, or during break away from unit

- Inconvenience of being observed in the workplace. We will endeavour to ensure that this research causes minimal disruption to the delivery of care within hospitals. Prior to data collection using non-participant observation, we will debrief the researchers/research assistants on their roles and the procedure to collect data with minimal disruption in the delivery of care. We also debrief the hospital staff to clarify the aim of the study and explain that the research is not an assessment, evaluation or judgement of the care they deliver to patients
- The in-depth interview will focus on communication in the workplace. Whilst it is possible that some of these questions could prompt discussions about difficult relationships with colleagues, it is not anticipated that these questions will cause distress. To prevent harms, we will ensure that all data are confidential and anonymised.
- Data collected using in-depth interviews and social network questionnaire will contain individual and hospital demographic data. However, to safeguard the rights to anonymity of study participants and the hospitals, both the individuals and hospitals will be given unique database ID to de-identify them. When reporting any study results, we will protect the identity of individuals and the health facilities by using de-identified data such as unique ID codes without any personal identifiers. For study participants attending interviews, FGDs or questionnaire research activities during their off or leave days, we will reimburse a transport allowance of Ksh. 650 per person (or mileage at a standard rate of Ksh. 25/km).
- For stakeholders taking part in the workshop, which will last more than 3, we will reimburse a standard out-of-pocket allowance of Ksh.1,000 per person. If the meeting is held face-to-face, we will also reimburse a transport allowance of Ksh. 600 per person (or mileage at a standard rate of Ksh. 25/km). If, however, the workshop occurs online, we will instead provide data vouchers worth Ksh. 250-500 to cater for data bundles for all meetings lasting at least 1 hour. These allowances are in line with KWTRP guidelines for study benefits and out of pocket expenses and the KWTRP payment guidelines for stakeholders.

Potential benefits

There are no direct benefits to the research participants. However, we hope that using information derived from understanding social ties and networks among and between health workers, we will identify which interactions and social ties work to improve quality of care in the 2 case study hospitals. This will ultimately be used to co-design recommendations for interventions that are aimed at improving quality of neonatal care in Kenyan hospitals.

Consent

Upon ethical approval, we will seek informed consent to conduct this study from health workers of the selected units and departments in the 2 hospitals and a wide-stakeholder team of researchers, academics, policy and regulatory representatives.

An information poster describing the purpose of the study will be provided to the respective hospital management, relevant hospital departments and unit managers and college/university class representatives and put on display in the NBU, Paediatric and Maternity (labour and post-natal) wards. The information poster will outline the purpose of the Pathways study and its different components and will be used to disseminate information on the study to all staff to formally invite them to share their experiences through interviews and social network questionnaire. For non-participant observation, informed verbal consent will be gained at the start of every episode of non-participant observations in hospitals. The study will be explained to participants, and informed consent forms will be provided by all study participants, before in-depth interviews, key informant interviews and social network questionnaire exercise. Each individual participant will be required to familiarise with the study aim before being asked to make an informed written consent. For the stakeholder workshop, information sheets explaining the aim of the study will be shared either via email or given out as hard copy and verbal assent obtained. If interviews take place online or by phone, consent forms for the virtual interviews will be sent to participants by email and they will be asked to reply to the email invite indicating their willingness to participate or where possible, asked to read and return signed electronic consent forms before the interviews. Participants would also be asked to send their online identification (for example Microsoft Teams, Skype, Zoom) where relevant, or otherwise a phone number, to the researcher. Further, the participant's verbal consent would be audio recorded by the researcher before commencing the interview.

Participants can withdraw from the study, without giving a reason, and without negative consequences, at any time. If a participant withdraws from the study after September 2022, all data provided will still be included in the analysis, as we anticipate that data analysis would near completion by this time. However, if a participant withdraws from the study before this date, data provided may still be included if analysis has already occurred, however data from the withdrawn participant will not be used as quotes and their data will be removed from any data repositories.

Data sharing

All data will be stored in secure KEMRI-Wellcome Trust Research Programme servers with specified researchers provided password protected access. Data held on these servers are backed-up in mirror servers also within the KEMRI-Wellcome Trust Research Programme. Only KEMRI-Wellcome Trust Research Programme study personnel or other listed investigators will be responsible for data collection management and analysis of the data. Data shared with specified researchers in Oxford will also be on password protected servers. De-identified electronic data will be shared using the secure University of Oxford email server or the secure institutional MS Teams platform. The research protocol and findings will be deposited in the KEMRI-WTRP research repository. Researchers that might need access to data from this study must seek approval as guided by KEMRI-WTRP guidelines for research data sharing.

Community engagement

The principal investigators will identify and engage several senior managers, clinical workers and educators from the participating county, hospitals and educational institutions. These will include the sub-county health management team leaders to assist in planning for the research activities at [name] Hospital; senior managers from the 2 hospital management teams and the participating academic colleges/schools to help identify key informant interviewees, and professional association leaders to identify key persons to attend the FGDs. The principal investigators have also identified and reached out to enlist 4 study collaborators, one from each of the hospitals, one from the university and from the [name] to contribute to the broader work of this research project. The collaborators role also includes sharing relevant information about the study sites (how neonatal care is organized or taught and how the environment of care is shaped by nurses. The principal investigators have also reached out to other researchers within KWTRP undertaking research in similar health systems research topics who can contribute to the design of the protocol and study tools.

Animal subjects

Not applicable.

Expected Application of the Results:

Insights from the Pathways Project will add new understanding to ongoing work by KEMRI-Wellcome Trust Research Programme colleagues in Kenya, particularly work focused on communication in neonatal care. Findings will also provide a useful addition to the existing body of literature on social networks of the healthcare workforce, which is almost entirely derived from high income settings. The explanatory power of realist programme theory in specifically developing new understanding of the chains of causation associated with social ties of hospital staff, will be useful for designing and targeting interventions to enhance how such ties contribute to quality improvement efforts in the neonatal unit. Social network analysis (SNA) will be used to analyse quantitative relational data. This is a relatively new methodology in healthcare research, and so the practical learning gained during the research process will be shared with KEMRI-Wellcome Trust Research Programme colleagues and others and will be useful for those intending to use SNA in healthcare, particularly in Kenya and similar settings elsewhere.

Findings about the role of non-technical socio-cognitive skills in the use of learned clinical competencies in neonatal care, will be used to develop recommendations specific to nurse educational interventions. Recommendations are likely to include how and when these skills can be incorporated in basic and specialized nursing programmes and in-service continuous professional development training activities. We anticipate that these findings can be applicable to wider healthcare training programmes.

Dissemination of findings

The study findings will be disseminated to the study hospitals. For [name] hospital, this will be through the existing feedback mechanisms established in the ongoing partnership project with study hospitals (SERU#2465), while for [name] Hospital, through the NEST feedback mechanisms. Study findings will also be disseminated as published work through the KEMRI-WTRP seminars, local and international scientific conferences, academic theses and open access scientific journals.

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Appendix A: Budget

a. Budget Summary

The overall budget for this 2-year project is estimated to be USD 116,329.18.

Detailed Budget

	Total Budget in USD
Personnel Cost	80,874.00
Kenya Equipment	3,842.11
Consumables	5,247.02
Research costs	5,781.05
Kenyan overheads costs @21.5%	20,585.00
Grand Total: USD	116,329.18

This project is part of the KEMRI-Wellcome Trust Research Programme Collaboration and as such will not incur separate overheads. Equipment for data collection will be supplied at no cost from existing items available for survey work.

Justification of the Budget

Kenya Personnel – This project will support work for 2 years for PI and for 18 months for an assistant research officer to be hired

UK personnel – salaries will be supported for Prof. Mike English and Dr. Claire Blacklock by the Nuffield Department of Medicine, University of Oxford. Other named UK experts will receive salary support from their respective departments.

Kenya Equipment comprising computers and audio recorders – Funds have been allocated to the assistant research officer linked to this project to be provided with a computer for their work and for purchase of 2 digital recording devices.

Materials & consumables including office costs for researchers – This covers travel to meetings with the Ministry of Health and other partners / stakeholders in Nairobi, stationery and printing costs, monthly telephone and internet costs for 2 staff and annual software licenses for MS Office, Adobe, SPSS, STATA and NVIVO based on market rates from pre-qualified suppliers or for KEMRI-Wellcome Trust Research Programme.

Research costs:

- **Study related travel for data collection** – Study team members will have to travel to the sites ([names] Hospital) on multiple occasions over the 2 years active study period. Budgeting includes costs for road travel to and from the sites (based on recommended rates within KEMRI-Wellcome Trust Research Programme)
- **Study-related refreshments:** This Budget includes refreshments during the non-participants observations (up to 6 shifts per hospital and up to 4 meetings per hospital) and during the SNA questionnaire activity, in-depth interviews, key informant interviews and focus group discussions (if they occur during tea or lunch breaks) based on market rates from pre-qualified suppliers or for EMRI-Wellcome Trust Research Programme.
- **Stakeholder Workshop engagement** – Budgets have been developed for either one face-to-face or online meetings with up to 18 participants (including study team members and stakeholders) lasting 5-7 hours. The workshop will be held in a pre-qualified facility within [name] at rates determined by KWTRP.
- **Study-related approvals:** The budget has been developed to include initial fees for SERU, [name] Hospital/University of [name] ERC and NACOSTI as well as annual renewal fees for up to 3 subsequent years.
- **Study-related Participants' transport and out-of-pocket reimbursements:** The budget has been developed to cover transport reimbursement costs, and where applicable, for out-of-pocket allowances for study participants at

the 2 study sites during interviews, Focus group discussions and stakeholder workshop. All these are based on KWTRP study benefits and allowances policy guidelines.

- **Dissemination workshops** - Budgets have been developed for presenting at the Kenya paediatric Association annual scientific and association of neonatal nurses-Kenya conferences (2022 and 2023) where 3 study team members will participate based on costs of workshops (membership fees, travel and accommodation for face-to-face meetings). The budget also includes the cost of publication in open access peer-refereed journals.

Appendix B: Role of investigators

Conrad Wanyama	Will provide overall guidance to the project, be responsible for coordinating work across the themes and provide guidance on the socio-cognitive skills part of work. Will be responsible for liaison with hospitals, the Ministry of Health and other stakeholders to create a Stakeholder Workshop and Study Recommendation Group, supervise and train more junior team members and contribute to research design, data collection, analysis and writing for publication and further dissemination of findings
Dr. Claire Blacklock	Will provide overall guidance to the project as well as on the social network analysis part of work. Will contribute to the qualitative research, social network analysis and realist analysis and contribute to research design, data collection, analysis and writing for publication and further dissemination of findings
Juliet Jepkosgei	Will contribute to data collection, analysis, writing and dissemination of findings.
Prof. Lisa Hinton Dr. Jacob McKnight Prof Bernie Hogan	Will be responsible for overall academic supervision of the DPhil work of Dr. Claire Blacklock
Prof. Mike English Dr. Geoff Wong Prof Grace Irimu Peris Musitia Joyline Jepkosgei Dr. Aluvaala Jalemba [removed] Dr. Dorothy Oluoch Prof. Sassy Molyneux Dr Hilary Edgcombe	They will support the two co-PIs and contribute to the conduct, management and interpretation of study findings and report writing.
[removed]	They will be responsible for coordinating hospital activities in the role of study nurses and contribute to report writing.
[removed]	They will be responsible for coordinating meetings with training institutions

Appendix C: Pathways Study: Non-participant observation prompt list

Before you start:

Introduce yourself to the staff you will be observing, explain the study, and obtain verbal consent (**record verbal consent on the relevant form**).

Note down:

- Date, time, duration, and location of non-participant observation
- Which cadres of staff/students you observe
- Numbers of staff you observe

Level A: Administration, Leadership and Management

1. **Where is the Administration block located in relation to the health care service delivery units?** Which offices and posts are located in the administration block?
2. **Is there a notice board?** What is posted on the notices?
3. **Is there a service charter?** What is contained on the charter? Where is it displayed?
4. **Is there a company/institutional mission, vision, values displayed?** Describe this.
5. **Where is the CEO's office OR medical superintendent's office in relation to other offices?** What is contained in the office: Furniture, artefacts, symbols, wall hangings?
6. **What is contained in the head of nursing's office?** Furniture, artefacts, symbols, wall hangings?
7. **What is the nature of dressing for the hospital top management?** What is the colour? Do they have the facility logo?
8. **What is the nature of dressing for hospital staff?** Does it differ from that of top management? Do they have facility logo? Are they uniforms? Are there dressings with no logos or with any other logos?
9. **How is the parking organised?** Management versus staff
10. **Which meetings were observed?** What was the purpose of the meeting? Was the meeting by formal invitation (any evidence to this?) Where were they held? Who was chair? How are people seated? Who spoke to whom? Any commonly used words/phrases? Any common verbal and non-verbal cues? **Are there any meetings before/after the main meeting?** How are the members constituted? How are they conducted? How long do they last? What happens thereafter?

Level B: Units/Wards

1. **Who are staff generally communicating with?** Within their own cadre/seniority level? Between different cadres/seniority levels?
2. **Do they communicate with different colleagues depending on what they are communicating about?** Which colleagues to staff appear to communicate freely with? Are there any barriers between certain staff? What is the style of communication of different staff?
3. **Do all staff appear to be equally free to communicate with their colleagues?** If not, who is not able to?
4. **What appear to be the norms of staff behaviour in the location you are observing?** Do some cadres of staff appear to have different behavioural norms to others?
5. **Do staff appear to follow advice of their colleagues in their work/decision-making?** Can you describe?
6. **Which staff seem to be more influential in the location you are observing?** What made you form this assessment/why?
7. **Which staff seem less influential in the location you are observing?** What made you form this assessment/why?
8. **Can you notice a hierarchy in the location you are observing?** Please describe.
9. **Do staff use any other information sources to undertake their work?** Books, protocols, etc?
10. **Can you observe any mentoring/supervising/supporting relationships or behaviours between staff?** How formal/informal is it? How is the relationship between the mentor and mentee(s)?
11. **Any unit-level meetings observed?** Describe Type, purpose of the meeting, where the meeting is held, who attended the meeting, who chairs the meeting, how are people seated? Who speaks to who? Any words or phrases that are commonly used? Any common verbal and non-verbal cues? **Are there any meetings before/after the main meeting?** How long do these last? How are the membership informally constituted? How are they are conducted? What happens thereafter?

Appendix D: Pathways Study - In-Depth Interview Guide

(Informed consent must be provided by the participant before commencing the interview.) *My name is X and I am a researcher working on the Pathways Study. I am interested in learning more about how nursing graduates (staff) who work in neonatal care utilise knowledge and skills learnt in nursing programmes, and how this is shaped their relationships at work and their peers and other clinical staff. I would like to ask you a few questions.*

Participant Study ID number:

PART A – for all participants

1. **How do you decide/choose who to ask for help or information at work?** Can you give me an example? Why did you choose this person? What was it about them/you/the situation, which made you ask them? Does choice of colleague depend on the type of help or information you need? Which colleagues do you need to speak to on a day-to-day basis to undertake your role effectively? Why?
2. **Does discussion with a colleague at work change what you do/ your behaviour/ your decision making?** Can you give me an example?
3. **Whose opinion(s) do you value most at work?** Why? Anything about them/you/the situation?
4. **Are there any colleagues that you find difficult to speak to (ask for help from) at work?** Why do you think you find it difficult to speak to (ask for help from) them? Anything about them/you/the situation? Are there any situations when you would speak to (ask for help from) them? Do you feel comfortable approaching senior (or junior) colleagues for help? Do you feel comfortable approaching colleagues from different professions for help?
5. **How do you select with whom to share your helpful information or knowledge (i.e. information that you have)?** What kinds of information or knowledge do you share?
6. **Are there any colleagues with whom you find it difficult to share your helpful information or knowledge?**
7. **Are there situations where you have to ask for information or help but you cannot get it?** Can you give me an example: situation/type of help/from who? What did you do about it: yourself/situation/the other person(s)? How does this make you feel?
8. **Do you feel staff members share information and knowledge freely at your hospital/unit?** Can you give me an example? What type of information, knowledge or help would people be commonly seek from others, or share with others on a day-to-day basis? Why do you think this is so?
9. **What would help you better communicate with your colleagues at work?** Would this improve patient care? How? Why?
10. **Can you always access the information you need in the workplace?** Do you ever feel like you are missing out on information at work? Do you try to access the information in any other ways? For example: clinical guidelines, protocols, hospital policies, key communication messages from management to staff, information specific to the professional cadre, books, phone, WhatsApp groups, any other information?
11. **Do you use any other information sources/resources/courses/CPD to do your job?** Can you give an example? How and when do you access this information?
12. **How could access to essential and reliable information be improved in the unit/hospital?** Would this improve patient care? How? Why?
13. **Do you feel that you can always say and do what you think is best, in the workplace?** Why/why not? Please give me an example. Do you feel like you do things differently or have a different outlook/attitude to some of your colleagues? How does this make you feel? Please give me an example. How does this make your colleagues feel? Does this impact on your patient care?
14. **What are your experiences of supervision/support/mentoring at work?**
15. **What (or who) do you feel has influenced you the most in the way you work?** Can you describe this type of influence detail? How has this impacted your individual perception about your work? How has this impacted on how you provide care to your patients? How does this make you and colleagues feel?
16. **Do you feel there is anyone at work who influences the behaviour of your whole peer group?** Who? Why do you think this is? Do you think you contribute to this person influencing your peer group? How?
17. **Are there individuals you prefer to be on duty with?** Who? What is it about them that makes you want to only work with? What is it about you that makes you wish to work with them?
18. **Are there individuals you would prefer not to be on duty with?** Who? What is it about them that makes you wish not to work with them? What is it about you that makes you wish not to work with them?
19. **What do you do if you receive contradictory advice at work?** Where does the contradictory advice come from? Talk me through your thought processes in how you decide what you will do.
20. **What are the hospital's 'values'?** How are these expressed to you? Do these 'values' change what you do at work?

21. **Can you describe what is known and said about this hospital by the general public?** Do you think this perception is also shared by some (or most) staff members? What do you think has contributed to this? How has this influenced the way you and your colleagues provide care to your patients?

For non-nurse staff and students, interview ends here.

PART B: additional questions for nurse managers, all nurses, plus student nurses

20. **What is your experience with new graduate nurses in providing care to neonates?** What makes you say so?
21. **Is there supervision/support/mentorship at workplace?** To whom is it targeted? Who implements it? When does this happen? What has been your experiences of supervision/support/mentoring at work? Can you give me an example? (nurses and student nurses)
22. **Does the workplace plan and implement off-the job formal training (including both short and long training opportunities) aimed at improving patient care at work?** Can you give an example? **If you have attended any of these trainings, can you comment on your experience?** Do you feel you have utilised what you learned? What makes you say so? Are there any specific workplace factors that contributed to this? What are they? (nurses)
23. **What stands out as a factor(s) that determines how nurses are likely (or not) going to utilise that they have learned at their workplace?** Tell me about institutional leadership factors, mentorship factors, other institutional initiatives (which, for who, how, when)? (nurses and student nurses)
24. **Tell me about individual nurse-specific factors that you have observed that determine how likely nurses are to use what they have learned in their workplace** (looking for things like effective communication, teamwork self-awareness, decision making etc----human factors)? (nurses and student nurses)
25. **Did you feel you are confident in communicating with rude, angry or disrespectful patients/colleagues?** Why do you say so? Can you give me an example?
26. **Are there emotionally challenging situations that you find handling at workplace?** Give me an example? Why do you say so? How does this impact on the care you give to your patients?
27. **Do you think there are factors about your other professional colleagues (doctors, nutritionists, laboratory personnel etc) that contribute to how nurses utilize knowledge and skills and competencies acquired during their training?** What are these factors? Why do you say so? (nurses and student nurses)
28. **Do you think the nursing school training theoretical work (including in clinical skills labs) is aligned to what is expected at the workplace?** Can you comment on this as a student nurse, a newly qualified nurse and as an experienced manager/leader?

Appendix E: Pathways Study – Social Networks Questionnaire

Informed consent must be provided by the participant before commencing the SNA questionnaire interview.

My name is X and I am a researcher working on the Pathways Study. We are interested in learning more about how staff/students who work in neonatal care communicate with one another, and how this might influence what they do at work. I would like to ask you a few questions about your own experiences of communicating with your colleagues.

Demographics

- Study ID number
- Job title/cadre/student status (include qualification and level of seniority)
- Unit (maternity, postnatal, neonatal, paediatric)
- Year of birth (or age in years)
- Gender
- Highest qualification (and year)
- Specialist certificates
- Training courses/workshops attended (in the last 5 years)
- Involvement in research
- Academic/teaching/faculty position
- Nomination as a clinical mentor/champion/coach/preceptor
- Length of time working on ward
- Employment elsewhere

Scenarios (will be piloted and adapted at start of study)

1. You are not sure of the dose of medication to give to a neonate.
List #1: Please indicate if you would speak to/seek advice from anyone
2. A neonate has an infection and you are unsure of the treatment plan.
List #1: Please indicate if you would speak to/seek advice from anyone
3. You need help to perform a routine procedure on a stable neonate.
List #1: Please indicate if you would speak to/seek advice from anyone
4. You have a patient on the ward with clinical orders that you are sure do not comply with clinical practice guidelines.
List #1: Please indicate if you would speak to/seek advice from anyone
5. You have a patient on the ward who you think needs a certain specific care, but it is not available.
List #1: Please indicate if you would speak to/seek advice from anyone
6. You notice that a neonate is looking very sick.
List #1: Please indicate if you would speak to/seek advice from anyone
7. You have had a very busy shift and two neonates died today. You are feeling tired and upset.
List #1: Please indicate if you would speak to/seek advice from anyone
8. The unit has no water.
List #1: Please indicate if you would speak to/seek advice from anyone
9. A colleague has been rude to you.
List #1: Please indicate if you would speak to/seek advice from anyone
10. You are very busy and some of your colleagues have finished their tasks.
List #1: Please indicate which colleagues would likely offer to help you with your own tasks
11. A mother has refused a procedure for her baby.
List #1: Please indicate if you would speak to/seek advice from anyone
12. A baby has died on the unit and you are uncomfortable breaking the bad news to her.
List #1: Please indicate if you would speak to/seek advice from anyone

List #1 = Roster method – a list of staff working in or supporting the unit

Appendix F1: Pathways Study – Key informant Interview

for Hospital Nursing Team Leader/Manager (one per hospital/unit)

(Informed consent must be provided by the participant before commencing the interview.) *My name is X and I am a researcher working on the Pathways Study. I am interested in learning more about how nursing graduates (staff) who work in neonatal care utilise knowledge and skills learnt in nursing programmes, and how this is shaped their relationships at work and their peers and other clinical staff. I would like to ask you a few questions.*

Participant study ID number:

Interview schedule: (Schedule will be piloted and adapted at start of study. Questions will also be adapted for interviewing researchers, as per protocol)

1. **Can you describe your role in unit** (Shift leader, unit manager etc).
2. **Does your unit/hospital have any job/role descriptions for nurses working on the unit?** Please can I see a copy?
3. **Does your unit/hospital have any Continuing Professional Development policies?** Please can I see a copy? Does the hospital have a library? Any annual CPD requirements for staff? Appraisals? Etc.
4. **Does your unit/hospital have any regular clinical meetings?** Who attends? What is the format? How frequently? Etc.
5. **Are any on-the-job training schemes going on in your unit/hospital for nurses?** Courses? Mentoring? Etc.
6. **What is your total nursing staff?** What is your current patient: nurse ratio? What is your expected ration?
7. **Do you have a nursing staff rota for each shift?** Can I have a copy of the last week and this week?
8. **How many nurses are you likely to be having on each shift?** AM, PM, Night, Weekends? What is the typical composition of this rota? Why is that so? Is this defined by the institution? Any other factors (e.g NCK etc?) (Nurses and student nurses)

Appendix F2: Pathways Study – Key informant Interview

for Nurse educators with administration and programme management role (one per teaching institution)

(Informed consent must be provided by the participant before commencing the interview.) *My name is X and I am a researcher working on the Pathways Study. I am interested in learning more about how nursing graduates (staff) who work in neonatal care utilise knowledge and skills learnt in nursing programmes, and how this is shaped their relationships at work and their peers and other clinical staff. I would like to ask you a few questions.*

Participant study ID number:

Interview schedule: (Schedule will be piloted and adapted at start of study. Questions will also be adapted for interviewing researchers, as per protocol)

9. **What is your role in the college** (Lecturer/tutor, programme manager, head of department etc).
10. **How many nursing programmes do you have in the school?** What is the level of training for each? What is the course duration of each?
11. **Do you have a curriculum for your nursing programmes?** Can I have a copy please? **What is your curricular review/revision policy/plan?** Can I have a look at it please?
12. **Are the nursing programmes all accredited?** Who is the accreditor? Can I see evidence of accreditation please?
13. **What is the entry criteria for each?** How do you determine the entry criteria? Do you have evidence for this?
14. **What is the admission capacity for each programme?** How is this determined?
15. **How many nurses from the programmes graduate annually?** Do you have any dropouts?
16. **Where do your nursing students undertake their clinical practicum?** Do you have any formal agreements with these institutions? Can I see the evidence please?
17. **Is there any mutual working relationship with facilities that provide student practicum placements in the area of nursing staff development trainings (workshops, symposiums, library, clinical consultancy)?** If you have evidence for this, can I see it please?
18. **What is your total academic staff (includes clinical laboratory and clinical instructors)?** What is your current Student: Faculty ratio? What is your expected ratio?

Appendix G1 - Pathways Study - FGD: Nursing educators (Teaching faculty involved in the curriculum implementation of nurse trainings for both basic and specialist neonatal and/or paediatric nurses, 5-9 members per FGD)

(Informed consent must be provided by each of the participant before commencing the discussion.) *My name is X and I am a researcher working on the Pathways Study. I am interested in learning more about how basic and specialist nursing graduates (staff) who work in neonatal care units are prepared for their workplace and how this preparation influences how they utilise knowledge and skills learnt in their nursing training. I would like us to have a discussion about your own experiences.*

1. Welcome the participants, do a formal introduction and allocate **Participant study ID numbers**:
2. Explain the process and lay ground rules
3. Explain the need to record
4. Gain verbal consent for participation and recording

Main question	Additional questions
What is your experience of how well Kenya's nurse training programmes prepare nurses to work in neonatal care units?	• Start off with basic programmes • Then ask about Specialist programmes Ask Why they say so? Give examples
In your experience as educators, what has worked to adequately prepare any nurse, basic or specialist, to be able to easily use what they have learned in college at their workplaces?	Probe on people-related factors Probe on leadership related factors Probe on assertiveness, self-awareness and decision-making factors
In your experience as educators, what has hindered preparing any nurse, basic or specialist, to be able to easily use what they have learned in college at their workplaces?	Probe on people-related factors Probe on leadership related factors Probe on assertiveness, self-awareness and decision-making factors
Do you think the theoretical work (including in clinical skills labs) is aligned to what is expected at the workplace for your future graduate nurses?	Probe on how this is scheduled, delivered and perceived by both teachers and learners
Do you think the communication skills and emotional competence skills taught at the nursing school is aligned to the challenges nurse graduates face at the workplace?	Probe on how these skills are taught and perceived by both teachers and learners
In your experience as educators, what things/factors about nursing students themselves have helped them, basic or specialist, to be able to easily use what they have learned in college at their workplaces?	Probe on people-related factors Probe on leadership related factors Probe on assertiveness, self-awareness and decision-making factors
In your experience as educators, what things/factors about nursing students themselves have hindered them, basic or specialist, to be able to easily use what they have learned in college at their workplaces?	Probe on people-related factors Probe on leadership related factors Probe on assertiveness, self-awareness and decision-making factors

In your experience as educators, what things/factors about hospital staff as clinical preceptors/clinical mentors do you think have helped nurses, basic or specialist, to be able to easily use what they have learned in college at their workplaces?	Probe on people-related factors Probe on leadership related factors Probe on assertiveness, self-awareness and decision-making factors
In your experience as educators, what things/factors about hospital staff as clinical preceptors/clinical mentors have hindered nurses, basic or specialist, to be able to easily use what they have learned in college at their workplaces?	Probe on people-related factors Probe on leadership related factors Probe on assertiveness, self-awareness and decision-making factors
Do you think there are factors about your other professional colleagues (doctors, nutritionists, laboratory personnel etc) that contribute to how nurses utilize knowledge and skills and competencies acquired during training?	Probe to identify these factors (probe on teamwork, team leadership, decision making and other human factor development through collaborative social learning) Why do you say so?
What has been the role of the teaching institution (any initiatives) in responding to the challenges you have mentioned above: challenges at • Teaching faculty level • Students' level • Hospital staff level	Probe further on these initiatives, what, when, how, for whom?
Are you involved in these initiatives?	Probe further on this: What, as who, when, how, for whom?
Do you have any recommendations going forward?	
Is there anything else from anyone before we close?	
Thank the participants for their time and contributions	

Appendix G2 - Pathways Study - FGDs: 1) **Nursing graduates (Basic Diploma and Degree General Nursing graduates)** working in various units and providing caring for newborn babies, and 2) **Specialist Nursing graduates (Specialist Neonatal and/or Paediatric Nurses and/or maternal-neonatal nurses)** working in various units and providing caring for newborn babies (5-9 members per FGD).

(Informed consent must be provided by each of the participant before commencing the discussion.) *My name is X and I am a researcher working on the Pathways Study. I am interested in learning more about how nursing graduates (staff) who work in neonatal care utilise knowledge and skills learnt in nursing programmes or other neonatal short CPD programmes. I would like us to have a discussion about your own experiences.*

5. Welcome the participants, do a formal introduction and allocate **Participant study ID numbers**:
6. Explain the process and lay ground rules
7. Explain the need to record
8. Gain verbal consent for participation and recording

Main question	Additional questions
Can you describe to me the nature of work you are involved in in this unit/department?	Are there any challenges you have experienced in undertaking your role? Give examples and why?
<i>For Basic Diploma/Degree General Nurses:</i> How would you describe your basic training in preparing you to work in neonatal care units?	Why do you say so? Give examples
<i>For Specialist Neonatal and/or Paediatric Nurses and/or Maternal-neonatal Nurses:</i> How would you describe your specialist training in preparing you to work in neonatal care units? How does this compare with your basic nursing training?	Probe on preparedness on communication skills and handling emotions (ability to communicate well with patients, colleagues, and supervisors. Handling angry parents, breaking bad news & handling rude/ disrespectful colleagues) Recognizing and managing own stress
Have you undertaken any neonatal-training relevant short course/training? Describe it: what, when, content, how and relevance	How does it compare to your basic nursing training? Why do you say so? Give examples.
What things/factors about yourself have helped you use what you learned in college and/or in short courses?	Probe on people-related factors Probe on leadership related factors Probe on assertiveness, self-awareness and decision-making factors
What things/factors about working with others have helped you use what you learned in college and/or in short trainings?	Probe on people-related factors Probe on leadership related factors Probe on assertiveness, self-awareness and decision-making factors
What things/factors about yourself have not helped you use what you learned in college and/or short trainings?	Give examples. Probe as above. Are these factors shared by others? What do the rest of us think?

What things/factors about working with others have hindered your ability to use what you learned in college and/or short trainings?	Give examples. Probe as above. Are these factors shared by others? What do the rest of us think?
Do you think your colleagues elsewhere share your feelings? (ask about Private hospitals versus public hospitals)	Why do you think this is so?
What is your opinion about practice improvement initiatives such as? 1. CPD courses (give examples) 2. Workplace mentorship 3. Using clinical practice guidelines 4. Staff induction trainings 5. Staff appraisal and performance management	Probe on How it is done, Why it is done, for Whom it is done, When it is done
If you are involved in any of the mentioned practice improvement initiatives above (need to say which one), share your experiences.	Ask: whether the experience is as a recipient or as a provider. Ask them to describe: How, When and Why.
Do you have any recommendations about this?	Ask about: 1. Recommendations for nurses as practitioners 2. Recommendations about other clinical colleagues 3. Recommendations for hospital managers 4. Recommendations for Nursing schools 5. Recommendations for the regulator
Is there anything else from anyone before we close?	
Thank the participants for their time and contributions	

Appendix H - Pathways Study – Stakeholder workshop event schedule (10-15 members)

Event programme/ timetable (if to be held online instead of in-person, the programme will be adapted accordingly)

Time	Activity	Description
10am	Consent Registration and refreshments	Invited stakeholders will be asked to give consent before participating in the event. They will have previously received a participant information sheet by email and will be given the opportunity to ask any questions in person, before completing the consent form. Reimbursements will be given to participants.
10.30am	Welcome	Participants will be welcomed to the event by the research team.
10.45am	Introduction to study	Researchers will present the background of the study, including findings of a realist synthesis, and work conducted on the neonatal unit in Kenya.
11.15am	Group brainstorming session – how do social ties influence quality of patient care?	Participants will be asked to discuss their initial thoughts on the information/issues in the presentation and how this compares to personal experiences, in small groups. Groups will be provided with paper, sticky notes, and flip chart.
11.45am	Feedback to whole group	Each small group will be encouraged to share their thoughts and take any questions.
12.15pm	Lunch	
1pm	Presentation of findings from interviews, SNA and non- participant observation	Researchers will present the remaining findings of the work conducted on the neonatal unit in Kenya to the stakeholders. This will include a series of summary slides and handouts which the participants can use in the activity.
1.30pm	Group activity – what do we think of the findings? how should these findings be used?	Participants will be asked to discuss the findings and put down their thoughts on paper, to be able to present back to the whole group.
2pm	Feedback to whole group	Each small group will be encouraged to share their thoughts and take any questions.
2.30pm	Tea	
3pm	Group discussion – what should our recommendations be?	During the tea break, the researchers will have collated the main points from the previous discussions and summarised into themes. These themes will be used as prompts for discussion. The session will be flexible, adapting based on the dynamics of previous sessions but is likely to involve facilitated group work, facilitated group discussions, and ranking exercises or similar.
4.30pm	Summary and close	Stakeholders will be thanked for their participation and given information about how findings will be fed back to them and others.

Appendix I – KEMRI-Wellcome Trust Research Programme: Participant Information Sheet, patient information poster and verbal consent/permission form for non-participant observation (clinical environments) for: -

Pathways Study Form Ia: Non-participant observation (for individuals working in neonatal care)

Study title: Pathways Study:

Understanding health worker social ties and communication, and their influence in neonatal care.

Lay Title: Understanding how health worker interactions influence the care of newborn babies.

Institution	Investigators
[removed]	

You are being asked to take part in a study. The box below tells you important things you should think about before deciding to join the study. We will provide more detailed information below the box. Please take time to read the following information carefully and discuss it with others if you wish to and ask questions about any of the information before you decide to participate. You may also wish to talk to your family or friends about this study, before agreeing to join.

Key Information for You to Consider
• Voluntary Consent. You are being asked to volunteer for a research study. You can choose whether you would like to participate or not. If you do agree you can change your mind at any time and withdraw from the research. This will not affect your work now or in the future. • Purpose. We are doing this research to better understand how health workers and teams work together to deliver neonatal care, including how changes might impact on different people in the team and how communication might be improved. The research will be used to inform how quality improvement interventions are implemented in hospitals. You have been invited to participate in this research because you work in neonatal care, or you work in the hospital and support neonatal care in some way. • Duration. This observation will last 6-8 hours of the entire shift • Procedures and Activities. We will be observing more generally how staff are working together in this unit during working hours. We will also observe a sample of hospital meetings. Researchers will take field notes during observations.

Who is carrying out this study and what is this study about?

- This study is being carried out by KEMRI in collaboration with the University of Oxford, UK. KEMRI is a Kenyan government organization that carries out medical research to find better ways of preventing and treating illness in the future for everybody's benefit.
- The study will involve observing how people interact with each other while at workplace (who they talk to, what they talk about and how they form interactions and connections). We will also ask health providers what they know, feel or do about these interactions and how these interactions impact care of neonates.

- We want to better understand how health workers and teams work together to deliver neonatal care, including how changes might impact on different people in the team and how communication might be improved. We will do this by observing these interactions during all working shifts. We will then ask about whom health workers are likely to seek advice from when faced with a difficulty (and why). We will also observe a sample of hospital meetings.

Why do you want to talk to me and what does it involve?

- We have selected observing people while at work as this is the best way to understand social interactions and communications with each other. You will be observed because the environment you work either directly provides or supports the provision of neonatal care in this hospital. Because this is a non-participant observation, we will not be involved in the care you give to neonates. Researchers will take written field notes. No events will be audio or video-recorded.

Are there any risks or disadvantages to me for taking part?

- There are no risks for taking part in the study. However, questions around interactions and social connections can be sensitive as they may include to a discussion about difficult relationships at workplace.

The observation will take 6-8 hours during the entire shift But we will aim to have only minimal interruption to your work

Are there any advantages to me for taking part?

- There are no individual benefits to taking part in this study. In participating in this study, you will contribute to knowledge of social connections and ties, including knowledge of factors that facilitate or hinder use of knowledge and skills acquired during trainings. This finding may help in making recommendations in the design of interventions that improve quality of care of neonates in Kenya and elsewhere in the future, for example through developing new health policies.

Data Protection

Who will have access to information about me in this research?

- All our research records are stored securely in locked cabinets and password protected computers and are accessed only by authorized persons.
- The personally identifiable information you provide will be used only for study purposes such as contact you for scheduling of visits and verification of consent through signed consent forms.
- We will share anonymized individual and summary information we collect or generate with our partner institution, University of Oxford in ways that do not reveal individual participants' identities.
- Anonymised data will be stored in a secure KEMRI-Wellcome Trust Research Programme repository and may be used for future research.
- KEMRI will keep any personally identifiable information about you from this study for 10 years after the study has finished in accordance with applicable Data Protection Requirements both in Kenya and in the UK. You have the right to access the personal data we hold that pertains to you, to object to or make corrections to the processing of all or part of the personal data. However, this might be limited due to coding which might make unblinding difficult.

Will the research be published? Could I be identified from any publications or other research outputs?

- The research will be published. We might however include direct quotations, but without identifying you, in any research outputs.

- In future, information collected or generated during this study may be used to support new research by other researchers in Kenya or other countries on improving newborn service delivery. In all cases, we will only share information with other researchers in ways that do not reveal individual participants' identities. For example, we will remove such as their names and where they live and replace this information with number codes. Any future research using information from this study must first be approved by a local or national expert committee to make sure that the interests of participants and their communities are protected.
- University of Oxford is responsible for ensuring that staff involved in the study in Kenya adhere to the safe and proper use of any personal information you provide. You can contact the research team for any further information about how your data will be managed. Further information about your rights with respect to your personal data is available from <https://compliance.admin.ox.c.uk/individual-rights>

Who has allowed this research to take place?

All research at KEMRI has to be approved before it begins by an independent national committee, an international committee and a committee at the KEMRI Wellcome Trust Research Programme. The committees look carefully at planned work before it begins, and must agree that the research is important, relevant to Kenya and follows nationally and internationally agreed research guidelines. This includes ensuring that all participants' safety and rights are respected. This study will also seek ethics approval from a subcommittee of the University of Oxford Central University Research Ethics Committee.

What will happen if I refuse to participate?

All participation in research is voluntary. You are free to decide if you want to take part or not. If you do agree you can change your mind at any time without any consequences. You can withdraw yourself from the study, without giving a reason, and without negative consequences, by advising us of this decision. The deadline by which you can withdraw from the study is September 2022, because we expect that data from this study would have already began being analysed by this time. If you withdraw from the study after this date, all information that you have already provided will still be included in the analysis. If you withdraw from the study before this date, information you have already provided may still be included if analysis has already occurred, however the information you have provided will not be used as quotes and the information will be removed from any data repositories.

What if I have any questions?

You are free to ask me any question about this research. If you have any further questions about the study, you are free to contact the research team using the contacts below:

Mr. Conrad Wanyama, KEMRI Wellcome Trust Research Programme, P.O. Box 230, Kilifi. Telephone: [mobile 0721275262] or 0700274694

If you want to ask someone independent anything about this research please contact:

Community Liaison Manager, KEMRI Wellcome Trust Research Programme, P.O. Box 230, Kilifi. Telephone: 041 7522 063, Mobile 0723 342 780 or 0705 154 386

And

The Head, KEMRI Scientific and Ethics Review Unit, P. O. Box 54840-00200, Nairobi; Telephone numbers: 0717 719477; 0776 399979 Email address: seru@kemri.org

KEMRI-Wellcome Trust Research Programme Information Poster for Pathways Study

Formal title: Understanding health worker social ties and communication, and their influence in neonatal care.

Lay title: Understanding how health worker interactions influence the care of newborn babies.

Appendix Ib: Information Poster

KEMRI-Wellcome Trust Research Programme: verbal consent/permission form
for non-participant observation for staff for: -

Study title: Pathways Study: Understanding health worker social ties and communication, and their influence in neonatal care.

Lay Title: Understanding how health worker interactions influence the care of newborn babies.

I confirm that I have provided information in the form of a study information poster in distinct areas within the hospital. I also confirm that I have explained the study and the process of observation to the participant(s) named below in accordance with the SOP and that I helped them understand the study and the purpose of the non-participant observation and gave them the chance to ask questions.

I also confirm that I explained to the participant(s) named below that their work will not be audio or video-recorded and that all the aspects of care, interactions and social ties will be used for the research purpose only.

I confirm that the study participant (s) listed below were present during the briefing session.

Shift:

Cadre code		Present
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Participant Name: _____	☐	<table border="1"><tr><td> </td></tr></table>		

Designee/investigator's signature: _____ **Date** _____

Designee/investigator's name: _____ **Time** _____

Appendix J– KEMRI-Wellcome Trust Research Programme: Participant Information Sheet and Consent form for non-participant observation (hospital meetings) for: -

Pathways Study Form J: Non-participant observation (for individuals attending hospital meetings)

Study title: Pathways Study: Understanding health worker social ties and communication, and their influence in neonatal care.

Lay Title: Understanding how health worker interactions influence the care of newborn babies.

Institution	Investigators
[removed]	

You are being asked to take part in a study. The box below tells you important things you should think about before deciding to join the study. We will provide more detailed information below the box. Please take time to read the following information carefully and discuss it with others if you wish to and ask questions about any of the information before you decide to participate. You may also wish to talk to your family or friends about this study, before agreeing to join.

Key Information for You to Consider
• Voluntary Consent. You are being asked to volunteer for a research study. You can choose whether you would like to participate or not. If you do agree you can change your mind at any time and withdraw from the research. This will not affect your work now or in the future. • Purpose. We are doing this research to better understand how health workers and teams work together to deliver neonatal care, including how changes might impact on different people in the team and how communication might be improved. The research will be used to inform how quality improvement interventions are implemented in hospitals. • Duration. Your participation in this study will last for the entire period of this meeting all the way until everyone has dispersed. • Procedures and Activities. We will be observing more generally how staff are communicating and interacting (verbally and non-verbally) during the formal meeting and shortly before/after the meeting (who they talk to, what they talk about and how they form interactions and connections). We will also ask attendees what they know, feel, or do about these interactions and how these interactions impact care of neonates

Who is carrying out this study and what is this study about?

- This study is being carried out by KEMRI in collaboration with the University of Oxford, UK. KEMRI is a Kenyan government organization that carries out medical research to find better ways of preventing and treating illness in the future for everybody's benefit.
- We want to better understand how health workers and teams work together to deliver neonatal care, including how changes might impact on different people in the team and how communication might be improved. We will do this by observing these interactions during meetings. We will all adhere to the requisite Ministry of Health COVID-19 protocols.

Why do you want to talk to me and what does it involve?

We have selected observing meetings as they shape the direction of how people interact and work together in the care of patients. Because this is a non-participant observation, we will not interrupt the discussions nor make any contributions (unless if want us to). The meetings will not be audio or video recorded.

Are there any risks or disadvantages to me for taking part?

There are no risks for taking part in the study. However, an external attendee in hospital meetings might create some discomfort when sensitive internal matters are being discussed. We will aim to maintain confidentiality of all matters discussed in the meeting, and only focus on the purpose of the research.

Are there any advantages to me for taking part?

There are no individual benefits to taking part in this study. In participating in this study, you will contribute to knowledge of social connections and ties, including knowledge of factors that facilitate or hinder use of knowledge and skills acquired during nurse trainings. This finding may help in making recommendations in the design of interventions that improve quality of care of neonates in Kenya and elsewhere in the future, for example through developing new health policies.

Data Protection

Who will have access to information about me in this research?

- All our research records are stored securely in locked cabinets and password protected computers and are accessed only by authorized persons.
- The personally identifiable information you provide will be used only for study purposes such as contact you for scheduling of visits and verification of consent through signed consent forms.
- We will share anonymized individual and summary information we collect or generate with our partner institution, University of Oxford in ways that do not reveal individual participants' identities.
- Anonymised data will be stored in a secure KEMRI-Wellcome Trust Research Programme repository and may be used for future research.
- KEMRI will keep any personally identifiable information about you from this study for 10 years after the study has finished in accordance with applicable Data Protection Requirements both in Kenya and in the UK. You have the right to access the personal data we hold that pertains to you, to object to or make corrections to the processing of all or part of the personal data. However, this might be limited due to coding which might make unblinding difficult.

Will the research be published? Could I be identified from any publications or other research outputs?

- The research will be published. We might however include direct quotations, but without identifying you, in any research outputs.
- In future, information collected or generated during this study may be used to support new research by other researchers in Kenya or other countries on improving newborn service delivery. In all cases, we will only share information with other researchers in ways that do not reveal individual participants' identities. For example, we will remove such as their names and where they live and replace this information with number codes. Any future research using information from this study must first be approved by a local or national expert committee to make sure that the interests of participants and their communities are protected.
- University of Oxford is responsible for ensuring that staff involved in the study in Kenya adhere to the safe and proper use of any personal information you provide. You can contact the research

team for any further information about how your data will be managed. Further information about your rights with respect to your personal data is available from <https://compliance.admin.ox.c.uk/individual-rights>

Who has allowed this research to take place?

All research at KEMRI has to be approved before it begins by an independent national committee, an international committee and a committee at the KEMRI Wellcome Trust Research Programme. The committees look carefully at planned work before it begins, and must agree that the research is important, relevant to Kenya and follows nationally and internationally agreed research guidelines. This includes ensuring that all participants' safety and rights are respected. This study will also seek ethics approval from a subcommittee of the University of Oxford Central University Research Ethics Committee.

What will happen if I refuse to participate?

All participation in research is voluntary. You are free to decide if you want to take part or not. If you do agree you can change your mind at any time without any consequences. You can withdraw yourself from the study, without giving a reason, and without negative consequences, by advising us of this decision. The deadline by which you can withdraw from the study is September 2022, because we expect that data from this study would have already began being analysed by this time. If you withdraw from the study after this date, all information that you have already provided will still be included in the analysis. If you withdraw from the study before this date, information you have already provided may still be included if analysis has already occurred, however the information you have provided will not be used as quotes and the information will be removed from any data repositories.

What if I have any questions?

You are free to ask me any question about this research. If you have any further questions about the study, you are free to contact the research team using the contacts below:

[removed]_____

If you want to ask someone independent anything about this research please contact:

[removed]

And _____

[removed]

KEMRI-Wellcome Trust Research Programme: verbal consent/permission form
for non-participant observation for hospital meetings for: -

Study title: Pathways Study: Understanding health worker social ties and communication, and their influence in neonatal care.

Lay Title: Understanding how health worker interactions influence the care of newborn babies.

I confirm that I have explained the study and the process of observation to the participant(s) named below in accordance with the SOP and that I helped them understand the study and the purpose of observation and gave them the chance to ask questions.

I also confirm that I explained to the participant(s) named below that they have the right to refuse to be included in observations and the right to withdraw their permission at any point.

I confirm that verbal consent was provided (or denied) by the participant(s) listed below who agreed (did not agree) to take part in this research.

[illegible]

Participant Name: _____ ☐

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Participant Name: _____ ☐

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Participant Name: _____ ☐

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Participant Name: _____ ☐

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Participant Name: _____ ☐

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Designee/investigator's signature: _____ **Date** _____

Designee/investigator's name: _____ **Time** _____

Appendix K– KEMRI-Wellcome Trust Research Programme: Participant Information Sheet and Consent form for Social Network Analysis (SNA) questionnaire for: -

Pathways Study Form K: Social Network Analysis (SNA) Questionnaire (for health workers directly providing or indirectly supporting the provision of neonatal care)

Study title: Pathways Study: Understanding health worker social ties and communication, and their influence in neonatal care.

Lay Title: Understanding how health worker interactions influence the care of newborn babies.

Institution	Investigators
[removed]	

You are being asked to take part in a study. The box below tells you important things you should think about before deciding to join the study. We will provide more detailed information below the box. Please take time to read the following information carefully and discuss it with others if you wish to and ask questions about any of the information before you decide to participate. You may also wish to talk to your family or friends about this study, before agreeing to join.

Key Information for You to Consider
• Voluntary Consent. You are being asked to volunteer for a research study. You can choose whether you would like to participate or not. If you do agree you can change your mind at any time and withdraw from the research. This will not affect your work now or in the future. • Purpose. We are doing this research to better understand how health workers and teams work together to deliver neonatal care, including how changes might impact on different people in the team and how communication might be improved. The research will be used to inform how quality improvement interventions are implemented in hospitals. You have been invited to participate in this research because you work in a neonatal care unit, or you work in the hospital and support neonatal care in some way (the delivery unit, post-natal unit, neonatal unit and paediatric unit, laboratory, pharmacy, nutrition, patient support, physiotherapy, orthopaedic/plaster care and occupational therapy). • Duration. Your participation in this study will last 30-45 minutes. • Procedures and Activities. We will ask you some questions for you to respond to while in a quiet, private place. These discussions will either be online, via phone or face-to-face. If conducted face-to-face, the requisite Ministry of Health COVID-19 protocols will be adhered to. If you agree to participate the researcher will ask you to sign a consent form before asking any questions. You can stop or pause the Social Network Analysis (SNA) questionnaire interview at any time, by letting the researcher know. We will take notes during the questionnaire interview,

Who is carrying out this study and what is this study about?

- This study is being carried out by KEMRI in collaboration with the University of Oxford, UK. KEMRI is a Kenyan government organization that carries out medical research to find better ways of preventing and treating illness in the future for everybody's benefit.
- The study involves asking health workers what they know, feel or do when they need help or advice from colleagues, using existing social interactions and networks and how these networks and social interactions impact care of neonates.

- We want to better understand how health workers and teams work together to deliver neonatal care, including how changes might impact on different people in the team and how communication might be improved.

Why do you want to talk to me and what does it involve?

- Selection

This hospital has several clinical environments where neonates receive care, including many supportive departments that contribute to the care of neonates. You have been selected from your department/unit so that we get experiences from individuals that will give us a true picture of the social networks and connections in the hospital, without preference.

- About the SNA questionnaire:

I/my colleague would like to ask you a number of questions about your background and the interactions you have with your colleagues at work. If you do not want to answer any of the questions you may say so and the interviewer will move on to the next question.

The researcher will take written notes during the interview, to complete the questionnaire. A researcher may sometimes need to contact you again, to clarify information.

Are there any risks or disadvantages to me for taking part?

- There are no risks for taking part in the study. However, we will ask you some questions about your background and interactions with colleagues.
- We will aim to conduct the interview during your tea or lunch break or when you are free while you are on duty to minimize disruption of your duties and obligation to work.
- If you are attending this SNA questionnaire activity while on your off or leave day (and not on a working day/shift), we will reimburse your transport costs at a rate of Ksh. 600 per person or mileage costs at the rate of Ksh.25/km for the face-to-face interview
- Online/phone questionnaire interviews will be reimbursed with a data voucher worth Ksh.250-500.

Are there any advantages to me for taking part?

- There are no individual benefits to taking part in this study. In participating in this study, you will contribute to knowledge of social connections and ties, including knowledge of factors that facilitate or hinder use of knowledge and skills acquired during nurse trainings. This finding may help in making recommendations in the design of interventions that improve quality of care of neonates in Kenya and elsewhere in the future, for example through developing new health policies.

Data Protection

Who will have access to information about me in this research?

- All our research records are stored securely in locked cabinets and password protected computers and are accessed only by authorized persons.
- The personally identifiable information you provide will be used only for study purposes such as contact you for scheduling of visits and verification of consent through signed consent forms.
- We will share anonymized individual and summary information we collect or generate with our partner institution, University of Oxford in ways that do not reveal individual participants' identities.
- Anonymised data will be stored in a secure KEMRI-Wellcome Trust Research Programme repository and may be used for future research.

- KEMRI will keep any personally identifiable information about you from this study for 10 years after the study has finished in accordance with applicable Data Protection Requirements both in Kenya and in the UK. You have the right to access the personal data we hold that pertains to you, to object to or make corrections to the processing of all or part of the personal data. However, this might be limited due to coding which might make unblinding difficult.

Will the research be published? Could I be identified from any publications or other research outputs?

- The research will be published. We might however include direct quotations, but without identifying you, in any research outputs.
- In future, information collected or generated during this study may be used to support new research by other researchers in Kenya or other countries on improving newborn service delivery. In all cases, we will only share information with other researchers in ways that do not reveal individual participants' identities. For example, we will remove such as their names and where they live and replace this information with number codes. Any future research using information from this study must first be approved by a local or national expert committee to make sure that the interests of participants and their communities are protected.
- University of Oxford is responsible for ensuring that staff involved in the study in Kenya adhere to the safe and proper use of any personal information you provide. You can contact the research team for any further information about how your data will be managed. Further information about your rights with respect to your personal data is available from <https://compliance.admin.ox.c.uk/individual-rights>

Who has allowed this research to take place?

All research at KEMRI must be approved before it begins by an independent national committee, an international committee and a committee at the KEMRI Wellcome Trust Research Programme. The committees look carefully at planned work before it begins, and must agree that the research is important, relevant to Kenya and follows nationally and internationally agreed research guidelines. This includes ensuring that all participants' safety and rights are respected. This study will also seek ethics approval from a subcommittee of the University of Oxford Central University Research Ethics Committee.

What will happen if I refuse to participate?

All participation in research is voluntary. You are free to decide if you want to take part or not. If you do agree you can change your mind at any time without any consequences. You can withdraw yourself from the study, without giving a reason, and without negative consequences, by advising us of this decision. The deadline by which you can withdraw from the study is September 2022, because we expect that data from this study would have already begun being analysed by this time. If you withdraw from the study after this date, all information that you have already provided will still be included in the analysis. If you withdraw from the study before this date, information you have already provided may still be included if analysis has already occurred, however the information you have provided will not be used as quotes and the information will be removed from any data repositories.

What if I have any questions?

You are free to ask me any question about this research. If you have any further questions about the study, you are free to contact the research team using the contacts below:

[removed] _____

If you want to ask someone independent anything about this research please contact:

[removed]

And

[removed]

KEMRI-Wellcome Trust Research Programme consent form for SNA
questionnaire for: -

Study title: Pathways Study: Understanding health worker social ties and communication, and their influence in neonatal care.

Lay Title: Understanding how health worker interactions influence the care of newborn babies.

I have had the study explained to me. I have understood all that has been read/explained and had my questions answered satisfactorily. And I agree to take part in this research

Please initial the sentences that reflect your choices, and then sign below:

I do wish to be notified by investigators in the event of research findings of possible importance to my facility or myself. **Yes** ☐ **No** ☐

I agree that the study team use the identifier that I have provided (telephone number, country ID number, etc.) to locate me in the future. **Yes** ☐ **No** ☐

I agree to the use of quotations in research outputs if I am not identifiable **Yes** ☐ **No** ☐

I agree to my anonymised research data being used, for future research **Yes** ☐ **No** ☐

I understand that I can change my mind at any stage and it will not affect me in any way.

Signature: _____ **Date:** _____

Participant Name: _____ **Time:** _____
(Please print name)

I have followed the study procedure to obtain consent from the participant. S/he apparently understood the nature and the purpose of the study and consents to the participation in the study. S/he has been given opportunity to ask questions which have been answered satisfactorily.

Designee/investigator's signature: _____ **Date** _____

Designee/investigator's name: _____ **Time** _____
(Please print name)

THE PARTICIPANT SHOULD NOW BE GIVEN A SIGNED COPY TO KEEP

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Appendix L– KEMRI-Wellcome Trust Research Programme: Participant Information Sheet and Consent form for In-depth interviews for: -

Pathways Study Form L: In-depth interview (for health workers directly providing or indirectly supporting the provision of neonatal care)

Study title: Pathways Study: Understanding health worker social ties and communication, and their influence in neonatal care.

Lay Title: Understanding how health worker interactions influence the care of newborn babies.

Institution	Investigators
[removed]	

You are being asked to take part in a study. The box below tells you important things you should think about before deciding to join the study. We will provide more detailed information below the box. Please take time to read the following information carefully and discuss it with others if you wish to and ask questions about any of the information before you decide to participate. You may also wish to talk to your family or friends about this study, before agreeing to join.

Key Information for You to Consider
• Voluntary Consent. You are being asked to volunteer for a research study. You can choose whether you would like to participate or not. If you do agree you can change your mind at any time and withdraw from the research. This will not affect your work now or in the future. • Purpose. We are doing this research to better understand how health workers and teams work together to deliver neonatal care, including how changes might impact on different people in the team and how communication might be improved. The research will be used to inform how quality improvement interventions are implemented in hospitals. You have been invited to participate in this research because you work in neonatal care, or you work in the hospital and support neonatal care in some way (the delivery unit, post-natal unit, neonatal unit and paediatric unit, laboratory, pharmacy, nutrition, patient support, physiotherapy, orthopaedic/plaster care and occupational therapy). • Duration. Your participation in this study will last 45-60 minutes. • Procedures and Activities. We will ask you some questions for you to respond to. These discussions will either be online, via phone or face-to-face. If conducted face-to-face, the requisite Ministry of Health COVID-19 protocols will be adhered to. If you agree to participate the researcher will ask you to sign a consent form before asking any questions. You can stop or pause the in-depth interview at any time, by letting the researcher know.

Who is carrying out this study and what is this study about?

- This study is being carried out by KEMRI in collaboration with the University of Oxford, UK. KEMRI is a Kenyan government organization that carries out medical research to find better ways of preventing and treating illness in the future for everybody's benefit.
- The study involves asking health workers what they know, feel or do when they need help or advice from colleagues, using existing social interactions networks and how these networks and social interactions impact care of neonates.
- We want to better understand how health workers and teams work together to deliver neonatal care, including how changes might impact on different people in the team and how communication might be improved.

Why do you want to talk to me and what does it involve?

- Selection

This hospital has several clinical environments where neonates receive care, including many supportive departments that contribute to the care of neonates. You have been selected from your department/unit so that we get experiences from individuals that will give us a true picture of the social networks and connections in the hospital, without preference.

- About the In-depth interview:

I/my colleague would like to ask you a number of questions about the nature of social connections and interactions between and among health workers, how they are formed and why and how this impacts care of neonates.

The interview will be audio-recorded (audio or video recorded if using an online platform such as MS Teams) to assist later in fully writing up the information. A researcher may sometimes need to contact you again, to clarify information.

Are there any risks or disadvantages to me for taking part?

- There are no risks for taking part in the study. However, questions around interactions and social connections can be sensitive as they may include a discussion about difficult relationships at workplace.
- We will aim to conduct the interview during your tea or lunch break or when you are free while you are on duty to minimize disruption of your duties and obligation to work.
- If you are attending this in-depth interview while on your off or leave day (and not on a working day/shift), we will reimburse your transport costs at a rate of Ksh. 600 per person or mileage costs at the rate of Ksh.25/km for the face-to-face interview
- Online interviews will be reimbursed with a data voucher worth Ksh.250 while phone interviews will be at the cost of the researcher.

Are there any advantages to me for taking part?

- There are no individual benefits to taking part in this study. In participating in this study, you will contribute to knowledge of social connections and ties, including knowledge of factors that facilitate or hinder use of knowledge and skills acquired during nurse trainings. This finding may help in making recommendations in the design of interventions that improve quality of care of neonates in Kenya and elsewhere in the future, for example through developing new health policies.

Data Protection

Who will have access to information about me in this research?

- All our research records are stored securely in locked cabinets and password protected computers and are accessed only by authorized persons.
- The personally identifiable information you provide will be used only for study purposes such as contact you for scheduling of visits and verification of consent through signed consent forms.
- We will share anonymized individual and summary information we collect or generate with our partner institution, University of Oxford in ways that do not reveal individual participants' identities.
- Anonymised data will be stored in a secure KEMRI-Wellcome Trust Research Programme repository and may be used for future research.

- KEMRI will keep any personally identifiable information about you from this study for 10 years after the study has finished in accordance with applicable Data Protection Requirements both in Kenya and in the UK. You have the right to access the personal data we hold that pertains to you, to object to or make corrections to the processing of all or part of the personal data. However, this might be limited due to coding which might make unblinding difficult.

Will the research be published? Could I be identified from any publications or other research outputs?

- The research will be published. We might however include direct quotations, but without identifying you, in any research outputs.
- In future, information collected or generated during this study may be used to support new research by other researchers in Kenya or other countries on improving newborn service delivery. In all cases, we will only share information with other researchers in ways that do not reveal individual participants' identities. For example, we will remove such as their names and where they live and replace this information with number codes. Any future research using information from this study must first be approved by a local or national expert committee to make sure that the interests of participants and their communities are protected.
- University of Oxford is responsible for ensuring that staff involved in the study in Kenya adhere to the safe and proper use of any personal information you provide. You can contact the research team for any further information about how your data will be managed. Further information about your rights with respect to your personal data is available from <https://compliance.admin.ox.c.uk/individual-rights>

Who has allowed this research to take place?

All research at KEMRI must be approved before it begins by an independent national committee, an international committee and a committee at the KEMRI Wellcome Trust Research Programme. The committees look carefully at planned work before it begins, and must agree that the research is important, relevant to Kenya and follows nationally and internationally agreed research guidelines. This includes ensuring that all participants' safety and rights are respected. This study will also seek ethics approval from a subcommittee of the University of Oxford Central University Research Ethics Committee.

What will happen if I refuse to participate?

All participation in research is voluntary. You are free to decide if you want to take part or not. If you do agree you can change your mind at any time without any consequences. You can withdraw yourself from the study, without giving a reason, and without negative consequences, by advising us of this decision. The deadline by which you can withdraw from the study is September 2022. because we expect that data from this study would have already began being analysed by this time. If you withdraw from the study after this date, all information that you have already provided will still be included in the analysis. If you withdraw from the study before this date, information you have already provided may still be included if analysis has already occurred, however the information you have provided will not be used as quotes and the information will be removed from any data repositories.

What if I have any questions?

You are free to ask me any question about this research. If you have any further questions about the study, you are free to contact the research team using the contacts below:

[removed]_____

If you want to ask someone independent anything about this research please contact:

[removed]

And

[removed]

KEMRI-Wellcome Trust Research Programme consent form for In-depth interview for health workers for: -

Study title: Pathways Study: Understanding health worker social ties and communication, and their influence in neonatal care.

Lay Title: Understanding how health worker interactions influence the care of newborn babies.

I have had the study explained to me. I have understood all that has been read/explained and had my questions answered satisfactorily. And I agree to take part in this research

Please initial the sentences that reflect your choices, and then sign below:

I do wish to be notified by investigators in the event of research findings of possible importance to my institution or myself. **Yes** ☐ **No** ☐

I agree that the study team use the identifier that I have provided (telephone number, country ID number, etc.) to locate me in the future. **Yes** ☐ **No** ☐

I agree for the interview to be recorded **Yes** ☐ **No** ☐

I agree to the use of quotations in research outputs if I am not identifiable **Yes** ☐ **No** ☐

I agree to my anonymised research data being used, for future research **Yes** ☐ **No** ☐

I understand that I can change my mind at any stage.

Signature: _____ **Date:** _____

Participant Name: _____ **Time:** _____
(Please print name)

I have followed the study procedure to obtain consent from the participant. S/he apparently understood the nature and the purpose of the study and consents to the participation in the study. S/he has been given opportunity to ask questions which have been answered satisfactorily.

Designee/investigator's signature: _____ **Date** _____

Designee/investigator's name: _____ **Time** _____
(Please print name)

THE PARTICIPANT SHOULD NOW BE GIVEN A SIGNED COPY TO KEEP

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Appendix M: KEMRI-Wellcome Trust Research Programme: Participant Information Sheet and Consent form for key informant interviews for: -

Pathways Study Form, M: Key informant interview (for nursing managers and unit leaders in neonatal care units or related environments)

Study title: Pathways Study: Understanding health worker social ties and communication, and their influence in neonatal care.

Lay Title: Understanding how health worker interactions influence the care of newborn babies

Institution	Investigators
[removed]	

You are being asked to take part in a study. The box below tells you important things you should think about before deciding to join the study. We will provide more detailed information below the box. Please take time to read the following information carefully and discuss it with others if you wish to and ask questions about any of the information before you decide to participate. You may also wish to talk to your family or friends about this study, before agreeing to join.

Key Information for You to Consider
• Voluntary Consent. You are being asked to volunteer for a research study. You can choose whether you would like to participate or not. If you do agree you can change your mind at any time and withdraw from the research. This will not affect your work now or in the future. • Purpose. We are doing this research to better understand how health workers and teams work together to deliver neonatal care, including how changes might impact on different people in the team and how communication might be improved. The research will be used to inform how quality improvement interventions are implemented in hospitals. You have been invited to participate in this research because you are one of the nurse managers or unit leaders with experience managing the facility and providing leadership to junior colleagues (nurses and nurse-students). • Duration. Your participation in this study will last 30-45 minutes. • Procedures and Activities. We will ask you some questions for you to respond to while in a quiet, private place. These discussions will either be online, via phone or face-to-face. If conducted face-to-face, the requisite Ministry of Health COVID-19 protocols will be adhered to. If you agree to participate the researcher will ask you to sign a consent form before asking any questions. You can stop or pause the key informant interview at any time, by letting the researcher know. We will audio-record your answers using a Dictaphone or online software in line with organisational policies (e.g. MS Teams). If conducted online or via phone, the conversation will be audio-recorded on the organizational device (online software such as MS Teams or institutional smartphone).

Who is carrying out this study and what is this study about?

- This study is being carried out by KEMRI in collaboration with the University of Oxford, UK. KEMRI is a Kenyan government organization that carries out medical research to find better ways of preventing and treating illness in the future for everybody's benefit.
- The study involves asking you information about your unit, how nursing care is planned and provided to newborn babies and nursing staff view the role of non-technical/socio-technical skills, including social interactions and networks in the care of neonates.

Why do you want to talk to me and what does it involve?

- Selection

You have been selected to participate for this interview because we feel your current position and experience can contribute much to our understanding and knowledge of the non-technical (human) factors that either hinder or facilitate how nurses use the clinical knowledge and skills they have acquired during training in the care of neonates at the workplace.

- About the key informant interview:

I/my colleague would like to ask you a number of questions about the work environment and how care is planned for neonates that is unique to your care context.

The interview will be audio-recorded (audio or video recorded if using an online platform such as MS Teams) to assist later in fully writing up the information. A researcher may sometimes need to contact you again, to clarify information.

Are there any risks or disadvantages to me for taking part?

- There are no risks for taking part in the study. We will aim not to link this information with your unit or hospital during future work (analysis and publications)
- We will aim to conduct the interview during your tea or lunch break or when you are free while you are on duty to minimize disruption of your duties and obligation to work.
- If you are attending this key informant interview while on your off or leave day (and not on a working day/shift), we will reimburse your transport costs at a rate of Ksh. 600 per person or mileage costs at the rate of Ksh.25/km for the face-to-face interview
- Online interviews will be reimbursed with a data voucher worth Ksh.250 while phone interviews will be at the cost of the researcher.

Are there any advantages to me for taking part?

- There are no individual benefits to taking part in this study. In participating in this study, you will contribute to knowledge of social connections and ties, including knowledge of factors that facilitate or hinder use of knowledge and skills acquired during nurse trainings. This finding may help in making recommendations in the design of interventions that improve quality of care of neonates in Kenya and elsewhere in the future, for example through developing new health policies.

Data Protection

Who will have access to information about me in this research?

- All our research records are stored securely in locked cabinets and password protected computers and are accessed only by authorized persons.
- The personally identifiable information you provide will be used only for study purposes such as contact you for scheduling of visits and verification of consent through signed consent forms.
- We will share anonymized individual and summary information we collect or generate with our partner institution, University of Oxford in ways that do not reveal individual participants' identities.
- Anonymised data will be stored in a secure KEMRI-Wellcome Trust Research Programme repository and may be used for future research.
- KEMRI will keep any personally identifiable information about you from this study for 10 years after the study has finished in accordance with applicable Data Protection Requirements both

in Kenya and in the UK. You have the right to access the personal data we hold that pertains to you, to object to or make corrections to the processing of all or part of the personal data. However, this might be limited due to coding which might make unblinding difficult.

Will the research be published? Could I be identified from any publications or other research outputs?

- The research will be published. We might however include direct quotations, but without identifying you, in any research outputs.
- In future, information collected or generated during this study may be used to support new research by other researchers in Kenya or other countries on improving newborn service delivery. In all cases, we will only share information with other researchers in ways that do not reveal individual participants' identities. For example, we will remove such as their names and where they live and replace this information with number codes. Any future research using information from this study must first be approved by a local or national expert committee to make sure that the interests of participants and their communities are protected.
- University of Oxford is responsible for ensuring that staff involved in the study in Kenya adhere to the safe and proper use of any personal information you provide. You can contact the research team for any further information about how your data will be managed. Further information about your rights with respect to your personal data is available from <https://compliance.admin.ox.c.uk/individual-rights>

Who has allowed this research to take place?

All research at KEMRI must be approved before it begins by an independent national committee, an international committee and a committee at the KEMRI Wellcome Trust Research Programme. The committees look carefully at planned work before it begins, and must agree that the research is important, relevant to Kenya and follows nationally and internationally agreed research guidelines. This includes ensuring that all participants' safety and rights are respected. This study will also seek ethics approval from a subcommittee of the University of Oxford Central University Research Ethics Committee.

What will happen if I refuse to participate?

All participation in research is voluntary. You are free to decide if you want to take part or not. If you do agree you can change your mind at any time without any consequences. You can withdraw yourself from the study, without giving a reason, and without negative consequences, by advising us of this decision. The deadline by which you can withdraw from the study is September 2022, because we expect that data from this study would have already begun being analysed by this time. If you withdraw from the study after this date, all information that you have already provided will still be included in the analysis. If you withdraw from the study before this date, information you have already provided may still be included if analysis has already occurred, however the information you have provided will not be used as quotes and the information will be removed from any data repositories.

What if I have any questions?

You are free to ask me any question about this research. If you have any further questions about the study, you are free to contact the research team using the contacts below:

[removed] _____

If you want to ask someone independent anything about this research please contact:

[removed]

And

[removed]

KEMRI-Wellcome Trust Research Programme consent form for key informant interview (hospital nurse managers) for: -

Study title: Pathways Study: Understanding health worker social ties and communication, and their influence in neonatal care.

Lay Title: Understanding how health worker interactions influence the care of newborn babies.

I have had the study explained to me. I have understood all that has been read/explained and had my questions answered satisfactorily. And I agree to take part in this research

Please initial the sentences that reflect your choices, and then sign below:

I do wish to be notified by investigators in the event of research findings of possible importance to my institution or myself. **Yes** ☐ **No** ☐

I agree that the study team use the identifier that I have provided (telephone number, country ID number, etc.) to locate me in the future. **Yes** ☐ **No** ☐

I agree for the interview to be recorded **Yes** ☐ **No** ☐

I agree to the use of quotations in research outputs if I am not identifiable **Yes** ☐ **No** ☐

I agree to my anonymised research data being used, for future research **Yes** ☐ **No** ☐

I understand that I can change my mind at any stage.

Signature: _____ **Date:** _____

Participant Name: _____ **Time:** _____
(Please print name)

I have followed the study procedure to obtain consent from the participant. S/he apparently understood the nature and the purpose of the study and consents to the participation in the study. S/he has been given opportunity to ask questions which have been answered satisfactorily.

Designee/investigator's signature: _____ **Date** _____

Designee/investigator's name: _____ **Time** _____
(Please print name)

THE PARTICIPANT SHOULD NOW BE GIVEN A SIGNED COPY TO KEEP

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Appendix N– KEMRI-Wellcome Trust Research Programme: Participant Information Sheet and Consent form for key informant interviews for: -

Pathways Study Form N: Key informant interview (for nursing educators in training institutions)

Study title: Pathways Study: Understanding health worker social ties and communication, and their influence in neonatal care.

Lay Title: Understanding how health worker interactions influence the care of newborn babies.

Institution	Investigators
[removed]	

You are being asked to take part in a study. The box below tells you important things you should think about before deciding to join the study. We will provide more detailed information below the box. Please take time to read the following information carefully and discuss it with others if you wish to and ask questions about any of the information before you decide to participate. You may also wish to talk to your family or friends about this study, before agreeing to join.

Key Information for You to Consider
• Voluntary Consent. You are being asked to volunteer for a research study. You can choose whether you would like to participate or not. If you do agree you can change your mind at any time and withdraw from the research. This will not affect your work now or in the future. • Purpose. We are doing this research to better understand how socio-cognitive skills influence the use of nurses' clinical competencies in neonatal care in Kenya as well as how health workers and teams work together to deliver neonatal care, including how changes might impact on different people in the team. The research will be used to inform how education-specific quality improvement interventions are designed and implemented in training institutes and hospitals. You have been invited to participate in this research because you are one of the nurse educators with leadership and/or programme management roles with experience in designing and implementing trainings to nursing students. • Duration. Your participation in this study will last 30-45 minutes. • Procedures and Activities. We will ask you some questions for you to respond to while in a quiet, private place. These discussions will either be online, via phone or face-to-face. If conducted face-to-face, the requisite Ministry of Health COVID-19 protocols will be adhered to. If you agree to participate the researcher will ask you to sign a consent form before asking any questions. You can stop or pause the key informant interview at any time, by letting the researcher know. We will audio-record your answers using a Dictaphone or online software in line with organisational policies (e.g. MS Teams). If conducted online or via phone, the conversation will be audio-recorded on the organizational device (online software such as MS Teams or institutional smartphone).

Who is carrying out this study and what is this study about?

- This study is being carried out by KEMRI in collaboration with the University of Oxford, UK. KEMRI is a Kenyan government organization that carries out medical research to find better ways of preventing and treating illness in the future for everybody's benefit.

- The study involves asking you information about your unit, how nursing care is planned and provided to newborn babies and nursing staff view the role of non-technical/socio-technical skills, including social interactions and networks in the care of neonates.

Why do you want to talk to me and what does it involve?

- Selection

You have been selected to participate for this interview because we feel your current position and experience can contribute much to our understanding and knowledge of the non-technical (human) factors that either hinder or facilitate how nurses use the knowledge and skills they have acquired during training at the workplace.

- About the key informant interview:

I/my colleague would like to ask you a number of questions about how training for nurses is designed and implemented around neonatal care and specific to your training institutional context.

The interview will be audio-recorded (audio or video recorded if using an online platform such as MS Teams) to assist later in fully writing up the information. A researcher may sometimes need to contact you again, to clarify information.

Are there any risks or disadvantages to me for taking part?

- There are no risks for taking part in the study. Information collected during this interview will not be linked to you or your institution during analysis and publication.
- We will aim to conduct the interview during your tea or lunch break or when you are free while you are on duty to minimize disruption of your duties and obligation to work. If we conduct these during tea/lunch break, we will provide refreshments.
- If you are attending this key informant interview while on your off or leave day (and not on a working day/shift), we will reimburse your transport costs at a rate of Ksh. 600 per person or mileage costs at the rate of Ksh.25/km for the face-to-face interview
- Online questionnaire interviews will be reimbursed with a data voucher worth Ksh.250-500. Phone interviews will be at the cost of the researcher.

Are there any advantages to me for taking part?

- There are no individual benefits to taking part in this study. In participating in this study, you will contribute to the influence of socio-cognitive factors as either facilitators or hinderances to the use of knowledge and skills acquired during nurse trainings. This finding may help in making recommendations in the design of interventions that improve quality of care of neonates in Kenya and elsewhere in the future, for example through developing new health policies.

Data Protection

Who will have access to information about me in this research?

- All our research records are stored securely in locked cabinets and password protected computers and are accessed only by authorized persons.
- The personally identifiable information you provide will be used only for study purposes such as contact you for scheduling of visits and verification of consent through signed consent forms.
- We will share anonymized individual and summary information we collect or generate with our partner institution, University of Oxford in ways that do not reveal individual participants' identities.
- Anonymised data will be stored in a secure KEMRI-Wellcome Trust Research Programme repository and may be used for future research.

- KEMRI will keep any personally identifiable information about you from this study for 10 years after the study has finished in accordance with applicable Data Protection Requirements both in Kenya and in the UK. You have the right to access the personal data we hold that pertains to you, to object to or make corrections to the processing of all or part of the personal data. However, this might be limited due to coding which might make unblinding difficult.

Will the research be published? Could I be identified from any publications or other research outputs?

- The research will be published. We might however include direct quotations, but without identifying you, in any research outputs.
- In future, information collected or generated during this study may be used to support new research by other researchers in Kenya or other countries on improving newborn service delivery. In all cases, we will only share information with other researchers in ways that do not reveal individual participants' identities. For example, we will remove such as their names and where they live and replace this information with number codes. Any future research using information from this study must first be approved by a local or national expert committee to make sure that the interests of participants and their communities are protected.
- University of Oxford is responsible for ensuring that staff involved in the study in Kenya adhere to the safe and proper use of any personal information you provide. You can contact the research team for any further information about how your data will be managed. Further information about your rights with respect to your personal data is available from <https://compliance.admin.ox.c.uk/individual-rights>

Who has allowed this research to take place?

All research at KEMRI must be approved before it begins by an independent national committee, an international committee and a committee at the KEMRI Wellcome Trust Research Programme. The committees look carefully at planned work before it begins, and must agree that the research is important, relevant to Kenya and follows nationally and internationally agreed research guidelines. This includes ensuring that all participants' safety and rights are respected. This study will also seek ethics approval from a subcommittee of the University of Oxford Central University Research Ethics Committee.

What will happen if I refuse to participate?

All participation in research is voluntary. You are free to decide if you want to take part or not. If you do agree you can change your mind at any time without any consequences. You can withdraw yourself from the study, without giving a reason, and without negative consequences, by advising us of this decision. The deadline by which you can withdraw from the study is September 2022, because we expect that data from this study would have already begun being analysed by this time. If you withdraw from the study after this date, all information that you have already provided will still be included in the analysis. If you withdraw from the study before this date, information you have already provided may still be included if analysis has already occurred, however the information you have provided will not be used as quotes and the information will be removed from any data repositories.

What if I have any questions?

You are free to ask me any question about this research. If you have any further questions about the study, you are free to contact the research team using the contacts below:

[removed]_____

If you want to ask someone independent anything about this research please contact:

[removed]

And

[removed]

KEMRI-Wellcome Trust Research Programme consent form for key informant interview (College and School Managers/educators) for: -

Study title: Pathways Study: Understanding Health Worker Communication Pathways and their influence in Neonatal Care

Lay Title: Understanding how health worker interactions influence the care of newborn babies.

I have had the study explained to me. I have understood all that has been read/explained and had my questions answered satisfactorily. And I agree to take part in this research

Please initial the sentences that reflect your choices, and then sign below:

I do wish to be notified by investigators in the event of research findings of possible importance to my institution or myself. **Yes** ☐ **No** ☐

I agree that the study team use the identifier that I have provided (telephone number, country ID number, etc.) to locate me in the future. **Yes** ☐ **No** ☐

I agree for the interview to be recorded ☐ **Yes** ☐ **No**

I agree to the use of quotations in research outputs if I am not identifiable **Yes** ☐ **No** ☐

I agree to my anonymised research data being used, for future research **Yes** ☐ **No** ☐

I understand that I can change my mind at any stage.

Signature: _____ **Date:** _____

Participant Name: _____ **Time:** _____
(Please print name)

I have followed the study procedure to obtain consent from the participant. S/he apparently understood the nature and the purpose of the study and consents to the participation in the study. S/he has been given opportunity to ask questions which have been answered satisfactorily.

Designee/investigator's signature: _____ **Date** _____

Designee/investigator's name: _____ **Time** _____
(Please print name)

THE PARTICIPANT SHOULD NOW BE GIVEN A SIGNED COPY TO KEEP

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Appendix O– KEMRI-Wellcome Trust Research Programme: Participant Information Sheet and Consent form for Focus Group Discussion for: -

Pathways Study Form O: Focus Group Discussion (for nursing graduates and nurse educators)

Study title: Pathways Study: Understanding health worker social ties and communication, and their influence in neonatal care.

Lay Title: Understanding how health worker interactions influence the care of newborn babies.

Institution	Investigators
[removed]	

You are being asked to take part in a study. The box below tells you important things you should think about before deciding to join the study. We will provide more detailed information below the box. Please take time to read the following information carefully and discuss it with others if you wish to and ask questions about any of the information before you decide to participate. You may also wish to talk to your family or friends about this study, before agreeing to join.

Key Information for You to Consider

- **Voluntary Consent.** You are being asked to volunteer for a research study. You can choose whether you would like to participate or not. If you do agree you can change your mind at any time and withdraw from the research. This will not affect your work now or in the future.
- **Purpose.** We are doing this research to better understand human and other workplace factors (also called non-technical or socio-cognitive skills) that either facilitate or hinder the use of skills and knowledge acquired during nurse training. The research will be used to inform how education-specific quality improvement interventions are designed and implemented in training institutes and hospitals. You have been invited to participate in this research because you are one of the nurse graduates providing clinical care for neonates in Kenya.
- **Duration.** Your participation in this study will last 60-90 minutes.
- **Procedures and Activities.** We will ask you some questions, in a group of 5-9 members, for you to respond to while in a quiet, private place. These discussions will either be online or face-to-face. If conducted face-to-face, the requisite Ministry of Health COVID-19 protocols will be adhered to. If you agree to participate the researcher will ask you to sign a consent form before asking any questions. You can stop or pause the discussion at any time, by letting the researcher know. We will audio-record your answers using a Dictaphone or online software in line with organisational policies (e.g. MS Teams). If conducted online the meeting conversations will be audio-recorded on the organizational device (using online software such as MS Teams).

Who is carrying out this study and what is this study about?

- This study is being carried out by KEMRI in collaboration with the University of Oxford, UK. KEMRI is a Kenyan government organization that carries out medical research to find better ways of preventing and treating illness in the future for everybody's benefit.
- The study involves asking you information about human and other workplace factors (non-technical/socio-technical skills) that either facilitate or hinder the use of skills and knowledge acquired during training.

Why do you want to talk to me and what does it involve?

- Selection

You have been selected to participate in this focus group discussion because we feel you can provide relevant information based on your experience as well as clinical cadre while previously as a nurse student and now as a nurse graduate providing clinical care to neonates in Kenya. We are interested in knowing what you know and about availability and how non-technical human and workplace factors (socio-cognitive skills) either hinder or facilitate how nurses use their clinical knowledge and skills they have acquired during training at the workplace.

- About the focus group discussion:

I/my colleague would like to ask you, within the group, a number of questions about the influence of socio-cognitive skills in the use of clinical knowledge and skills among nurses providing care to neonates.

The discussion will be audio-recorded (audio or video recorded if using an online platform such as MS Teams) to assist later in fully writing up the information. A researcher may sometimes need to contact you again, to clarify information.

Are there any risks or disadvantages to me for taking part?

- There are no risks for taking part in the study. Information collected during this discussion will not be linked to you or your institution during analysis and publication.
- We will aim to conduct the discussion during your tea or lunch break or when you are free while you are on duty to minimize disruption of your duties and obligation to work.
- If you are attending this focus group discussion while on your off or leave day (and not on a working day/shift), we will reimburse your transport costs at a rate of Ksh. 600 per person or mileage costs at the rate of Ksh.25/km for the face-to-face FGD meeting.
- Online FGD meetings will be reimbursed with a data voucher worth Ksh.250-500.

Are there any advantages to me for taking part?

- There are no individual benefits to taking part in this study. In participating in this study, you will contribute to the influence of socio-cognitive factors as either facilitators or hinderances to the use of knowledge and skills acquired during nurse trainings. This finding may help in making recommendations in the design of interventions that improve quality of care of neonates in Kenya and elsewhere in the future, for example through developing new health policies.

Data Protection

Who will have access to information about me in this research?

- All our research records are stored securely in locked cabinets and password protected computers and are accessed only by authorized persons.
- The personally identifiable information you provide will be used only for study purposes such as contact you for scheduling of visits and verification of consent through signed consent forms.
- We will share anonymized individual and summary information we collect or generate with our partner institution, University of Oxford in ways that do not reveal individual participants' identities.
- Anonymised data will be stored in a secure KEMRI-Wellcome Trust Research Programme repository and may be used for future research.
- KEMRI will keep any personally identifiable information about you from this study for 10 years after the study has finished in accordance with applicable Data Protection Requirements both in Kenya and in the UK. You have the right to access the personal data we hold that pertains to you,

to object to or make corrections to the processing of all or part of the personal data. However, this might be limited due to coding which might make unblinding difficult.

Will the research be published? Could I be identified from any publications or other research outputs?

- The research will be published. We might however include direct quotations, but without identifying you, in any research outputs.
- In future, information collected or generated during this study may be used to support new research by other researchers in Kenya or other countries on improving newborn service delivery. In all cases, we will only share information with other researchers in ways that do not reveal individual participants' identities. For example, we will remove such as their names and where they live and replace this information with number codes. Any future research using information from this study must first be approved by a local or national expert committee to make sure that the interests of participants and their communities are protected.
- University of Oxford is responsible for ensuring that staff involved in the study in Kenya adhere to the safe and proper use of any personal information you provide. You can contact the research team for any further information about how your data will be managed. Further information about your rights with respect to your personal data is available from <https://compliance.admin.ox.c.uk/individual-rights>

Who has allowed this research to take place?

All research at KEMRI must be approved before it begins by an independent national committee, an international committee and a committee at the KEMRI Wellcome Trust Research Programme. The committees look carefully at planned work before it begins, and must agree that the research is important, relevant to Kenya and follows nationally and internationally agreed research guidelines. This includes ensuring that all participants' safety and rights are respected. This study will also seek ethics approval from a subcommittee of the University of Oxford Central University Research Ethics Committee.

What will happen if I refuse to participate?

All participation in research is voluntary. You are free to decide if you want to take part or not. If you do agree you can change your mind at any time without any consequences. You can withdraw yourself from the study, without giving a reason, and without negative consequences, by advising us of this decision. The deadline by which you can withdraw from the study is September 2022, because we expect that data from this study would have already began being analysed by this time. If you withdraw from the study after this date, all information that you have already provided will still be included in the analysis. If you withdraw from the study before this date, information you have already provided may still be included if analysis has already occurred, however the information you have provided will not be used as quotes and the information will be removed from any data repositories.

What if I have any questions?

You are free to ask me any question about this research. If you have any further questions about the study, you are free to contact the research team using the contacts below:

[removed]_____

If you want to ask someone independent anything about this research please contact:

[removed]

And

[removed]

KEMRI-Wellcome Trust Research Programme consent form for Focus group
Discussion (nurse graduates and nurse educators) for: -

Study title: Pathways Study: Understanding health worker social ties and communication, and their influence in neonatal care.

Lay Title: Understanding how health worker interactions influence the care of newborn babies.

I have had the study explained to me. I have understood all that has been read/explained and had my questions answered satisfactorily. And I agree to take part in this research

Please initial the sentences that reflect your choices, and then sign below:

I do wish to be notified by investigators in the event of research findings of possible importance to my professional group or myself. **Yes** ☐ **No** ☐

I agree that the study team use the identifier that I have provided (telephone number, country ID number, etc.) to locate me in the future. **Yes** ☐ **No** ☐

I agree for the interview to be recorded **Yes** ☐ **No** ☐

I agree to the use of quotations in research outputs if I am not identifiable **Yes** ☐ **No** ☐

I agree to my anonymised research data being used, for future research **Yes** ☐ **No** ☐

I understand that I can change my mind at any stage.

Signature: _____ **Date:** _____

Participant Name: _____ **Time:** _____
(Please print name)

I have followed the study procedure to obtain consent from the participant. S/he apparently understood the nature and the purpose of the study and consents to the participation in the study. S/he has been given opportunity to ask questions which have been answered satisfactorily.

Designee/investigator's signature: _____ **Date** _____

Designee/investigator's name: _____ **Time** _____
(Please print name)

THE PARTICIPANT SHOULD NOW BE GIVEN A SIGNED COPY TO KEEP

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.....

Appendix P – KEMRI-Wellcome Trust Research Programme: Participant Information Sheet and verbal assent form for stakeholder workshop for:

Pathways Study Form P: Stakeholder workshop

Study title: Pathways Study: Understanding health worker social ties and communication, and their influence in neonatal care.

Lay Title: Understanding how health worker interactions influence the care of newborn babies.

Institution	Investigators
[removed]	

You are being invited to take part in a research project. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information and ask us if there is anything that is not clear or if you would like more information. Take time to decide whether you wish to take part.

Key Information for You to Consider
• Voluntary Consent. You are being asked to volunteer for a research study. You can choose whether you would like to participate or not. If you do agree you can change your mind at any time and withdraw from the research. This will not affect your work now or in the future. • Purpose. We are doing this research to better understand how health workers and teams work together to deliver neonatal care, including how changes might impact on different people in the team and how communication might be improved. We also are interested in understanding the role of non-technical factors (socio-cognitive skills) in facilitating or hindering the use of clinical competencies among nurses working in neonatal areas. The research will be used to inform how quality improvement interventions are implemented in hospitals and training institutions. We have invited you because you have relevant experience in healthcare delivery (particularly neonatal care), research and policy/decision making, and you are familiar with key aspects of intervention design or implementation. • Duration. Your participation in this event will last 5-7 hours. • Procedures and Activities. You will participate in this one-day stakeholder workshop event to contribute to group discussions with other participants and the research team, to make sense of and comment and reflect on the data. You will also help in the co-design of a set of recommendations, as an output from the workshop. This event will be audio-recorded. If conducted online the meeting conversations will be audio-recorded on the organizational device (using online software such as MS Teams). • Risks or disadvantages. In this study, there is a possibility that the questions could prompt discussions about difficult relationships or experiences in the workplace. • Benefits. There are no direct benefits in this study. We expect that findings from this study will be used to develop recommendations to inform the design and implementation of quality improvement interventions in neonatal care in Kenya.

Who is carrying out this study and what is this study about?

- This study is being carried out by KEMRI in collaboration with the University of Oxford, UK. KEMRI is a Kenyan government organization that carries out medical research to find better ways of preventing and treating illness in the future for everybody's benefit.
- The study has involved collecting data through non-participant observation from 2 hospitals as well as from health care workers and nurse managers and educational managers of 4 training programmes. Specific for this workshop, we have invited you to contribute to group discussions with other participants and the research team, to make sense of and comment and reflect on the data that has already been collected. You will also help in the co-design of a set of recommendations, as an output from the engagement event. You can leave the event at any time, by letting the researcher know.
- This event will be face-to-face with the requisite Ministry of Health COVID-19 protocols being adhered to (unless we choose to run it online).
- The discussion will be recorded (audio recorded if face-to-face and audio or video recorded if online) to assist later in fully writing up the information.

Why do you want to talk to me and what does it involve?

- We have invited you because you have relevant experience in healthcare delivery (particularly neonatal care), research and policy/decision making, and you are familiar with key aspects of how to design recommendations and intervention designs for quality improvement.

Are there any risks or disadvantages to me for taking part?

- There are no risks for taking part in the study. However, questions around interactions and social connections can be sensitive as they may include to a discussion about difficult relationships at workplace.
- The discussions should take approximately 5-7 hours. You will be provided with either a standard fare reimbursement of Ksh. 600 or mileage costs at the rate of Ksh.25/km for face-to-face meetings.
- Online stakeholder meeting will be reimbursed with a data voucher worth Ksh.250-500 per person.
- Because we anticipate the meeting to take longer than 3 hours, you will be eligible for a standard out-of-pocket expense of ksh. 1000 per person as determined by KEMRI-WTRP guidelines for study benefits and compensation. This is not meant in any way to influence how you participate in the study.

Are there any advantages to me for taking part in the study?

- There are no individual benefits to taking part in this study. In participating in this study, you will contribute in making recommendations in the design of interventions that improve quality of care of neonates in Kenya and elsewhere in the future, for example through developing new health policies.

Data Protection

Who will have access to information about me in this research?

- All our research records are stored securely in locked cabinets and password protected computers and are accessed only by authorized persons.
- The personally identifiable information you provide will be used only for study purposes such as contact you for scheduling of visits and verification of consent through signed consent forms.
- We will share anonymized individual and summary information we collect or generate with our partner institution, University of Oxford in ways that do not reveal individual participants' identities.
- Anonymised data will be stored in a secure KEMRI-Wellcome Trust Research Programme repository and may be used for future research.

- KEMRI will keep any personally identifiable information about you from this study for 10 years after the study has finished in accordance with applicable Data Protection Requirements both in Kenya and in the UK. You have the right to access the personal data we hold that pertains to you, to object to or make corrections to the processing of all or part of the personal data. However, this might be limited due to coding which might make unblinding difficult.

Will the research be published? Could I be identified from any publications or other research outputs?

- The research will be published. We might however include direct quotations, but without identifying you, in any research outputs.
- In future, information collected or generated during this study may be used to support new research by other researchers in Kenya or other countries on improving newborn service delivery. In all cases, we will only share information with other researchers in ways that do not reveal individual participants' identities. For example, we will remove such as their names and where they live and replace this information with number codes. Any future research using information from this study must first be approved by a local or national expert committee to make sure that the interests of participants and their communities are protected.
- University of Oxford is responsible for ensuring that staff involved in the study in Kenya adhere to the safe and proper use of any personal information you provide. You can contact the research team for any further information about how your data will be managed. Further information about your rights with respect to your personal data is available from <https://compliance.admin.ox.c.uk/individual-rights>

Who has allowed this research to take place?

All research at KEMRI has to be approved before it begins by an independent national committee, an international committee and a committee at the KEMRI Wellcome Trust Research Programme. The committees look carefully at planned work before it begins, and must agree that the research is important, relevant to Kenya and follows nationally and internationally agreed research guidelines. This includes ensuring that all participants' safety and rights are respected. This study will also seek ethics approval from a subcommittee of the University of Oxford Central University Research Ethics Committee.

What will happen if I refuse to participate?

All participation in research is voluntary. You are free to decide if you want to take part or not. If you do agree you can change your mind at any time without any consequences. You can withdraw yourself from the stakeholder event, without giving a reason, and without negative consequences, by advising us of this decision. If you withdraw from the study after the event, information you have already provided will still be included the analysis, however the information you have provided will not be used as quotes.

What if I have any questions?

You are free to ask me any question about this research. If you have any further questions about the study, you are free to contact the research team using the contacts below:

[removed] _____

If you want to ask someone independent anything about this research please contact:

[removed]

And

[removed]

KEMRI-Wellcome Trust Research Programme Verbal consent form for
Stakeholder workshop event for: -

Study title: Pathways Study: Understanding health worker social ties and communication, and their influence in neonatal care.

Lay Title: Understanding how health worker interactions influence the care of newborn babies.

I have followed the study procedure to obtain verbal consent from the participants.

I attest that the information concerning this research was accurately explained to and apparently understood by the participants who have been given opportunity to ask questions which have been answered satisfactorily.

I confirm that verbal consent was provided (or denied) by the participant(s) listed below who agreed (did not agree) to take part in this research.

[illegible]

Participant Name: _____ ☐

☐

Participant Name: _____ ☐

☐

Participant Name: _____ ☐

☐

Participant Name: _____ ☐

☐

Participant Name: _____ ☐

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Participant Name: _____ ☐

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Participant Name: _____ ☐

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Participant Name: _____ ☐

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Participant Name: _____ ☐

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Participant Name: _____ ☐

☐

Designee/investigator's signature: _____ **Date** _____

Designee/investigator's name: _____ **Time** _____

(Please print name)

Appendix 2.2.4: Adapted Social Network Analysis Scenarios

Adapted Social Network Scenarios – Hospital 1

Type of social support	Scenario/question
Instrumental	You need help to perform a procedure (such as fixing a feeding tube OR applying Chlorhexidine for cord care) on a stable newborn/neonate. Who do you request help from?
Informational	You are not sure of an intervention such as the dose of medication or volume of feeds/fluids to give to a newborn/neonate. Who do you ask?
Emotional	You have had a very busy shift and two newborns/neonates died today. You are feeling tired and upset. Who do you talk to about how you are feeling?
Appraisal	The hospital management has asked staff/students to identify a clinical mentor to support them improve their performance at work. Who would you choose?

Adapted Social Network Scenarios – Hospital 2

Type of social support	Scenario/question
Instrumental	You need help to perform a routine procedure on a stable neonate. Who do you request help from?
Instrumental	A neonate requires emergency care. Who do you inform?
Informational	You are not sure of the dose of medication to give to a neonate. Who do you ask?
Informational	A mother has refused a procedure for her baby. Who do you discuss this with?
Emotional	A baby has died on the unit and you are uncomfortable breaking the bad news to the mother/caregiver. Who do you speak to?
Emotional	You have had a very busy shift and two neonates died today. You are feeling tired and upset. Who do you talk to about how you are feeling?
Emotional	A colleague has been rude to you. Who do you speak to?
Appraisal	You notice that you are unfamiliar with certain core skills necessary in the NBU/maternity/ward. Who do you go to review this support?
Appraisal	The hospital management has asked staff/students to identify a clinical mentor to support them improve their performance at work. Who would you choose?

Appendix 2.2.5: Sense-checking feedback sheets



GROUPING Who individuals consider to be their peers and trusted colleagues, based on their observations of others

Summary narrative:

Within a hospital unit, staff will group with colleagues who they identify with in some way, based on observations of their appearance and conduct. When staff feel they have aspects of identity in common, they will develop trust towards one another, and work together more collaboratively. However, assumptions linked to shared identity can lead to the formation of insular cliques, with those external to the clique recognised as outsiders, and judgements made. As such, fractions and division deepen, and different cliques can operate in parallel within the same unit.

The conduct of individuals is continually observed by others on the unit, and colleagues will feel comfortable approaching an individual for advice or support who displays that they are 'careful' in the way they communicate with staff and patients. In addition, when individuals demonstrate that they have good knowledge, skills or experience, colleagues will also seek them. Conversely, colleagues will avoid approaching individuals who show 'lack of care' in their conduct, or who are deemed to have poor knowledge and skills.

"Yeah, we could... there are those we could discuss with, the same, same guys because it's like we...we are familiar, not even familiar that they are at some point in life, you can relate with them they can relate with you. The kind of life I've gone through; they have gone through" Student Nurse

"So my feeling is I wish, I wish we could be on the same page when discussing a patient and not to tell me I talk to the intern, and I'm qualified nurse. I've worked here for five years and an intern is just here for 12 weeks." Nurse

"So mostly I like to work with people who are hardworking, people who are task oriented, people who are like, "You know what? We're going in and but you have to finish then we don't leave anyone behind." Even if they finish on their side, they will come and assist the other person, yes." Doctor

"He's knowledgeable, yes, but he has this negativity on him, (clicks), like he looks down upon you." Student Nurse

Reflective questions for application of Grouping GELLE Domain in the workplace:

1. Do staff (including junior staff and students) feel valued and accepted by their colleagues?
2. Do staff have opportunities to work with diverse colleagues?
3. Can staff communicate meaningfully with colleagues who are different to themselves?
4. Do staff treat colleagues and patients with cordiality, patience and respect?
5. Are staff humble, reliable, committed, open, collaborative and supportive, and do they display integrity and a joyful and caring attitude?
6. Can staff easily identify and approach colleagues who are knowledgeable, skilled, senior, experienced, or specialised?



FEEDBACK ACTIVITIES – 2 parts

PART 1: In your personal opinion, are the arguments (CMOCs) below a true representation of what can sometimes occur in the neonatal workplace?

Please read and complete the table below:

Arguments from Pathways Study i.e. Context(C), Mechanism(M), Outcome(O) Configurations (CMOCs)	In your opinion, is this CMOC a true representation of what can sometimes occur in the neonatal workplace? – please add comments/suggestions in this column
U1: When a group of individuals within the unit share identity/ purpose (C) they will trust and respect one another (O) because they perceive that they share a common ‘representation’ (i.e. ‘way of looking at the world’) and values (M).	
U2: When staff operate in parallel cliques on a unit (C) negative impacts on staff and patients can occur (O) because of poor communication and teamworking (M).	
U3: When a colleague displays they are ‘careful’ towards their co-workers and also patients, in the way they interact and communicate (C), individuals will seek support and advice from this colleague (O), because they feel trusting towards them and comfortable approaching them (M).	
U4: When a colleague displays a ‘lack of care’ towards their co-workers and also patients, in the way they interact and communicate (C), individuals will avoid this colleague (O), because they do not trust them, consider them a poor team player and ‘rigid to change’, and/or fear they will respond with incivility. (M).	
U5: When students are recipients or witnesses of incivility by unit staff (C) students will disengage, show peer-reliance and experience poor learning (O) because they will fear staff and will feel discouraged (M).	
U6: When a colleague is identified as having knowledge, status, technical skills or experience (C) they will be sought for legitimate/ defensible information and help with decision making by individuals (O) because their advice is valued as trusted and authoritative (M).	
U7: When a colleague is identified as having poor skills (C) individuals will not seek their advice (O) because they will be deemed as unable to help (M).	

PART 2: Do you have any ideas or suggestions of action that could be taken, by focusing on some of these areas?

Please write your ideas and suggestions on the available sticky notes and share/stick them as advised.



EMPOWERING The aspects of formality and structure within the unit which influence the ability of specific individuals to act

Summary narrative:

Social constitutions, for example the tacit structures of social hierarchy and formality within the unit, influence the actions available to individuals by empowering or disempowering. Indeed, hierarchy in a unit can improve oversight and communication and therefore empower staff, which can improve a sense of belonging and purpose within the unit team. However, when filled with tension and fear, a hierarchy will disempower and divide staff. Likewise, within social sub-groups on the unit, individuals who are most central within the group have most power and influence on group behaviours, unlike those on the periphery, regardless of competency.

Communication on the unit is enhanced when the roles of individuals are clear. When roles are not clear within the team there will be confusion, conflict, individuals may adapt their own roles, and activities and tasks may not be completed by the most appropriate staff.

"We would receive through the, our rep, our representative. So, they'd communicate to her then she posts in the group. Like, "This is what has been happening this week, or this is what's going to happen next week, this is how we're going to do it." Doctor

"It is frustrating...because the cadre lines are very clearly drawn in our public facilities, so I have to take it with caution. It is very difficult for me to discipline a nurse regardless of, you know, of the occurrence. I have to go through their ranks." Doctor

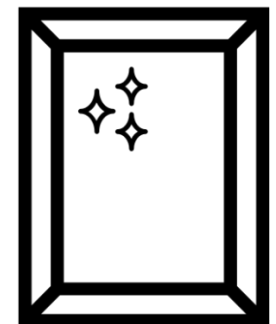
"I do not...we don't question consultants. We do what they say." Doctor

"There are people here who don't like writing, like for men, men don't like sitting down and writing..... So when you know you are, you are having a man, that man will tend to do most of the manual works, deliveries, what, and you will be the one to be writing." Nurse

"So if seniors are doing things a certain way, you will feel the need to follow in their way, if they're reluctant you'll be reluctant." Nurse

Reflective questions for application of Empowering GELLE Domain in the workplace:

7. Does the hierarchy assist information exchange, by clear communication pathways and gatekeepers?
8. Do inclusive and collaborative practices on the unit, serve to empower those who have a positive influence on social norms?
9. Are individual roles sufficiently clear to allow staff to develop effective communication networks?
10. Is allocation of roles in the unit fair, and are roles aligned, with manageable scopes of work?
11. Do the roles allocated to individuals match their skill set, and are staff absences mitigated by appropriate distribution of key roles within the unit?



FEEDBACK ACTIVITIES – 2 parts

PART 1: In your personal opinion, are the arguments (CMOCs) below a true representation of what can sometimes occur in the neonatal workplace?

Please read and complete the table below:

Arguments i.e. Context(C), Mechanism(M), Outcome(O) Configurations (CMOCs)	In your opinion, is this CMOC a true representation of what can sometimes occur in the neonatal workplace? – please add comments/suggestions in this column
U8: When a ‘facilitative hierarchy’ is fostered by leaders (C) there will be oversight and access to advice and information, with improved sense of belonging and group purpose (O) because there will be clear and intentional positive use of power (M)	
U9: When a ‘restrictive hierarchy’ is present (C) there will be poor oversight and access to advice and information, reduced sense of belonging and freedom, and a tendency to follow orders (O) because of tension, fear and othering (M).	
U10: When an individual occupies a central position in the unit, or within a specific social group or clique (C) they will have greater influence on group norms (O) because they have more social power over group discourse and practices (M)	
U11: When an individual occupies a peripheral position in a social group (even if they have valuable contributions to bring) (C) they will not influence group norms (O) because they have little power to alter group discourse (M).	
U12: When individual roles are clear (C) communication will be more effective (O) because go-to people with the necessary delegated authority are more easily identifiable (M)	
U13: When individual roles are unclear (C) there will be role evolution, duplication, conflict, inappropriate delegation, etc. (O) because of confusion within the team about responsibilities and boundaries (M).	
U14: When roles do not align with the skills, capacity or perceived professional identity of staff (C) there will be frustration, overwhelm, and informal role filling (O) because of perceived mismatch by staff (M).	

PART 2: Do you have any ideas or suggestions of action that could be taken, by focusing on some of these areas?

Please write your ideas and suggestions on the available sticky notes and share/stick them as advised.



LEADING How leadership within the clinical unit influences the relational culture

Summary narrative:

The approach to leading on the unit influences culture. The ways in which leaders act, and display their own attitudes towards work, communicate a strong 'values tone' to staff and students and influence their behaviours and collective habits (either positively or negatively). Effective leaders earn the respect of unit staff by showing they possess admirable values and personal qualities, through their conduct, delivered with self-confidence and humility. Leading in an inclusive and collaborative manner cultivates a sense of belonging in others, and members of the team will be encouraged to share and contribute to unit activities and innovations. Likewise, leading from a place of well-informed understanding of the unit and awareness of the capabilities within the team, is essential for achieving meaningful support to staff in their day-to-day work. Leaders must also delegate clearly and wisely, to empower others in appropriate leading roles, and to avoid personal overwhelm.

"Okay as a, when you are a team leader one thing you when support you have to give to the staff if you don't then you are failing, ensure the consumables are within reach. There is really... it is really very bad when a...a nurse who is in NICU with ventilated very" sick babies having to come for things in the store. ... I should be able to make them be near them." Nurse

"Whenever they give directives or advice, and then you follow them accurately, it helps a lot. Yeah, it has helped me even improve my, my working." Nurse

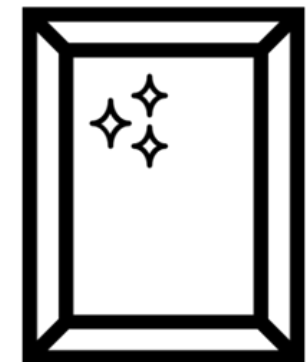
"...for me, I will not escalate. Personally, because, ...I know, nobody will listen to me." Nurse

"So I have identified mostly senior nurses who have experience in the unit. And have delegated. Delegated, because since I can't be able to do, yes, I have delegated some of them." Nurse

....when I come in in the morning.....the best person to give me a summary.....is usually the in-charge because she has a sort of real-time access to the nurses on the shift...what numbers are we dealing with in the unit, ...any challenges....with patient care,....red flags., are we running low on resources....people she is working with....and we have had to discuss to see how to deal with that, students and different qualified staff.. Doctor

Reflective questions for application of LEADING GELLE Domain in the workplace:

1. Do leaders act with kindness, encouragement, humility, patience, respect, and show an open attitude to learning?
2. Do leaders communicate clear and consistent expectations of staff, and exercise timely and appropriate correction and support?
3. Do leaders feel supported to use their authority with confidence in a safe learning culture, for the good of others?
4. Do leaders invest in developing team capacity through encouragement, inclusivity, and collaboration?
5. Are leaders proactive in gaining understanding of their team, to provide effective oversight and facilitate timely support?
6. Are leaders clear about the scope of their own role, and do they actively delegate to and empower others?



FEEDBACK ACTIVITIES – 2 parts

PART 1: In your personal opinion, are the arguments (CMOCs) below a true representation of what can sometimes occur in the neonatal workplace?

Please read and complete the table below:

Arguments i.e. Context(C), Mechanism(M), Outcome(O) Configurations (CMOCs)	In your opinion, is this CMOC a true representation of what can sometimes occur in the neonatal workplace? – please add comments/suggestions in this column
U15: When leaders set a 'positive values tone' on the unit (C) it will be a more organised, positive and respectful place to work (O) because staff will normalise these values (i.e. will be encouraged to 'follow-suit') (M).	
U16: When leaders set a 'negative values tone' on the unit (C), normalisation of undesirable behaviours by staff will occur (O) because a reliable and consistent example of positive behaviours and attitudes is absent (M).	
U17: When leaders are respected by staff/students due to the demonstration of esteemed attributes, and have self-confidence (C), they will be more effective in their role, and supported by the team (O) because they have created a 'safe' working environment (M).	
U18: When leaders are not respected by staff/students or lack self-confidence (C) they will be considered ineffective in their leadership role, and will face resistance from staff/students (O) because staff perceive them to be disengaged from others and/or overwhelmed (M).	
U19: When a leader is inclusive and collaborative in their approach (C), satisfaction, continuity and sense of teamwork will be enhanced on the unit (O) because team members will engage and participate (M).	
U20: When a leader fails to demonstrate an inclusive and collaborative approach (C) staff will disengage and not respect their leader (O) because they will feel excluded by poor or incompetent leadership practices (M).	
U21: A leader with good situational awareness (C) will support staff in the provision of quality care (O) because they better understand and respond to the needs of the team (M).	
U22: When a leader is clear about their own role and delegates appropriately to others (C) the leader will be less overwhelmed, more effective, and satisfaction of staff will improve (O) because they will be confident about which roles and responsibilities to delegate and whom to empower (M).	
U23: When a leader fails to delegate appropriately to others (C) their leadership will be considered ineffective and staff will feel frustrated and dissatisfied (O) because skills of the team are not being utilised, and the leader (and some staff) are overwhelmed (M)	

PART 2: Do you have any ideas or suggestions of action that could be taken, by focusing on some of these areas?

Please write your ideas and suggestions on the available sticky notes and share/stick them as advised.



LEARNING How those within the unit support all learners to become competent professionals

Summary narrative:

Teaching and learning on the unit is socially determined, and influences how learners are supported to become competent professionals. The structure of training on the unit can either help or hinder the development of shared understanding amongst the team, and when structured well can be used to achieve both greater inclusion of staff and improved consistency and quality in patient care. Well-managed student placements help to create clear expectations and a better learning environment. Conversely, poorly managed student placements lack clarity and oversight, and lead to chaotic teaching and learning. When students are allocated to specific staff on the unit, they will feel more a part of the team, and will be better supervised. Indeed, without adequate supervision, students may undertake tasks they are not competent to complete. Moreover, when teaching and learning places ultimate responsibility on students themselves to seek and initiate their own learning during clinical placements, they will differ widely in approach, and therefore only some will gain the necessary knowledge and skills needed for their ongoing professional career.

“And during the continuous medical education, they are brought to the level where they should be able to understand what they didn't get clearly.” Nurse

I can say, you see when, when, when people are new, when the students are usually here, they usually don't want to touch anything, not unless you show them because they are afraid maybe these babies are too little, they are fragile, and they don't want to mess. Nurse

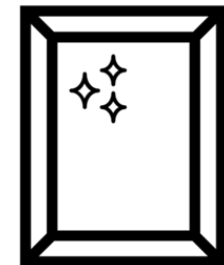
“...they'll come and reprimand you. And yet they are not around to guide you do these, these and this.” Student nurse

“..when you are allocated student, you do communicate. Like you instruct them what's supposed to be done, how it's supposed to be done, and also you, you observe them on what they're doing. Try to correct. Try to encourage something they've done correctly.” Nurse

“More observation and skills, we see there are skills that you have to observe so that you can also do it, most of the skills that we learn, we learn from our fellow students, but I wish it was the other way around.” Student nurse

Reflective questions for application of LEARNING GELLE Domain in the workplace:

1. Is learning structured in an inclusive manner, which endorses best practice?
2. Are diverse opportunities to enable and consolidate learning for best practice exploited? (e.g. printed summaries on walls, peer dissemination, supervised clinical learning, making impacts of learning tangible)
3. Do students and new staff experience support for learning on first arrival to the unit?
4. Is a named clinical supervisor, based in the unit, allocated to all students and new staff?
5. Is learning overly-dependent on individual student initiative?



FEEDBACK ACTIVITIES – 2 parts

PART 1: In your personal opinion, are the arguments (CMOCs) below a true representation of what can sometimes occur in the neonatal workplace?

Please read and complete the table below:

Arguments i.e. Context(C), Mechanism(M), Outcome(O) Configurations (CMOCs)	In your opinion, is this CMOC a true representation of what can sometimes occur in the neonatal workplace? – please add comments/suggestions in this column
U24: When clinical teaching and learning on the unit is prioritised and structured (C), inclusion, encouragement, appreciation will be strengthened in the unit, and consistency in patient care will be supported (O) because common understanding within the team will be promoted, and authority ascribed to the training (M).	
U25: When administrative aspects of student and new staff experience are well managed, e.g. inductions, number of candidates, assessment processes, clear mentor, opportunities for attending CMEs, etc. (C) learning experience and a trusting learning environment will be enhanced (O) because expectations, support and authority are made clear from the outset (M).	
U26: When administrative aspects of student/ new staff experience are poorly structured or poorly implemented (C) the learning environment will be chaotic, with discord, frustration and inappropriate reliance on individual student initiative (O) because of lack of oversight and clarity of expectations and understanding (M).	
U27: When students/ new staff are allocated to a specific member of staff for supervision (C), learning, trust and sense of belonging are enhanced (O) because of consistency and reliability (M).	
U28: When students/ new staff have inadequate clinical supervision (C) inadequate learning and adverse patient care can occur (O) because students may practice beyond their competencies (e.g. when they are unaware of errors made – ‘unknown unknowns’) (M)	
U29: When there is an assigned Clinical Instructor and/or Clinical Mentor (C) students will experience enhanced learning (O) because there is clear structure to the placement and a point of support (M).	
U30: When learning is self-directed and relies on a student’s personal initiative (C) there will be a wide spectrum in student learning outcomes during clinical placements (O) due to differences in personal learning approaches and motivations (M).	

PART 2: Do you have any ideas or suggestions of action that could be taken, by focusing on some of these areas?

Please write your ideas and suggestions on the available sticky notes and share/stick them as advised.



EQUIPPING How physical order within the unit influences the relational structure of the workforce

Summary narrative:

The environment of the unit itself can facilitate or hinder social processes. For example, when the physical environment is organised in an intentional and enabling way, 'the right way' becomes 'the easy way'. However, when the physical environment is chaotic, this leads to wasted time, frustration, incivility and workarounds by staff, impacting on work activities and delivery of care. Likewise, physical overcrowding on the unit can trigger overwhelm of staff, and reliance on shortcuts. When patient records are stored on the unit in an orderly manner, and their use is routinely integrated into day-to-day clinical practice by staff, the quality and use of documentation improves. In addition, the provision of a rest space for staff enhances wellbeing, and gives an opportunity to step away from their physically and emotionally demanding work, support one another, eat and refresh. Since the environment of a unit shapes the workarounds developed and used by staff and learned by students, when staff and students transfer to new unit, they will require support (e.g. orientation) to adapt to its unique set of

"When you come to workstation ensure your work environment is well equipped, arranged... so in case you have an issue you know where to get whatever you need." Nurse

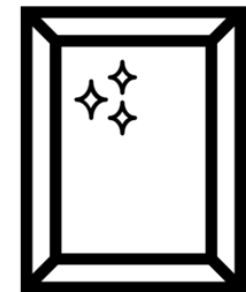
"We've got 'speaking walls'. I....yeah. Those are the charts, the guidelines like standard management of neonatal pneumonia, neonatal sepsis... charts on Apgar score, charts on fluid management...yeah. Kangaroo care." Nurse

"Yeah, you can ask the primary nurse but when you go through the file, you can find that it is the paper that was written that is missing...If it was, if it was, if it was history, you just come and take it from the mother." Student nurse

"The afternoon, they're not productive, in the morning, they've worked well and they've worked smart. But since they've just continued working, they didn't have even lunch break. Because sometimes there's only one person in a nursery, she can't go for, for lunch. Who will take care of the nursery. Sometimes she's, there's a busy nursery. So you get such a person who works from morning to evening and you get it become so difficult in the evening. That person is worn out." Nurse

Reflective questions for application of EQUIPPING GELLE Domain in the workplace:

6. Does the physical environment make 'the right way the easy way' by the orderly positioning of items and equipment?
7. Is written reference information positioned strategically on the unit to assist people in their work?
8. Is level of staffing and the available space sufficient?
9. Do physical aides (e.g. phones, tables) on the unit facilitate communication?
10. Are written records kept in an orderly manner and integrated into routine care?
11. Do staff have access to a protected rest space, and the means for rest and recovery?
12. Are new staff supported to adapt best practice norms within the unit?



FEEDBACK ACTIVITIES – 2 parts

PART 1: In your personal opinion, are the arguments (CMOCs) below a true representation of what can sometimes occur in the neonatal workplace?

Please read and complete the table below:

Arguments i.e. Context(C), Mechanism(M), Outcome(O) Configurations (CMOCs)	In your opinion, is this CMOC a true representation of what can sometimes occur in the neonatal workplace? – please add comments/suggestions in this column
U31: When the physical environment is organised in an intentionally facilitative manner (C) desirable actions and practices will be implemented (O) because ‘the right way becomes the easy way’ (M).	
U32: When the physical environment is disordered and chaotic (C) there will be incivility and workarounds (O) because time will be wasted and staff will become frustrated (M).	
U33: When there is a high patient: staff ratio or overcrowding (C) there will be shortcuts, neglect of specific activities, and negative impacts on patient care and staff/student wellbeing (O) because staff will be overwhelmed, and will lack space/time to effectively carry out their roles (M).	
U34: When patient records are kept in an orderly manner and/or are integrated into communication exchanges between staff (C) the quality and use of written records will improve and be maintained (O) because value and purpose of documentation will be enhanced (M).	
U35: When patient records are not stored in an orderly manner and/or their quality is poor (C) there will be workarounds, poor patient care, dissatisfaction, blaming, and further worsening of the quality of documentation (O) because of frustration and wasted time from delayed file retrieval, missing components of (or entire) files, and distrust (M).	
U36: When staff are provided with a rest space with adequate facilities (e.g. fridge, lockers) (C) there will be improved staff satisfaction, and more relaxed communication with colleagues (O) because they will feel valued by the hospital, and will be able to step away from the busy clinical environment (M)	
U37: When staff are tired, hungry, and/or not provided with adequate rest facilities (C) they will not feel valued and will display incivility (O) because they will feel exhausted and will be required to adopt unsatisfactory workarounds (e.g. changing in corridor) (M).	
U38: When a member of staff transfers to a new unit and is not made aware of the unit-specific norms (C) they are likely to practice different norms to those practiced by unit staff, which may clash (O) because norms of individuals evolve to fit different workplace environment (i.e. availability of resources, size of unit, and numbers of patients etc.) (M).	

PART 2: Do you have any ideas or suggestions of action that could be taken, by focusing on some of these areas?

Please write your ideas and suggestions on the available sticky notes and share/stick them as advised.

Appendix 2.4.1. OSF registration of scoping review

Blacklock C, Edgcombe H, Conrad Wanyama, Juliet Jepkosgei, Lisa Hinton, Jacob McKnight, Elinor Harriss, Molyneux S, Wong G, and Mike English Protocol: Identifying and mapping candidate interventions targeting relational contexts of hospitals - A review of the literature. OSF Registries. Available: <https://doi.org/10.17605/OSF.IO/GX47W> (Accessed 20.9.24)

Protocol: Identifying and mapping candidate interventions targeting relational contexts of hospitals - A review of the literature

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Abstract

Objective: To identify and map candidate interventions for improving the relational environment in hospitals, targeting aspects of context identified in realist programme theory. The findings will inform recommendations co-developed with stakeholders in Kenya.

Introduction: The relational environment, or how health workers communicate and interact with one another, profoundly influences behavioural norms and is fundamental to the delivery of quality patient care in hospitals. However, it has been relatively neglected in interventions aiming to improve quality of patient care. We previously reported a realist synthesis of staff social ties in hospitals, and are currently refining the programme theory using realist evaluation. To inform upcoming stakeholder co-development activities, we now seek to identify and map candidate interventions which could target important aspects of context identified as influencing relational environment.

Inclusion criteria: Relevant documents from credible sources in both the academic and grey literature. Interventions must primarily focus on the relational environment of hospitals and be relevant to our realist programme theory. Documents with richest and most relevant data will be prioritised for inclusion.

Methods: Ovid Embase, Ovid Medline, and EBSCOhost CINAHL will be searched with no limits for language or publication dates. Reference lists of included documents will be

screened. Grey literature will be purposively searched. Screening will be conducted by a single author, with a second screening a sample of retrieved documents to check for systematic error. Data will be extracted using NVivo and analysed thematically in NVivo and Word. Identified relevant interventions will be mapped and described by emergent typology.

Introduction

The relational environment of healthcare, and its influence on health worker communication and behavioural norms, are fundamental determinants of quality of patient care and wellbeing of staff working in hospitals.(1,2) By 'relational environment', we refer to the specific verbal and non-verbal ways in which health workers communicate with one another in the hospital workplace, and the subsequent structures of social ties and networks that are formed with others. For example, it has been observed that health workers who display similar personal or professional characteristics, such as junior doctors, tend to preferentially communicate with one another. This can lead to the formation of cliques and influence information-seeking and information-sharing behaviours in hospitals.(2,3)

The relationships (i.e. social ties) and the resulting social networks that are formed between health workers have tended to be relatively neglected as targets for interventions to improve quality of patient care in the academic literature.(4,5) Interventions that neglect the relational environment of hospitals limit the potential for behavioural change to occur and, crucially, be sustained, given the profound importance of communication, power and influence.(6–8)

We have previously argued that a greater conceptual understanding of the social ties that exist between healthcare workers is needed to inform interventions aiming to improve quality of patient care.(2) We conducted a realist synthesis seeking to better understand the relational environment in hospitals and its influence on quality of service delivery. We asked: how, why, for whom, to what extent and in what context the social ties of staff within a hospital influence quality of service delivery, including quality improvement? A summary of the programme theory is shown in Box 1 (2):

Box 1: Programme Theory – reproduced from (2)

Hospital staff prefer to communicate with colleagues who are similar to themselves, and with whom they share trust. However, this can create boundaries, silos and redundant information within pockets of the workforce, and different behavioural norms adopted by members of different groups, dominated by influential individuals. Tacit hierarchical rules also determine communication with others in the workplace based on status, forming a landscape of differential access to information and others. Fragmentation between different status groups can occur, and space for status-enhancing behaviours is created. Workplace silos and status boundaries can be bridged in the presence of trust, confidence and mutual understanding, or where need is urgent and immediate. The organisation can actively comply with or challenge social boundaries within the workforce by the formal processes endorsed, which allow day-to-day performances of relative power, based on identity and hierarchical status. Attempts to manage the discourse, and the effectiveness of formal workplace communication processes, act to construct or disassemble social boundaries in hospitals. Connections between staff influence access to information and other forms of capital, behavioural norms and perceived agency. Ties are continuously shaped and as such are amenable to intervention. The capacity of

these connections and the overall structure of the workplace social network are vital to delivering quality patient care.

Aspects of context found to be relevant to the relational environment in hospitals from 35 context-mechanism-outcome configurations derived from the literature,(2) as well as those that are subsequently being developed through further refining of the programme theory using realist evaluation, may potentially be targeted to effect change. We hypothesise that manipulation of the elements we have identified as 'contexts', through targeted interventions, will trigger alternative 'mechanisms' and lead to a change in relational outcomes.(9–11) To test, refine and expand the initial programme theory developed from the literature for use in the complex setting of neonatal care delivery in Kenya, a realist evaluation is ongoing, drawing on mixed-methods data (protocol submitted - bmjopen-2022-066150).

In preparation for an upcoming event with practitioners and policy makers in Kenya to co-develop recommendations for improving the quality of newborn care through improving the relational environment in hospitals, we now seek to identify and map relevant candidate interventions from the literature. We will use the results of this literature review to co-develop possible and feasible recommendations, informed by the findings of the realist evaluation. Deeper conceptual understanding of the relational environment will be linked to targeted candidate interventions that offer promise in influencing the relational determinants of workforce behavioural change identified in the realist programme theory. Indeed, the previously developed CMOCs (2) and current realist evaluation identify relevant aspects of context which could be manipulated to change the relational environment. The proposed review will complement/inform this process by examining the literature to see what kind of interventions have been described which could relate to those contextual aspects. An overview of this literature will assist the development of specific recommendations for neonatal care in Kenya with expert stakeholders.

We are interested in identifying and mapping interventions which primarily target the relational environment of healthcare – i.e. not those primarily seeking to improve a specific aspect/area of clinical care. This is a distinguishing feature of this review, in comparison with reviews that have focused on interventions which are implemented within the existing relational environment, or that have not primarily focused on aspects of relational environment – for example audit and feedback.

Identifying and mapping relevant candidate interventions will assist policy makers and practitioners when considering novel options to manipulate aspects of their own context which influence the relational environment.

A blended approach to reviewing the literature will be taken. Rapid scoping review methods will be drawn upon (for example, a broad search of the literature to identify and map relevant data),(12) whilst some processes drawn from a realist approach to evidence synthesis will be used in the selection of documents (for example, looking for relevance and rigour, prioritising richest data, and aiming for understanding rather than inclusion of all).(13) The objective of this literature review is to identify and map credible candidate interventions for improving the relational environment in hospitals, which target aspects of context identified as relevant from realist programme theory.

Review question

What kinds of interventions might reasonably influence the relational environment (i.e. communication between health workers) in hospitals?

Keywords

Communication; Health worker; Hospital; Intervention; Social network

Eligibility criteria

See Table 1 below:

Table 1: Inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
• Credible source (see criteria below) • Hospital setting • The intervention primarily targets the relational environment of healthcare - i.e. not an intervention to improve a specific aspect/area of clinical care, for example. Relevant to realist programme theory • Adds new knowledge to existing identified documents	• Not credible source • Not hospital setting • The intervention does not primarily target the relational environment of healthcare • Not relevant to realist programme theory • No new knowledge added (theoretical saturation during thematic analysis)

Types of Sources

We seek to identify credible (see criteria below) candidate interventions from both the academic and grey literature that target aspects of context identified in existing and ongoing realist work as being relevant to the relational environment of the hospital workplace. We use 'context' to refer to a specific feature of a setting identified as having an influence on causal 'mechanisms' within a context-mechanism-outcome configuration.(9-11)

Parallel to the academic literature exists a growing knowledge-in-practice grey literature, with papers and reports by professional groups, organisations and commissioned experts. Such documents include case studies and recommendations, often placing relational aspects of healthcare delivery at the centre for workforce change and quality improvement.(12) As such, the grey literature differs from and complements the academic literature, offering valuable insights from clinical practice or 'ground-level' as to how the relational environment might be supported and improved in healthcare settings.

Since we intend to identify and map a broad range of candidate interventions rather than elicit and compare effectiveness, we will judge the relevance of interventions based on existing(2) and emerging realist programme theory from ongoing realist evaluation. In our search for relevant interventions, we will not only include examples of implementation (all

study designs will be included, including case study reports), but also recommendations for novel interventions if these are: 1) sufficiently detailed for practical application, and 2) credible (see criteria below).

Interventions will be deemed credible if they fulfil one of the following criteria:

- Published in peer reviewed academic journal
- Published as a case study in a formal document
- Published as recommendations for practice, by a recognised professional organisation, within an official commissioned report, or by government

Methods

We will take a blended approach to reviewing the literature, drawing on aspects of rapid scoping review methodology,⁽¹³⁾ whilst some processes will be drawn from a realist approach to evidence synthesis in the selection of documents (for example, looking for relevance and rigour, prioritising richest data, and aiming for understanding rather than inclusion of all).⁽¹⁴⁾ We will seek to identify relevant and rich data, seeking theoretical saturation of themed intervention approaches rather than comprehensiveness.

Search strategy

To map relevant interventions, whilst managing a vast academic literature base, we will use three 'tracer' (i.e. representative but not exhaustive) search concepts: "organisational culture", "quality improvement" and "hospitals". Mesh terms will be used for these where available. Ovid Embase, Ovid Medline, and EBSCOhost CINAHL will be searched by an information specialist (EH) with no limits for language or publication dates. The search strategies will use text words and relevant indexing to literature specifically about the impact of organisational (or corporate) culture on quality improvement in hospitals. The reference lists of included papers will be assessed for additional relevant studies, following the JBI Evidence Implementation guidance about the conduct of systematic scoping reviews.⁽¹³⁾ We will also include relevant literature known to us and expert colleagues.

Searches will be conducted of UK professional websites using the terms "culture" or "quality improvement" or "quality". Given the potential size and scope of the available grey literature, UK NHS, professional and government websites will be chosen as an initial purposive sample, as the professional and quality improvement landscape of the UK health sector is rich and relatively familiar to the authors. In addition, particularly rich and relevant grey literature from outside the UK will also be included when identified from authors personal libraries, snowballing searches or from discussion with experts. Relevant documents will be purposively sought from Kenya and the World Health Organisation, as these are particularly relevant to the planned co-design activity in Nairobi.

Study/Source of Evidence selection

All references will be exported to Endnote X9 (Thomson Reuters, New York, NY), and deduplicated manually using EndNote X9 functionality.

Screening will be undertaken by the first author using the inclusion and exclusion criteria in Table 1, with the second author screening a sample (20%) of documents retrieved from the

database search, to check for systematic errors. Reasons for exclusion will be noted during screening. Any disagreements between authors will be discussed between the two reviewing authors, or with the wider team should disagreement persist.

The results of the search and review process will be reported in the final manuscript, and a PRISMA diagram presented.

Data Extraction

Relevant full-text documents will be imported into NVivo. Data relevant to interventions (or recommendations for interventions) targeting the relational environment will be extracted from included documents by the first author. Characteristics of included documents will be extracted and tabulated by the first author in MS Word. The second author will check a sample of the data extraction, to look for systematic error.

Data Analysis and Presentation

Deductive coding will initially be used to organise extracted data in NVivo, using a set of themes derived from the social support literature,⁽¹⁵⁾ which is of relevance to the functions of social ties in the hospital workplace. This initial deductive coding will be followed by inductive coding within each of the four initial deductive themes. Intervention strategies will be grouped by inductive theme, and relevant details specific to the intervention group (including aspects relevant to implementation, such as resources needed, etc.) will be extracted to create a set of detailed intervention typologies. The second author will read a selection of included full texts to familiarise with the data and will sense-check the emerging typologies.

Intervention themes and typologies will be linked to the realist programme theory during the analysis process, by considering specific aspects of context that intervention typologies might be reasonably expected to manipulate. Typologies will be revised and refined throughout the analysis and interpretation process.

Results will be presented as an organised map of identified interventions, described as detailed thematic typologies. Typologies will also be linked to contextual targets drawn from our existing realist programme theory.

Mapping of intervention typologies will help to inform and organise thinking around how candidate interventions might be hypothesised to target contexts relevant to the relational environment of hospitals. For example, an intervention typology around knowing the names of colleagues might reasonably be expected to enhance 'careful' behaviour in the workplace,^(2,16) and to trigger trust, causing colleagues to feel more comfortable approaching them.

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Conflicts of interest

None declared

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Appendices

Appendix I: Search strategy

Database: Embase 1974 to present

#	Query
1	<i>exp hospital/</i>
2	<i>(hospital or hospitals).ti,ab.</i>
3	<i>1 or 2</i>
4	<i>total quality management/</i>
5	<i>"quality improvement".ti,ab.</i>
6	<i>4 or 5</i>
7	<i>exp organizational culture/</i>
8	<i>((organisation* or organization* or corporate*) adj2 culture*).ti,ab.</i>
9	<i>7 or 8</i>
10	<i>3 and 6 and 9</i>

Appendix 3.1.1 Context-mechanism-outcome configurations with illustrative quotes from the literature

Context-mechanism–outcome configuration (CMOC)		Illustrative quotes
DOMAIN 1: Social Groups Close social ties formed with others, based on identity and personal view of the world (representation), in relation to the individual.		
CMOC1	When health care workers share a common identity (C), they will be more likely to trust one another (O), as they share an underlying representation (M).	<i>“Social tribes, like professional tribes, are split along professional lines. People are closer to and interact more readily with those with whom they identify, trained with, or share practices with, and to whom they are ideologically and attitudinally closer”¹</i>
CMOC2a	When health care workers share a representation (C), they will preferentially communicate with one another (M) leading to insular communication (O).	<i>“Our first result is that homophily matters in the formation of connections within health care organizations. People expect, a priori, that self-similar colleagues are more likely to accept them, be trustworthy, and hold similar beliefs, thereby mitigating the potential conflicts, misunderstandings, and monitoring costs that come with making connections”²</i>
CMOC2b	When health care workers share a representation (C), outsiders are easily identified (M), leading to communication boundaries (O).	<i>“Categories of professionals are typically separated from each other by social and cognitive boundaries, which may be an impediment to the creation of trustworthy relationships.”²</i>
CMOC3	When a health care worker has an existing reciprocal relationship with a peer (C), they will preferentially seek advice or support from that person (O), because they trust the person (M1) and feel comfortable (M2).	<i>“Consistent across hospitals were significant positive effects for reciprocal relationships, indicating that there are pairs of professionals that tend to consult each other (mutual).”³</i>
CMOC4	When health care workers share a representation (C), this can lead to redundant information (O1), group-think (O2) and echo (O3), due to insular communication (M).	<i>“Physicians who were highly constrained in their interpersonal networks were less likely to self-report adopting EBM. This finding is consistent with the theory of structural holes (Burt, 1992). ...One important risk is that subjects may start to trust their group judgment more than information from the surrounding scientific world.”⁴</i>
CMOC5a	When a health care worker is central within a social group (C), their personal behaviours will embody group norms (O) because they will hold tightly to group identity as own (M).	<i>“..there is a significant negative association between the physicians’ propensity to use EBM [evidence-based medicine] and the coreness they exhibit in their organization...the core is formed by physicians having a significantly lower propensity towards EBM than their peers located in the peripheral part of the network.”⁵</i>
CMOC5b	When a health care worker is peripheral within a social group (C), they may deviate in behaviour from group norms (O1), and oppose/conflict with central members of the group (O2) because they may not wholly identify with the group representation (M).	<i>“... less-central individuals are likely exposed to fewer negative comments about the system. Thus, less-central individuals are more likely to adopt and use the new system.”⁶</i>

Context-mechanism–outcome configuration (CMOC)		Illustrative quotes
CMOC6a	When a health care worker is central within a social group (C), they will have greater power over group norms (O), because they have greater influence over group narratives and representation (M).	<i>"Findings suggest that the more centrally located a manager is in a social cluster, the more likely that manager is to integrate new ideas into new organizational capabilities."</i> ⁷
CMOC6b	When a health care worker is peripheral within a social group (C), they will have little power over group norms (O), because they have little influence over group narratives and representation (M).	<i>"...structure of this model underlies a group tightly connected physicians who interact strongly in order to exchange relevant knowledge, and a large number of less cohesive clinicians who are more likely to be connected amongst themselves than to members of the core part of the network. This result might be interpreted as a marginalization of physicians who are more prone to use EBM in their clinical practice."</i> ⁵
CMOC6c	When a health care worker is central within a social group (C1) and has power over material resources (C2), they will have additional power over group norms (O) because they own the distribution of material resources and decision-making authority (M).	<i>"Nurse coordinators in operating rooms often exercised a dominating, hierarchical form of power in relation to surgeons as they approved or denied access to space, time and resources for surgical operations, based on the urgency of individual cases"</i> ⁸ <i>"In the present case, high centrality occurred with department heads, such as the high connection density in Figure 2. In general, those with high work network centrality were those experienced nurses who not only controlled physical resources but were also in command of decision-making powers."</i> ⁹
CMOC7a	Where a health care worker requires diverse information to undertake their role effectively, e.g. senior nurse, junior doctor (C), they will become more central in the workplace information-sharing network (O), because they must frequently seek information from others (M1) and others frequently seek information from them (M).	<i>"Centrality was not linked to gender, age and seniority in psychiatry, but was associated with job and activity."</i> ¹⁰
CMOC7b	When a health care worker is peripheral in the workplace information-sharing network (C), they risk isolation (O), because they are not actively engaged in information-seeking (M1) or information-sharing (M2) with colleagues.	<i>"The communication network for Unit 5 has seven isolates. In addition, two of the more influential RNs (high Eigenvector Centrality) are not communicating with staff not on their shift, and there are a number of "pendants" (people with single links). The pendants are usually PCTs"</i> ¹¹
CMOC7c	When a health care worker needs legitimate/defensible information (C), they will speak to someone who embodies desirable group norms (O), because the information received will comply with social expectations (M).	<i>"For example, core RNs [registered nurses] can serve an important function in the communication of norms and process variations to noncore members such as anesthesia residents or other nursing staff members"</i> ¹²
DOMAIN 2: Hierarchy Social ties or barriers formed based on hierarchical status of the individual.		

Context-mechanism–outcome configuration (CMOC)		Illustrative quotes
CMOC8a:	When an individual is senior in the hierarchy (C1), or is a custodian of hierarchical status (C2), they have permission to approach both high and low status colleagues (O1) because of understanding of the 'social rules of operation' (M).	<i>"In particular, junior doctors collaborate with senior nurses who may then distribute information through clear lines of authority within the nursing profession."</i>¹³ <i>"Thus it is by virtue of the hierarchical position in nurses' networks provided by their organizational rank that nurse managers are allowed to actively control knowledge transfer between other nurses and the doctors."</i>¹³ <i>"Junior doctors tend to borrow social capital from senior doctors"</i>¹³
CMOC8b:	When an individual is lower in the chain-of-command/hierarchy (C), they lack permission to approach some colleagues directly so accesses new/external information through the established chain of command (O1), or through a broker (O2), because of understanding of the 'social rules of operation' (M).	<i>"...in poor-coding facilities, the quality administrator functioned as a department manager, lacking formal authority at the organizational level. She said, "my role on the core measures is to provide data to the chief of medicine. I do not have a say in instituting changes related to practice and documentation". "</i> ¹⁴
CMOC9a	Where hierarchical control is paramount to the functioning of a social group (C) members will be more likely to accept and follow orders from a senior (O) due to concentration of authority (M). - a	<i>"In a centralised system, communication tends to flow vertically, between layers of the organisational hierarchy. That nurses' networks are more centralised tends to support the commonly held belief that hierarchical relations are more typical of this profession than medicine where the autonomy and independence of individual practitioners is emphasised."</i> ¹⁵
CMOC9b	Where hierarchical control is not paramount to the functioning of a social group (C) members will need to be convinced to change behaviour (O) due to flattened structure and distributed authority (M). - b	<i>"Cascading information from the top down may work for the nursing profession, especially if your first point of contact is a director of nursing. They have access to information and their networks are far-reaching. Certain behaviours which are acceptable in a hierarchy, such as orders, would not be acceptable in the more egalitarian structure of medical communities."</i> ¹⁵
CMOC10a	Where parallel hierarchies are operating within the same workplace (C), permission to approach colleagues outside one's own hierarchy structure will vary (O), according to the specific authoritative power over the individual and their understanding of the 'social rules of operation' between hierarchies (M).	<i>"Interprofessional team members recognized in the register nurse a leadership that facilitated their relationship with the physician. One physical therapist expressed "they know everything that happens, they do not have problem in speaking strong, in approaching a physician. Many other people panic about talking to a physician". "</i> ¹⁶
CMOC10b	Where doctors have historically taken the role of leader in health care teams (C), they will assume a position of authority (O), because of their understanding of the 'social rules of operation' (M).	<i>"In the NICU, physicians serve as team leaders with ultimate professional and legal responsibility for patients."</i>¹⁷ <i>"... with doctors at the top of the clinical hierarchy, others (e.g., paraprofessionals) act in ways to preserve the hierarchy and defer to doctors' judgments."</i>¹⁶

Context-mechanism–outcome configuration (CMOC)		Illustrative quotes
CMOC11a	When there is a hierarchical structure (C), there is a risk of fragmentation into sub-groups based on status (O), because individuals identify more closely with peers of the same status (M1) and trust them more (M2).	<i>“However, many of the junior doctors are located in close proximity to each other, peripherally, on the left of the network. Less experienced medical staff seem thus to rely on each other rather than ask more senior staff for help to solve work-related problems.”¹</i>
CMOC11b	When an individual is higher up in the chain-of-command/hierarchy (C), they will preferentially communicate with other higher status staff (O), because they feel higher status colleagues will better understand their scope of work (M1), and will hold more useful information (M2).	<i>“In conclusion, there is evidence of teamwork occurring within multidisciplinary long-term care teams, but the type of teamwork differs for different staff groups. The collaborative teamwork described in the literature is limited to the higher status professionals.”¹⁸</i>
CMOC11c	When an individual is lower in the chain-of-command/hierarchy (C), they will only expect specific types of support from colleagues of higher status (O), because of their understanding of the ‘social rules of operation’ (M1) and because they feel more comfortable with peers for usual support (M2).	<i>“Because they have clear definitions of what functions the different levels of managers should perform, communication between staff and managers can be enhanced by periodically surveying (formally or informally) staff about functional supports. Open, regular communication between staff and management will enhance satisfaction with manager performance.”¹⁹</i>
CMOC12a	When an individual is higher up in the chain-of-command/hierarchy (C), they will preferentially communicate with other higher status staff (O), because they will further enhance their own status/power by association (M).	<i>“The structures reinforce the status differentials inherent in the teams and perpetuate the control of decision-making and problem-solving by the higher status professionals by ensuring that decision-making remains the onus of the higher status professionals. This is echoed in the formal organization of the teams in that only the higher status nurses and core multidisciplinary professionals attend team rounds on a regular basis.”¹⁸</i>
CMOC12b	When an individual is higher up in the chain-of-command/hierarchy (C), they will have power over information (O) by controlling the information and resources disseminated to low status colleagues (M).	<i>“Gatekeeping was used by nurses to negotiate their social positioning in the health care hierarchy, both in relation to one another and with their medical colleagues. Nurse managers exercised control of information to reinforce their position in the nursing hierarchy (nurse managers have administrative responsibility for an operating room department and do not usually assume a clinical role).”⁸</i>
DOMAIN 3: Bridging distance The ways in which an individual can be encouraged to communicate with others with whom they do not have a close social tie.		
CMOC13	When a health care worker observes a non-peer colleague displaying they are being ‘careful’ (C), they will exchange required information with this colleague (O), because they feel trusting towards the colleague (M1) and feel comfortable approaching them (M2).	<i>“Relational influencers are typically influential because of their ‘people skills’ and relational and communication expertise.”²⁰</i>

Context-mechanism–outcome configuration (CMOC)		Illustrative quotes
CMOC14	When a health care worker has a longstanding or multiplex relationship with a non-peer colleague (C), they will approach that colleague as a 'go-to person' (O), because of mutual understanding (M1), and trust (M2).	<i>"...the dietitian and social worker are long-term members of the team, having worked with the unit for many years. While it makes sense that a dietitian and a social worker are critical team members, we can only uncover their centrality in discussions about patient care using SNA."</i> ²¹
CMOC15	When a health worker needs information urgently (C), they will select a colleague from those who are physically present (O), because they will receive an immediate response (M).	<i>"Collaboration and sharing knowledge and information are strongly influenced by physical context: the farther people are from each other, the less likely this interaction becomes (Cross & Parker, 2004). In this study, the two separate parts of the ward are clearly seen in the network structure: MCU and ICU."</i> ²²
CMOC16	When a health care worker can speak to a colleague face-to-face (C), information exchange will be enhanced (O), because they can better read and respond to verbal and non-verbal cues (M1) and is more confident that they will be understood (M2).	<i>"Supporting earlier findings, verbal communication was preferred by most participants and supports the importance of "common ground" between users for communication to be effective [82,85]. In person verbal communication includes the use of a common language and communication patterns such as body language that enhance the communication process."</i> ²³
CMOC17	Information can be exchanged between disconnected groups (O), when there is an individual who can act as a broker (C), because they communicate with members of both groups (M).	<i>"All of the blocks report getting and giving most of their information from either the higher status nurses (Block 1) or from other members of their own block. As such, the higher status nurses are the conduit through which information is passed between shifts and between the core multidisciplinary professionals (Block 5) and the nursing staff (Blocks 2-4). These higher status nurses are, therefore, the key linking or bridging persons between the blocks."</i>¹⁸ <i>"Directors of nursing then are the go-between for a number of people who would not otherwise be connected. There are good reasons for this in terms of their structural position in the formal organisation. As the average of their centrality scores indicate, nurses in this sample are in a position to mediate and control, not just passively receive, information. The nurses in our sample occupy central positions which means that they play a very important role in the diffusion of information and influence within the wider structure of their profession by sending, receiving and transferring signals from diverse groups."</i>¹⁵
DOMAIN 4: Discourse The totality of the different ways of seeing the world, both content but also how each relates to the other and is communicated, in terms of overall dominance and power.		
CMOC18a	The pattern of ongoing exchange and negotiation between social groups in the hospital workforce (C) creates and maintains (O1) or challenges (O2) the dominant discourse in a hospital, by demonstrating and exerting the relative power of different group representations within the hospital workforce (M).	<i>"The data in Table 2 suggest a "center-periphery" pattern similar to the pattern of interactions found among physicists (Cole & Cole, 1973), mathematicians (Crane, 1972), and biomedical researchers (Breiger, 1976). These studies indicate that groups of scientists and professionals are generally not organized in a hierarchical structure in which each person is directly accountable to a superior. Instead a group of influential individuals influences the direction of others' work and controls the distribution of resources while other professionals exchange information and resources with this central group directly or indirectly (Blissett, 1972). These results suggest such a pattern."</i> ²⁴

Context-mechanism–outcome configuration (CMOC)		Illustrative quotes
CMOC18b	For health care workers in an organisation, its rituals and norms (C) construct what an individual perceives is acceptable in the workplace (O), through the demonstration of social expectations and etiquettes (M).	<i>“... the network analysis of communication revealed that the average team briefings exhibited a hierarchical structure to communication, with the surgeon speaking the most frequently and dominating the conversation. On average, team members only communicated directly with the surgeon or resident and did not speak to each other during the briefing.”²⁵</i>
CMOC19a	When a health care worker has to do or say something at work (C), they keep to within a ‘bandwidth’ of actions they perceive to be ‘accepted’ or ‘permitted’ (O), based on their understanding of what the dominant discourse is within a hospital and their relative personal position based on identity and hierarchical status (M).	<i>““... The dialysis unit became the poster child for hand hygiene.” A sign on the door of an isolation room at one end of the dialysis unit is another indication of change. When 4 doctors tried to enter the isolation room without proper garb, a nurse blocked the door and refused to budge until they donned gowns and gloves. As they re-entered the unit, she reminded them to dispose of their gowns and gloves in the bin in the isolation room. Then she gave them hand sanitizer. The sign, suggested by staff, reads: “STOP. Do Not Enter. Please See Staff.” Staff prepared an infection control protocol to give to anyone entering the room.”²⁶</i>
CMOC19b	The perceived values of an organisation (C) facilitate the creation of status differentials within the workplace (O) because individuals benchmark their activities and identities against how much they embody these values (M).	<i>“... esteem is tied to work tasks. At top hospitals the focus is on removing doctors from the clinic so they can capitalize on their pedigree by publishing and speaking at conferences and grand rounds..... In the lower prestige hospitals the esteemed physicians sustain the local patient base”²⁷</i>
CMOC20a	Where formal communication processes in hospitals are dysfunctional/unreliable (C), make-shift processes of informal information exchange dependent on social connections result (O) because individuals have to compensate to acquire necessary information (M).	<i>“Consistent with earlier findings, the providers in this study used non-linear strategies, such as incorporating multiple methods of communication to multiple providers simultaneously, to transfer or assume care of the patient [79]. This process has been identified as “channel switching” – using multiple sources of information to supplement one another in an attempt to piece together and understand the complex history and the current and future needs of the patient [80].”²³</i> <i>“..we have identified a gap in the structures of medicine and nursing, where there are few informal ties. This means that information is unlikely to be spread between the two professions by informal routes. This makes formal arrangements for communication all the more important.”²⁸</i>
CMOC20b	When informal information exchange becomes the norm in a hospital (C), access to information by specific individuals and groups is inherently skewed (O), because it will depend on how socially connected the individual or group is (M).	<i>“Providers working in inpatient units reported that they were unhappy with their ability to communicate with providers on different shifts. For example, a nurse working the night shift in an inpatient unit stated, “One of my biggest frustrations is the inability to discuss with the primary physician team my concerns/observations/patient requests that do not warrant a call to the covering team.” This provider stated that in this situation she either had to ask the day nurse to convey her concerns or tape a note to the front of the chart with the hope the physician would read it”²³</i>

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Appendix 3.1.2: Supporting data extracted from documents included in realist synthesis

(Documents which contributed any amount of supporting data to a specific CMOC are marked '1' in the column denoting the relevant CMOC)

Document	1	2a	2b	3	4	5a	5b	6a	6b	6c	7a	7b	7c	8a	8b	9a	9b	10a	10b	11a	11a	11b	11c	12a	12b	13	14	15	16	17	18a	18b	19a	19b	20a	20b	
Anderson 1985	1	1		1	1	1	1	1	1	1			1																	1							
Anderson 1991	1	1	1	1	1	1		1		1				1						1			1					1		1							
Anderson 2011						1	1	1	1	1		1	1																	1							
Atalib 2017																												1				1	1			1	1
Bae 2017		1	1	1																		1	1														
Barrot 2013																																					
Benham Hutchins 2010			1								1			1	1													1	1	1	1	1	1	1	1	1	1
Boyer 2010	1	1	1	1	1						1			1				1	1												1	1		1	1		
Brewer 2018a						1		1		1	1		1												1				1	1	1						
Brewer 2018b				1		1		1		1	1		1												1		1			1							
Cerne 2004																																					
Chan 2017	1	1	1	1				1		1	1	1		1		1		1	1	1	1	1	1		1		1			1	1						
Cott 1997	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1		1		1		1	1					1	1	1	1	1	1		
Creswick 2009	1	1	1	1	1						1	1		1	1			1	1	1	1	1			1	1			1		1	1	1	1	1	1	1
Creswick 2010	1	1		1	1			1	1	1	1	1		1	1			1		1	1	1		1	1	1	1	1	1	1	1	1			1		
Creswick 2015		1	1						1		1	1			1														1								
Currie 2014																							1							1							
Dauvrin 2015						1	1	1	1	1			1	1											1	1						1	1				
Dauvrin 2017						1	1	1	1	1	1		1												1							1	1	1	1		
Di Vincenzo 2017	1	1		1	1	1		1	1	1	1		1		1		1	1		1		1				1	1	1		1	1	1	1	1	1	1	1
Effken 2013		1			1		1			1				1	1					1					1						1	1	1			1	
Espinoza 2018	1	1	1	1		1	1			1	1			1	1			1	1								1			1	1	1	1	1	1	1	1
Fong 2017								1		1	1		1					1							1	1			1	1	1						
Forsyth 2018						1	1	1	1	1	1	1	1	1	1			1	1	1					1					1		1	1	1	1		
Grace 2015	1			1							1							1	1	1		1			1	1	1				1	1	1	1	1	1	1
Heiligers 2008	1	1		1	1						1			1							1		1					1	1	1	1						
Heng 2005											1	1																			1						

Heng 2013		1								1	1																1	1		1	1					
Hurtado 2018				1																																
Iacopino 2018	1				1																						1									
Iyengar 2011	1			1	1	1	1	1	1	1	1		1													1	1		1	1	1	1	1			
Iyengar 2015	1					1	1	1	1	1			1	1			1									1					1	1	1	1		
Janmano 2018					1						1			1	1			1				1	1			1			1	1	1		1	1		
Jippes 2013						1	1	1	1	1	1	1	1																			1				
Jippes 2010	1	1																								1				1	1	1	1	1		
Landim 2010						1	1	1	1	1			1	1	1			1				1	1			1		1			1	1		1	1	
Lindberg 2013	1					1	1	1	1	1	1		1	1	1											1				1	1	1	1	1	1	
Llupia 2016	1			1										1	1										1		1					1	1			
Lurie2009																																				
MacPhee 2000	1	1		1										1	1					1			1	1		1			1	1	1	1	1	1		
MacPhee 2002	1	1	1	1										1	1	1				1			1	1		1		1			1	1	1	1		
Marques-Sanchez 2018	1	1		1											1	1	1	1	1			1					1			1	1	1	1	1		
Mascia 2011a	1	1	1	1	1				1								1						1							1	1	1	1	1	1	
Mascia 2011b	1	1	1	1	1	1	1	1	1	1			1	1			1	1	1			1	1		1		1			1	1	1	1	1	1	
Mascia 2013	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1			1			1		1				1	1	1	1	1	1	1	
Mascia 2015	1	1	1	1		1							1				1			1			1				1	1			1	1	1	1		
McCurdie 2018				1						1	1	1		1	1	1		1								1		1	1		1	1	1	1	1	
Meltzer 2010	1	1	1		1	1	1	1	1	1	1		1													1					1	1		1	1	
Menchick 2010						1	1	1	1	1	1	1	1														1					1	1	1	1	
Myers 2016				1																								1								
Pappas 2003	1	1		1	1				1		1	1																			1	1	1	1	1	
Pappas 2004									1		1															1		1			1	1				
Pappas 2007						1			1		1	1		1														1			1	1	1	1	1	
Patterson 2013	1	1		1					1		1	1		1				1								1				1			1		1	
Pinelli 2015											1	1		1					1			1				1				1	1	1	1	1	1	
Rangachari 2008						1			1		1	1	1	1	1	1		1			1				1	1	1			1	1	1	1	1	1	
Reed Elliot 2012									1		1	1	1					1								1					1	1	1	1	1	
Regts 2016							1			1	1		1	1													1					1		1	1	
Riley 2009					1				1	1	1	1			1	1			1							1		1			1	1	1	1	1	

[illegible]

Appendix 3.1.3: Examples of the analytic work undertaken on whiteboards during visualisation process of realist synthesis

Appendix 3.3.1: Documents included in scoping review, by document type and country

Intervention type	Description	Country	Date pub	Type of document
Diversity and inclusion, representation	Nurse leader on hospital board(MacLeod, 2010)	US	2010	Peer reviewed journal Discussion/ review piece
	Bridging role of healthcare worker from specific served community(Topp et al., 2022)	Australia	2022	Peer reviewed journal Qualitative study
	Monitoring: minority ethnic group representation at band 8c and above, executive and non-executive directors, and number of ethnic minority staff involved in disciplinary procedures. Changes to recruitment processes, diverse interview panels and training for staff participating in interview panels, wide discussions about equality and inclusion issues, including at staff inductions, strategy developed, mandatory training for white managers and for disciplinary panel members– North East London NHS Foundation Trust(M. West et al., 2020)	UK	2020	Think tank report with case studies
Flattening hierarchy	Crew Resource Management - Two-challenge rule – if disagree, politely state concerns twice, then seek superior if not satisfied(“Crew Resource Management yields good results,” 2007)	US	2007	Newsletter Report of small care study example
	Briefings, shared mental model, situational awareness, debriefings, communication techniques that allow all staff members to voice concerns in timely way. Implementation: project manager steering committee, train the trainers-style learning (with CPD credits and compensation for time out of working hours), reinforcement in meetings(McKoin et al., 2010)	US	2010	Small journal - assume peer reviewed... Case study
	TEAM-STEPPS/ CRM – briefings and huddles, cross-monitoring, use of standard formats and skills in communication. Involve everyone in training who is involved in care of patient.(Deering et al., 2011)	US	2011	Peer review journal Review
	NetworkZ in-situ simulation training for OT teams in usual OT – 2 simulations and debriefs, training in closed-loop communication, speaking up, and structured recap.(Jowsey et al., 2019)	New Zealand	2019	Peer reviewed journal Qualitative study
	“Call me Bob” – intended to flatten hierarchy and improve speaking out for safety. First name basis between staff, dropped doctor title (retained for patient and family interactions) New badge issue to doctors with familiar name prominent. Personally-delivered and email circulated. Hospital president met with influential resistors. Support gained from leadership and senior physicians first.(Connors, 2020)	US	2020	Peer-reviewed journal Case study

	Time out procedure -a brief pause in theatre before first incision is made to check patient ID, op site and side, and procedure to be performed. Verbal and by inspection. Checklists have increased the number of things to check in time out. This study found that time-out was usually incomplete - either incomplete team, started after first incision, partial completion(Braaf et al., 2013)	Australia	2013	Peer-reviewed journal paper Institutional ethnography
	Multidisciplinary training – Maudsley simulation -appreciation for one another's roles, fostering of collaboration(M. West et al., 2020)	UK	2020	Think tank report with case studies
	Explaining Michigan - Checklist as tool to aid speaking up, Nurses monitoring of doctors' adherence to checklist – flattening of hierarchy by these assigned roles(Dixon-Woods et al., 2011)	US	2011	Peer-reviewed journal Theory-orientated evaluation
Shared governance	Shared governance, involvement of nurses in communication and decision making in hospital, opportunities to shadow those in leadership(Johnston & Villa, 2018)	US	2018	Peer reviewed journal Discussion piece
	Management Made Easy (MME) - daily problem solving by frontline workers -regular check-in meetings, rounding, huddles.(Chattergoon et al., 2014)	Canada	2014	Peer reviewed journal Case study
	House Staff Quality Council set up to communicate with both hospital administration and the entire house staff on issues of quality improvement and to initiate change projects to address preventable medical errors and system change. House staff Quality Council also included front line staff or managers from other healthcare professions. Aligned with division of quality and patient safety(Fleischut et al., 2011, 2012)	US	2011	Peer-reviewed journal Case study
	High Commitment Management very successful in turning around a hospital in Ghana. Key elements of High Commitment Management: 1) bundles of management practices are more effective than singular practices, 2) Key practices include: selective staffing, self-managed team, decentralised decision making, attention for training and job flexibility, open communication and performance-contingent remuneration, participative decision making, efforts to reduce status differentials, 3) effective bundles are balanced - good internal coherence, synergistic, external coherence, good fit between practices and type of staff, organisational mission/task and type of organisation, combine tight rules and procedures with loose, autonomy facilitating practices.(Marchal et al., 2010)	Ghana	2010	Peer reviewed journal Realist evaluation
	Shared Decision-Making Unit Councils. Set up by nurses to improve participation in decision making. Has also been adopted by multidisciplinary teams. Team conducted a survey of current practice of unit councils and then developed guidelines. Chair and co-chair were not the unit manager but reported to the unit manager. Decisions were reached by consensus(Murray et al., 2016)	US	2016	Peer reviewed journal Case study
	Unit-Based Safety Teams, which involve front-line staff as well as unit managers and are conducted on unit. Engagement and ownership. Also, patient safety rounds, which also involve parents of babies on the unit. Support from paediatric core safety team.(Alton et al., 2006)	US	2006	Peer reviewed journal Case study
	Shared Governance at Nottingham University Hospitals NHS Trust – elected councils of frontline	UK	2020	Think tank report

	midwifery and nursing staff throughout organisation – unit-practice councils, speciality councils, and themed councils. Self-governing. Training, tools and coaching from shared governance facilitators. Monthly leadership council meetings for chairs of councils, chaired by chief nurse.(M. West et al., 2020)			with case studies
Leadership	WalkRounds - a way of connecting senior leadership to patient safety and to inculcate safety ideas into healthcare system. Information - analysis - action - feedback. Objectives of WalkRound project: 1) increase awareness of safety issues by all clinicians, 2) make safety a high priority for senior leadership, 3) educate staff about patient safety concepts such as non-punitive reporting, 4) obtain and act on information elicited from staff about safety problems and issues.(Frankel et al., 2003)	US	2003	Peer reviewed journal Case study
	WalkRounds guide - 7 steps: Preparation, Scheduling, Conducting, Tracking, Reporting, Feedback, Measurement. Conducted weekly. Training provided.(Frankel et al., 2008)	US	2008	Peer reviewed journal Prospective study
	Local adaptations common, but can either be bad (used as spot check assessments) or very good (foster a sense of trust and hear true feedback). Take care not to risk replacing the main objectives of WalkRounds (specific, actionable knowledge about safety issues, and a more positive safety culture and relationship between ward and board) with a form of surveillance which could alienate frontline staff and produce fallible insights. Must ensure that local adaptations align with rather than conflict with the intervention's model of change. WalkRounds should follow script in toolkit, information should be confidential, systems rather than individual focused.(G. Martin et al., 2014)	UK	2014	Peer reviewed journal Qualitative study
	Counter-productive issues with implementation of WalkRounds - 1) nominal respect for front-line concerns, 2) executive presence without engagement, 3) controlling the conversation(Rotteau et al., 2014)	Canada	2014	Peer reviewed journal Qualitative study
	Revamped hospital nurse council to improve engagement. Project-based. Participation by senior leadership, training for nurse council members in QI skills, mentoring of new members, agenda and structured meetings with improved dialogue.(Gokenbach, 2007)	US	2007	Case report
	Nursing philosophy of the organisation revisited/written after lots of discussion and interviews with staff...."We, the nurses of UCDMC..." Implementation of the nursing philosophy meant breaking down barriers, sharing information, encouraging participation in decision making and expecting and rewarding high performance. (Also talks about importance of avoiding mandatory overtime, adequate pool of nurses. Policies and annual training sessions about violence in the workplace)(Robinson, 2001)	US	2001	Case report
	Mission statement - Leadership retreat with feedback and stories from staff, patients and community members re: culturally appropriate services. Cultural awareness taskforce then set up to create a strategic plan. Conducted environmental and organisational assessment. Created strategic vision, strategic plan, and implementation team, with implementation of sub-projects (e.g. recruit and retain diverse employees, language services, cultural material repository, etc.)(Gertner et al., 2010)	US	2010	Case report

	Video of patient hospital experience was played to leadership team ('patient voice'). weekly operations huddle of all senior and programme leaders within the organisation to discuss progress and remove barriers.(Chattergoon et al., 2014)	Canada	2014	Case report
	Multifaceted leadership development programme for mid-level managers, adapting the following two courses: 1) Introduction to complex health systems, 2) communication skills and emotional competence course(Jacinta Nzinga et al., 2021)	Kenya	2021	Evaluation
	Explaining Michigan - Using credible trusted leaders to communicate evidence to staff, Modelling of desired behaviours by senior staff(Dixon-Woods et al., 2011)	US	2011	Ex-post theory of intervention project
Supporting revalidation	Improving appraisal and revalidation: align external revalidation by embedding in everyday hospital practice, appraisal, and line management, revalidation workshops, evidence pack, forms, templates, completed examples, standard certificate of learning for all trust CPD events, with electronic record of practice hours and CPD hours on staff portals – Central Manchester University Hospitals NHS Foundation Trust(M. West et al., 2020)	UK	2020	Think tank report with case studies
Discipline	Implementing Code of Professionalism. Agreed code of professionalism disseminated to all staff and all given a copy and asked to sign. Reporting system (phone and online) that did not require name. Committee on Professionalism then held meetings with the relevant people following a referral. Importance of the committee and how they handled the reports. Triage and then investigation etc.(Capitulo, 2009)	US	2009	Case report
	A civility educational programme for unit leaders in two hospitals, run by a group of Clinical Nurse Specialists(Garcia et al., 2021)	US	2021	Case report
	Incivility educational programme and cognitive rehearsal training for nurses(Razzi & Bianchi, 2019)	US	2019	Case report
	Diagnostic interviews conducted with staff about digressive behaviour - identified fear and futility, 'the untouchables'. Intervention (Safe at Hopkins): 1) sharing interview findings (widespread public sharing across multiple fora of uncomfortable findings - this alone signalled openness and people came forward), 2) coordinating and formalising mechanisms for identifying and dealing with disruptive behaviour (clear definitions and procedures, to risk assessment team outside of usual formal hierarchy structures, had power to follow up), 3) training leaders in encouraging voice (encouraging staff to report and zero tolerance for retaliation), 4) building capacity for difficult conversations (training for leaders).(Dixon-Woods et al., 2019)	US	2019	Case study
	Violation letter - Sent to managers of violators of hand hygiene compliance, signed by chair of infection control committee as well as chief medical officer and chief nursing officer. Manager was required to reply in writing with actions taken.(Chou et al., 2010)	US	2010	Case report
	Mersey Care NHS Foundation Trust - Deal with adverse incidents quickly and informally to reduce impact of lengthy investigations on staff wellbeing. Shift from blame culture to learning culture. Support for staff. Share good practice stories to learn from positives as well as negatives. Restorative practice.(British Medical Association, 2021; De-Regil et al., 2011)	UK	2020	Think tank report with example case reports

	Template documentation to collect information before making the decision whether to instigate formal proceedings -led to reduction in disciplinary cases, contributing to psychological safety(NHS Resolution, 2019)	UK	2019	Resolution
	Barts Health NHS Trust -pre-disciplinary checklist -had led to reduction of cases and narrowing of gap between white and BAME staff(NHS Resolution, 2019)	UK	2019	Case report
Recognition	Celebration of nursing units who were compliant with hand hygiene measures.(Chou et al., 2010)	US	2010	Case report
	Good catch award publicly given and displayed when an individual or group identifies and reports a patient safety hazard and then takes structured actions to mitigate the hazard. Award presented, and then displayed on unit with summary of what was done, and individual also given a certificate.(Herzer et al., 2012)	US	2012	Case report
	Vouchers for outstanding nursing care(Brunges & Foley-Brinza, 2014)	US	2014	Case report
Training	Science of safety training(Paine et al., 2010)	US	2010	Prospective cohort study
	Many other examples of specific training are found in different sections of this table			
Facilitation	Specific creation of facilitator role to take on some of the surrounding tasks associated with improvement projects; 'like a shop' to help improvement projects. Headed by senior consultant and all facilitators had working in the hospital for many years. Assisted staff in managing change. The facilitators did quite a bit of work -chaired meetings, kept time, documented, provided refreshments and set up room, etc. Had 'clout' by means of their social position(Thor et al., 2004)	Sweden	2004	Case study
	Freeing up senior charge nurse time through administrative support: NHS Ayrshire and Arran(M. West et al., 2020)	UK	2020	Think tank report with case studies
	Explaining Michigan - Dedicated trolley for CVC insertion -instrumental and expressive functions, creating a ritual (using checklist)(Dixon-Woods et al., 2011)	US	2011	Ex-post theory of intervention project
Provision for wellbeing	Meal breaks, serenity area (quiet space away from patients), fun activities (football, T-shirts to wear on Fridays, party), unit redesign(Brunges & Foley-Brinza, 2014)	US	2014	Case report
	One-hour off-unit meal breaks for nurses working 12 hr shifts in acute medical ward(Stefancyk, 2009)	US	2009	Case report
	Mindfulness - volunteers who signed up in staff area participated in 45min mindfulness sessions every other day - didactic and experimental activities: waking up from autopilot, body scanning, refraining from judgment, using the breath as a stress reliever, and befriending yourself.(Hallman et al., 2017)	US	2017	Case report
	Mindfulness - daily group mindfulness sessions for internal medicine team immediately before the daily interdisciplinary board round, conducted in the nursing station. Facilitator. Body scan, mindfulness breathing, movement and sensory awareness exercises(Kang et al., 2022)	Australia	2022	Case report
	Responsive rota - Try to accommodate preferences and needs of staff(Brunges & Foley-Brinza, 2014)	US	2014	Case report
	Mutual Aid rota arrangement, central coordinators and formal process (including request form) to facilitate redeployment and shift swapping. During pandemic - NHS Lothian(M. West et al., 2020)	UK	2020	Think tank report with case studies

	Provision for staff to buy vouchers for hot meals at night from patient menu, which were delivered by porters - Royal Free London NHS Foundation Trust(M. West et al., 2020)	UK	2020	Think tank report with case studies
	Think to drink initiative– hydration stations on every unit and reusable water bottles given to staff - James Paget University Hospitals NHS Trust(M. West et al., 2020)	UK	2020	Think tank report with case studies
	WeCare café– café and garden for staff to take break away from ward, and access to ‘listeners’ - promoting proper rest breaks, supported by local community donations – Kettering General Hospital(M. West et al., 2020)	UK	2020	Think tank report with case studies
Real-time data	Regular staff surveys, results of survey used by unit practice council to focus change initiatives(Brunges & Foley-Brinza, 2014)	US	2014	Case report
	Real-time electronic mortality review system capturing views of front-line staff. Email sent following death of a patient.(Mendu et al., 2020)	US	2020	Case study evaluation
	Use of unit-based data to inform/improve clinical practice, promoting transparency(Castle & Shapiro, 2016)	US	2016	Case study
	Electronic incident reporting system which produces useful data for decision makers to improve patient safety(Mushcab et al., 2020)	Saudi Arabia	2020	Prospective case study
	Anonymous web-based incident/error reporting system – increased rates of reporting, particularly near misses which were not captured by the old system(Unal & Intepeler, 2020)	Turkey	2020	Quasi-experimental study
	Electronic events reporting system with reports reviewed by multidisciplinary team, regular assessment of safety culture, patient safety dashboard for hospital leaders and board of trustees.(Paine et al., 2010)	US	2010	Prospective cohort study
	Anonymity and freedom from punitive action in reporting medication “variance”. Check box style reports. Unified database to identify targets for intervention. Front-line staff involved in reviewing data and suggesting improvements.(Stump, 2000)	US	2000	Case report
	Senior multidisciplinary leadership rounds to discuss issues with nurses – increased capital of nurses and lead to substantial changes (e.g. new orthopaedic nurse coordinator role, appointment of more nurses)(Johnston & Villa, 2018)	US	2018	Professional reflection
	Leveraging Frontline Leadership Expertise intervention cycle: 1) information gathering (observation and safety fora), 2) prioritisation (debriefing, identify priorities, assign responsibility and promote follow-up), 3) follow up (individual and collective action to resolve problems and enact change), 4) feedback communication (with unit staff regarding information gathered and actions taken)(Singer et al., 2013)	US	2013	Evaluation
	Structured debriefing by nurse leaders for clinical teams involved in critical events outside ICU. Areas for improvement were identified and acted on by nurse leader.(Gabriel et al., 2022)	US	2022	Case report
	Structured morbidity and mortality rounds using Ottawa M&M Model (OM3): appropriate case selection, cognitive/system issues analysis, interprofessional participation, dissemination of lessons(Kwok et al., 2017)	Canada	2017	Prospective interventional study

	Designing of a tool for patients and families to report harm. Investigation and action by staff. Used for learning(Lachman et al., 2015)	UK	2015	Case report
	Patient visits programme - where senior clinician paired with non-clinical administrator to visit patients and ask for their feedback on the hospital/their stay, using a structured tool. Tool for gaining insights into patient experience(Sidhu et al., 2002)	US	2002	Case report
	Green cross method - Proactive way of collective incident data at daily staff meetings. Visual method for reporting patient safety incidents for a whole month(Källman et al., 2022)	Sweden	2022	Retrospective cross-sectional study
	Root cause analysis -structured process - data collection, review and observation, and analysis to identify root cause of problem. Systems approach to thinking. Corrective action. Complex problem solving, team approach, system/process focus, promotes staff awareness and knowledge(Karkhanis & Thompson, 2021)	US	2021	Discussion
	Explaining Michigan - Use of data on unit in communication to staff(Dixon-Woods et al., 2011)	US	2011	Ex-post theory of intervention project
	Newsletter(Paine et al., 2010)	US	2010	Prospective cohort study
	Synthesis file from journal club or nurses and allied health professionals involved in research in hospital posted on hospital intranet(Dall'Oglio et al., 2018)	Italy	2018	Case report
	Corona Voice– weekly short web-based staff survey -used data in evolving action plan during pandemic– Northumbria Healthcare NHS Foundation Trust(M. West et al., 2020)	UK	2020	Think tank report with case reports
	Jointly reducing workload: led to a reduction in audit activity as a review within Trust found that many activities did not add value - East London NHS Foundation Trust(M. West et al., 2020)	UK	2020	Think tank report with case reports
Peer-to-peer review	Nurses provided constructive feedback to peers, based on observed practices compared to professional standards. Standard documentation tool developed. Nurses were provided with training and the programme was supported by the nurse executive team.(LeClair-Smith et al., 2016)	US	2016	Case report
Schwartz rounds	Schwartz rounds -Structured regular forum for all staff to discuss emotional and social aspects of working in healthcare, 1hr, catering provided, sharing from panel then facilitated open discussion, confidential space, diverse steering group and senior clinician champion – support, appreciation for the roles of others, reduce hierarchies, open culture(Adamson et al., 2018; The Point of Care Foundation, n.d.)	Canada	2018	Survey study
Handovers	Structured interdisciplinary bedside rounds, promoting patient-centred workflow. These were adapted and improved using PDSA cycles, and diagram made of agreed final model. Team undertook some training in advance (on the model, situational leadership, managing conflict, personality)(Castle & Shapiro, 2016)	US	2016	Case study
	Handover of patient from theatre to ICU involving members of ICU team coming to theatre for the last 30mins to familiarise with patient. Could ask questions face-to-face but too much time away from unit(Hamid et al., 2021)	US	2021	Case report

	Bedside nursing handover (instead of meeting room or corridor), with standard format. Helped nurses to prioritise patient care.(McAllen et al., 2018)	US	2018	Case study evaluation
	Standardised I-PASS handover (at same time as TEAM-STEPPS training) and new EMR system which included I-PASS template. Needed adaptation for different units and surgical unit resistant to implementation.(Shahian et al., 2017)	US	2017	Case report
	I-PASS used in transfer of ICU patients to medical ward. Family members participated. 1) Common understanding of patient, confirmed with read-back technique, 2) standardised structure with pre-populated patient details, 3) face-to-face, one message at a time, synthesis and questions, 4) formal acknowledgement of responsibility and accountability.(Sheth et al., 2016)	US	2016	Prospective improvement initiative
Huddles	Hospital level: brief 15-minute structured stand-up meetings every morning, requiring representative from each department to give 30sec safety summary. Open to all staff.(Castaldi et al., 2019)	US	2019	Case study
	Twice daily safety huddles on PICU, which identified patients at high risk of deterioration and improved situational awareness and better patient outcomes. PICU warning tool also used.(Dewan et al., 2022)	US	2022	Structured quality improvement initiative
Partnerships within hospital	Nurse-physician leadership dyad - Physical presence of the leadership dyad on unit. Jointly responsible for clinical, service and cost outcomes of unit(Castle & Shapiro, 2016)	US	2016	Case study
	Appointment of Patient Safety Deltas from different units across the hospital, supported by the patient safety team. Education programme and regular for a, participate in patient safety rounds, help with implementing unit-based improvement initiatives(Schwoebel & Creely, 2010)	US	2010	Case report
	Quality Control Circle - group of staff gather regularly to discuss, analyse and solve work-related problems and produce recommendations and standard operating procedures. Includes senior managers and front-line workers.(D. Zhang et al., 2020)	China	2020	Evaluation study
	Patient link – patient ambassador responsible for spending time with patients and families, thereby easing staff time(Brunjes & Foley-Brinza, 2014)	US	2014	Case report
	Each board member paired with ethnic minority network strategic ambassador to deliver specific actions for which they were accountable– North East London NHS Foundation Trust(M. West et al., 2020)	UK	2020	Think tank report with case studies
	Explaining Michigan - Project targeted senior leaders, team leaders, and ICU staff. Partnered unit with senior executive(Dixon-Woods et al., 2011)	US	2011	Ex-post theory of intervention project
Meetings	Patient safety grand rounds for all staff, journal clubs, research meeting, discussion and networking groups(Paine et al., 2010)	US	2010	Prospective cohort study
	National speakers, lunch and learn, online opportunities, posters, journal clubs(Tetuan et al., 2017)	US	2-17	Pre-post comparison
	Journal club monthly, with CPD credits, JC coordinator, facilitator role assigned for each session, preliminary literature search, then synthesis files produced and posted on hospital intranet(Dall'Oglio et al., 2018)	Italy	2018	Case report
	Monthly patient morbidity and mortality conference - case study presented for root cause analysis by	US	2010	Case report

	interdisciplinary audience. Meeting starts with summary of last month's case and findings/recommendations. good catch award given to recognise reporting of an identified near miss that could have led to error. Presentation, structured discussion, scribe. Findings and recommendations integrated into improvement efforts. Medical director instigated initiative and supported by senior management, with approval from relevant departments. Resources (personnel and space) were allocated. Same day and time every month, with necessary equipment/furniture. Held at noon and lunch is provided. CPD points for attendance. cases selected as opportunities for learning(Szekendi et al., 2010)			
Coaching	Experienced staff trained in coaching to support aspects of usual work or improvement efforts (one of several interventions)(Gershengorn et al., 2014)	US	2014	Discussion
	Staff volunteers were trained as 'safety coaches', then took on responsibility for educating, monitoring and reinforcing on units (one of several patient safety interventions)(Phipps et al., 2018)	US	2018	Case study evaluation
	Unit-based safety programme included assistance by a coach and by partnering with a member of the hospital leadership.(Paine et al., 2010)	US	2010	Prospective cohort study
	Supporting newly registered nurses and those from overseas: senior internal team of experienced nurses – mentoring and coaching programme for all new nurses - Barking, Havering and Redbridge University Hospitals NHS Trust(M. West et al., 2020)	UK	2020	Think tank report with case studies
Mentoring	Intermediate Improvement Science Series (I2S2) training course. Multidisciplinary classes (12 days over 6 months) - training followed by improvement project with mentor.(Kaminski et al., 2012)	US	2012	Case report
	Quality Academy Programme started by one hospital. Conducted by trained staff, teaching plus requirement to complete a QI project, with on-to-one mentoring.(Sarff & O'Brien, 2020)	US	2020	Case report
	Reverse mentoring – all board members matched with mentor from minority ethnic group – North East London NHS Foundation Trust(M. West et al., 2020)	UK	2020	Think tank report with case studies
	Supporting newly qualified midwives: Cardiff and Vale University Health Board – Prep for practice programme – worked with university to make continuity placement where students final placement matched first clinical rotations when newly qualified. Allocated mentors (continuity preceptors'). Protected supernumerary status for first two weeks of job, then 2 weeks working same shifts as preceptor. Provided with special badges to allow colleagues from across MDT to identify them as potentially needing more support. WhatsApp group. Monthly meetings for preceptees(M. West et al., 2020)	UK	2020	Think tank report with case studies
External accreditation	Self-assessment and accountability process(Ng et al., 2013). – Canadian accreditation process,(Al-Awa et al., 2012) Australian Council on Healthcare Standards(Andres et al., 2019)	Canada Australia	2012, 2019	Standards
	Magnet Recognition Programme – 14 forces of magnetism: 1) quality of nursing leadership, 2) organisational structure, 3) management style, 4) personnel policies and programmes, 5) professional models of care, 6) quality of care, 7) quality improvement, 8) consultation and resources. 9) Autonomy, 10) community and the healthcare organisation, 11) nurses as teachers, 12)	US	2005	Case report

	image of nursing, 13) interdisciplinary relationships, 14) professional development(Drenkard, 2005)			
	Magnet Recognition Programme (American Nurses Credentialing Centre) -self nomination and self-appraisal against standards, multiday site visit by trained evaluators, annual submission of data and re-evaluated every 4 years(Havens & Johnston, 2004)	US	2004	Professional reflection
	ANCC's Pathway to Excellence Programme - 6 Pathway Standards: 1) shared decision making, 2) leadership 3) safety, 4) quality, 5) wellbeing, 6) professional development.(Pabico & Graystone, 2018)	US	2018	Discussion
Collaboration with other hospitals	Health Foundation's Safer Patients Initiative - hospitals participated in a large multi-hospital programme, which included expert support and collaborative learner community(Benn et al., 2009)	UK	2009	Multi-methods study
	Participation of 10 hospitals in Leadership Saves Lives Collaborative. Training of core hospital team (guiding coalition) and sharing/networking between hospitals(Bradley et al., 2018)	US	2018	Longitudinal intervention study
	Collaborative of 6 tertiary care paediatric referral hospitals - shared data and collective commitment to improving quality of healthcare(Lyren et al., 2016)	US	2016	Case report
	Ontario ICU Clinical Best Practice Project - 15 participating ICUs - central coordinating office took lead on QI activities, disseminated educational materials. Hospitals participated in biannual face to face conferences and monthly video chats. 1yr trial.(Dainty et al., 2013)	Canada	2013	Qualitative study
	Explaining Michigan - Institutional isomorphism amongst participating hospitals (networked), Normative and mimetic types of isomorphism were felt to be the strongest influencers in this programme, Community-based participatory approaches, cooperation, reciprocity "sense of community" – project workshops, online networking, project token (wristband, mirror, T-shirt listing the participating hospitals – project notepaper also contained a list of participating hospitals) – participants ended up leading most interactions themselves, Frequent communication outside the formal structure – virtual learning community, Building of horizontal ties and pressure to maintain "regard" of peers, Changing the representation through narrative of CVC-BSIs as a social problem, Sharing data – different types, Shared vision, Collective critical reflection and discussion as multi-hospital community built consensus and legitimacy, Local autonomy to adapt, with agreed parameters, Data collection, Sharing of anonymous comparative data from other units, Consequences for not submitting data, Back up/ legitimacy in carrying out role if encounter resistance, Importance of core team to provide support – discipline, but responsibility and local ownership(Dixon-Woods et al., 2011)	US	2011	Ex-post theory of intervention project
Collaboration with educational institutions	Hospital education committee - Monitor and promote quality of residency training. Need to claim strategic position, create educational culture and structure and work with external stakeholders(Silkens et al., 2017)	Netherlands	2017	Qualitative study
	Culture of caring team (CoC) – collaborative between academic institutions and hospital. Included academic practice leaders, clinical instructors, staff nurses, and students. Learning was relevant to the clinical environment, and topics were paired with journal articles and activities(Gierach et al., 2019)	US	2019	Case report

	Recommendations and conceptual framework of how to align quality and safety mission of teaching hospitals and graduate medical education. Culture of engaging trainee in continuous improvement process and non-blame culture in safety meetings etc., Create positions on hospital quality and safety committees for GME leaders and hospital leaders to attend GME board meetings. Access to reporting systems and QI data etc. Core curriculum. Training of trainers. Embed other professions in resident safety work and vice versa- MDT.(Tess et al., 2015)	US	2015	Discussion
Collaboration with experts	Link nurse for IPC. Had online training and direct communication with IPC team and other link nurses. Example of assigned role which has external expert ties, role needs to be legitimised and individuals need to be suited to the role in their skills. Internal factors, external support, role needs to be legitimised(Williams et al., 2019)	UK	2019	Case report
	QI Collaborative Royal College Paediatrics and Child Health – sign up as hospital multidisciplinary teams, training, online platform etc.(M. West et al., 2020)	UK	2020	Think tank report with case studies
	NHS-Virginia Mason Partnership – 5 NHS health boards partnered with US non-profit Virginia Mason – this included monthly face-to-face meetings as a group, lasting 6 hours, during which all focus was on honest, open, reciprocal and supportive discussion(Burgess et al., 2019)	UK	2019	Discussion

Appendix 3.3.2: Selected Ideals, Principles and Recommendations from UK NHS and Professional bodies, of relevance to programme theory

Source	Summary of overall advocacy call	(Selected) Recommendations
British Medical Association: Caring, supportive, collaborative: doctors' vision for change in the NHS 2019(British Medical Association, 2021)	• A supportive culture where doctors work in an environment that supports their wellbeing, promotes learning and encourages the development of systems to improve safety and quality of care – and where diversity is celebrated and there is equal opportunity and reward • A valued workforce where everyone who works in the NHS feels part of a properly resourced team working in harmony and with the right mix of skills to do the job • A collaborative structure where doctors and all NHS staff are empowered to work together across traditional organisational divides, so that patients receive seamless care • Underpinned by adequate funding and terms and conditions for doctors to relieve system pressures	• Civility • Inductions, ongoing support, peer support, mentoring (including appropriate mentors for those from minority or under-represented groups) • Reduce fear and blame in regulation processes • Wellbeing of staff • Learning culture (non-punitive) • Safe staffing levels • Cut down on unnecessary, improve IT systems • Admin support for doctors to free up time • Meet training needs of doctors, within multidisciplinary team, clear understanding of roles of colleagues
Royal College of Midwifery: Making maternity services safer: nurturing a positive culture 2021(The Royal College of Midwives, 2021)	Nurse and midwives have three core work needs that must be met to ensure wellbeing and motivation at work, and to minimise workplace stress: • autonomy – the need to have control over their work lives, and to be able to act consistently with their values. • belonging – the need to be connected to, cared for, and caring of others around them at work, and to feel valued, respected and supported. • contribution– the need to experience effectiveness in what they do and deliver valued outcomes (taken from Kings Fund Courage of Compassion report)	Practical tools to improve culture: • Supported - o Schwartz rounds - o The Leader's Toolkit - o Restorative supervision • Valued - o Restorative supervision and A-EQUIP (Advocating for Education and Quality Improvement) training for Professional Midwifery Advocates (midwife leadership and advocacy role) - o Improving workplace behaviour training - o RCM caring for you

		Start with a self-assessment of organisational culture (available tools signposted), and share findings with workforce.
Royal Pharmaceutical Society: reducing workplace pressure through professional empowerment 2011(Royal Pharmaceutical Society, 2011)	Professional empowerment may be improved through interlinked factors, to reduce stress and workplace pressure, including: • Mechanisms for raising concerns. • Increasing the confidence of pharmacists through better management skills. • Ensuring pharmacists take breaks. • Matching resources to demand. • Balancing professionalism with commercial or financial pressure. • Ensuring pharmacists feel in control. • Ensuring physical working environments are fit for purpose. • Increasing the job satisfaction of pharmacists.	• Learning culture • Management skills • Adequate rest breaks • Carefully considered targets – realistic, achievable, supported • Need control over practice – control needs to match level of accountability • Wellbeing – working environment – rest areas, water, equipment and resources • Professional development, remuneration, career development, support structures -job satisfaction
Royal College of Nursing (M. West et al., 2020)	Nurse and midwives have three core work needs that must be met to ensure wellbeing and motivation at work, and to minimise workplace stress: • autonomy – the need to have control over their work lives, and to be able to act consistently with their values. • belonging – the need to be connected to, cared for, and caring of others around them at work, and to feel valued, respected and supported. • contribution– the need to experience effectiveness in what they do and deliver valued outcomes	• Authority, power and influence: Introduce mechanisms for nursing and midwifery staff to shape the cultures and processes of their organisations and influence decisions about how care is structured and delivered. • Justice and fairness Nurture and sustain just, fair and psychologically safe cultures and ensure, equity, proactive and positive approaches to diversity and universal inclusion • Work conditions and working schedules Introduce minimum standards for facilities and working conditions for nursing and midwifery staff in all health and care organisations • Teamworking Develop and support effective multidisciplinary teamworking for all nursing and midwifery staff across health and care

		services • Culture and leadership Ensure that health and care environments have compassionate leadership and nurturing cultures that enable both care and staff support to be high quality, continually improving and compassionate • Workload Tackle chronic excessive work demands in nursing and midwifery, which exceed the capacity of nurses and midwives to sustainably lead and deliver safe, high-quality care, and which damage their health and wellbeing. • Management and supervision Ensure that all nursing and midwifery staff have the effective support, professional reflection, mentorship and supervision needed to thrive and flourish in their roles • Education, learning and development Ensure that the right systems, frameworks and processes are in place for nurses' and midwives' learning, education, and development throughout their careers. These must promote fair and equitable outcomes.
NHS Patient Safety Strategy 2019(National Health Service, 2019)	To continuously improve patient safety: • Patient safety culture • Patient safety system • Insight: improving understanding of safety by drawing intelligence from multiple sources of patient safety information • Involvement: equipping patients, staff and partners with the skills and opportunities to improve patient safety throughout the whole system • Improvement: designing and supporting programmes that deliver effective and sustainable change in the most important areas	• Psychological safety • Diversity and inclusion – the value of difference – collective leadership • Vision made explicit • Compassionate leadership and clear role within team • Culture of learning (non-punitive) • Kindness and civility • Careful implementation of change – e.g. digital systems - • Patient safety partners • Embedded syllabus • Collaborative learning from training to multidisciplinary teams, across patient pathways

		• Network of patient safety specialists (external ties or multiplex ties) • Leaders collecting different types of data, listening
NHS Resolution(NHS Resolution, 2019)	• Embed a just and learning culture • Equity • Lack of fear • Civility	• Restorative just culture, civility and inclusiveness • Learning culture – work done vs work imagined • New staff -induction -aware of values and expected behaviours from self and others • Monitoring of disciplinary action to make sure not disproportionately affecting staff from minority backgrounds • Robust and appropriate disciplinary processes – avoiding excessive and inappropriate disciplinary action • Just and learning charter
Romney report for the BMA 2019 (not directly relevant as about the British Medical Association itself, rather than hospitals)(Romney, 2009)	• Culture • Calling out • Committees • Resolution process	• Ways to encourage women to join committee • Quotas or minimum numbers to improve representation of women on committee • Call out bad behaviour and discriminatory conduct • More effective committee structures and activities to get best out of people • Limit number of committees that individuals can be part of • Carefully thought through resolution process if compliant is made • Civility • diversity and inclusion • calling out of incivility • intervene or report when bad behaviour witnessed • training in how to have difficult conversations as well as diversity equality, anti-bullying • training for committee chairs to encourage all members to participate • 360 appraisals for members of committees

		• Monitoring of appointment practices – fair and transparent process • Women's group with peer mentoring • Mentoring, shadowing, supporting new committee members • Lay-out/structure of meetings to encourage participation • Adequate complaints system • Clarity of complaints and resolution process