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 mortality rate in Kenya has remained relatively unchanged. 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. 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.

However, a more detailed understanding of tacit human factors, or health systems ‘software’, 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). 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’. Indeed, such ‘software’ factors can profoundly influence acquisition of new knowledge and behaviours and norms at individual and group level, and thus are determinants of quality care. 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). 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. The impact of relational ties on clinical decision making was demonstrated in the landmark study by Coleman et al 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. Communication which impacts on health worker decision making may furthermore take place in ‘back stage’ ad-hoc opportunistic exchanges, for example, in hospital corridors, 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 healthcare 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 (e.g., 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.

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, which was used to help guide the focus of scientific inquiry 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.
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,\(^2^0\)\(^2^2\) which will employ a mixed-methods approach to collect relevant data, drawing on diverse methods.\(^2^3\) 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 literature\(^2^1\) 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),\(^2^4\) 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.\(^5\)
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). 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. 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.

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.
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

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<th>Data collection</th>
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<td><strong>Non-participant observation</strong>&lt;br&gt;<strong>Social network questionnaire</strong>&lt;br&gt;<strong>In-depth interviews</strong></td>
<td>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.&lt;br&gt;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&lt;br&gt;Must be aged 18 years or over, be able to provide informed consent and available to participate in the study</td>
<td>Does not work in, or provide any support to neonatal care delivery in the hospital&lt;br&gt;Aged under 18 years, unable to give informed consent or unable to participate in study, without participation adversely affecting care delivery</td>
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| **Key Informant Interviews** | Senior nurse/manager in the hospital:<br>Must be above 18 years and be able to provide informed consent<br>Must be duly registered and licensed to practice at diploma in nursing and above<br>Must be an employee of the hospital under study<br>Must have formal leadership roles in the neonatal or paediatric ward<br>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<br>Nurses working on locum or other agencies<br>Aged below 18 years, not willing or able to provide informed consent or unable to participate in the study due to work pressures. |

| **Focus group discussions** | Basic nursing graduates:<br>Must have a diploma or degree in nursing and/or midwifery<br>Must be registered and licensed by nursing council of Kenya to practice in Kenya<br>Must be above 18 years and be able to provide informed consent<br>Are working in hospitals in Kenya on full time, part time or locum basis<br>Must be available to participate in the study | Nurses with certificate or postgraduate specialty nurse training<br>Not willing or able to provide informed consent<br>Unable to participate in the study due to work pressures. |

| **Nursing graduates: neonatal and paediatric nurses or maternal-neonatal nurses**<br>Nurse educators:<br>Must have a minimum of a postgraduate diploma in nursing/midwifery or medical education and registered and licensed by Nursing Council of Kenya<br>Must be working full time or part time at the schools of nursing for Kenya Medical Training College, Kenyatta National Hospital and University of Nairobi.<br>Must be above 18 years, be able to provide informed consent and available to participate in the study | Nurse educator in the attached training facility:<br>Must be duly registered and licensed to practice at diploma in nursing and above<br>Must be an employee of the hospital under study<br>Must have formal leadership roles in the neonatal or paediatric ward<br>Must be available to participate in the study, without their participation adversely affecting to the functioning of the neonatal unit | Junior teaching faculty without leadership or management roles<br> Educators working on part time or are employees of other agencies<br>Aged below 18 years or not willing or able to give informed consent<br>Unable 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)<br>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) |

**Table 1** Study inclusion and exclusion criteria
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. The researcher will use a random sequence generator to locate a corresponding ID code for each member of staff. Participants will be asked to identify colleagues they would speak to from a staffing 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. 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. 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.

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.

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<td>Method</td>
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<tr>
<td>1. Non-participant observation</td>
<td>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.</td>
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<td>2. In-depth semistructured interviews</td>
<td>One interview per participant (up to total 35 in each of 2 hospital sites)</td>
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<td>3. Social network questionnaire</td>
<td>One questionnaire per participant (total 40–120+ participants per hospital site, depending on size of networks)</td>
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<td>4. Key informant interview</td>
<td>One person per each hospital and one person per each attached training facility (total of 5–7 persons)</td>
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<td>5. Focus group discussions</td>
<td>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</td>
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<tr>
<td>6. Stakeholder Workshop</td>
<td>One session following the data analysis from methods 1–3. Total of 8–12 participants</td>
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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 co-developed 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 CMOCs (box 1) using retroduction (box 1). 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. Where indicated by our interpretations of the primary data, new, expanded or revised CMOCs 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 (e.g., 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 the 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 feedback.

![Figure 2: Programme Theory Development in the Pathways Study](http://bmjopen.bmj.com/)

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 codedveloped 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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Patient consent for publication Not applicable.

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REFERENCES

Appendix A: 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? 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 conducted? What happens thereafter?
Appendix B: 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 C: 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 D1: Pathways Study – Key informant Interview
for Hospital Nursing Team Leader/Manager (one per hospital/unit)

(Inform 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.
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 D2: 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 E1 - 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

<table>
<thead>
<tr>
<th>Main question</th>
<th>Additional questions</th>
</tr>
</thead>
</table>
| 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 | Probe on people-related factors  
  Probe on leadership related factors |
<table>
<thead>
<tr>
<th>Question</th>
<th>Probe on assertiveness, self-awareness and decision-making factors</th>
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<tbody>
<tr>
<td>or specialist, to be able to easily use what they have learned in college at their workplaces?</td>
<td>Probe on people-related factors</td>
</tr>
<tr>
<td>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?</td>
<td>Probe on leadership related factors</td>
</tr>
<tr>
<td>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?</td>
<td>Probe to identify these factors (probe on teamwork, team leadership, decision making and other human factor development through collaborative social learning)</td>
</tr>
</tbody>
</table>
| 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 E2 - 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

<table>
<thead>
<tr>
<th>Main question</th>
<th>Additional questions</th>
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<tbody>
<tr>
<td>Can you describe to me the nature of work you are involved in in this unit/department?</td>
<td>Are there any challenges you have experienced in undertaking your role? Give examples and why?</td>
</tr>
<tr>
<td>For Basic Diploma/Degree General Nurses: How would you describe your basic training in preparing you to work in neonatal care units?</td>
<td>Why do you say so? Give examples</td>
</tr>
<tr>
<td>For Specialist Neonatal and/or Paediatric Nurses and/or Maternal-neonatal Nurses: 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?</td>
<td>Probe on preparedness on communication skills and handling emotions (ability to communicate well with patients, colleagues, and supervisors. Handling angry parents, breaking bad news &amp; handling rude/ disrespectful colleagues) Recognizing and managing own stress</td>
</tr>
<tr>
<td>Have you undertaken any neonatal-training relevant short course/training? Describe it: what, when, content, how and relevance</td>
<td>How does it compare to your basic nursing training? Why do you say so? Give examples.</td>
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<tr>
<td>What things/factors about yourself have helped you use what you learned in college and/or in short courses?</td>
<td>Probe on people-related factors Probe on leadership related factors Probe on assertiveness, self-awareness and decision-making factors</td>
</tr>
<tr>
<td>What things/factors about working with others have helped you use what you learned in college and/or in short trainings?</td>
<td>Probe on people-related factors Probe on leadership related factors Probe on assertiveness, self-awareness and decision-making factors</td>
</tr>
<tr>
<td>What things/factors about yourself have not helped you use what you learned in college and/or short trainings?</td>
<td>Give examples. Probe as above. Are these factors shared by others? What do the rest of us think?</td>
</tr>
<tr>
<td>Question</td>
<td>Response</td>
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<tr>
<td>What things/factors about working with others have hindered your ability to use what you learned in college and/or short trainings?</td>
<td>Give examples. Probe as above. Are these factors shared by others? What do the rest of us think?</td>
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<tr>
<td>Do you think your colleagues elsewhere share your feelings? (ask about Private hospitals versus public hospitals)</td>
<td>Why do you think this is so?</td>
</tr>
<tr>
<td>What is your opinion about practice improvement initiatives such as?</td>
<td>Probe on How it is done, Why it is done, for Whom it is done, When it is done</td>
</tr>
<tr>
<td>1. CPD courses (give examples)</td>
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<tr>
<td>2. Workplace mentorship</td>
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<tr>
<td>3. Using clinical practice guidelines</td>
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<tr>
<td>4. Staff induction trainings</td>
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<tr>
<td>5. Staff appraisal and performance management</td>
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<tr>
<td>If you are involved in any of the mentioned practice improvement initiatives above (need to say which one), share your experiences.</td>
<td>Ask: whether the experience is as a recipient or as a provider. Ask them to describe: How, When and Why.</td>
</tr>
<tr>
<td>Do you have any recommendations about this?</td>
<td>Ask about:</td>
</tr>
<tr>
<td></td>
<td>1. Recommendations for nurses as practitioners</td>
</tr>
<tr>
<td></td>
<td>2. Recommendations about other clinical colleagues</td>
</tr>
<tr>
<td></td>
<td>3. Recommendations for hospital managers</td>
</tr>
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<td></td>
<td>4. Recommendations for Nursing schools</td>
</tr>
<tr>
<td></td>
<td>5. Recommendations for the regulator</td>
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<tr>
<td>Is there anything else from anyone before we close?</td>
<td></td>
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<tr>
<td>Thank the participants for their time and contributions</td>
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## Appendix F - 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)

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>10am</td>
<td>Consent Registration and refreshments</td>
<td>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.</td>
</tr>
<tr>
<td>10.30am</td>
<td>Welcome</td>
<td>Participants will be welcomed to the event by the research team.</td>
</tr>
<tr>
<td>10.45am</td>
<td>Introduction to study</td>
<td>Researchers will present the background of the study, including findings of a realist synthesis, and work conducted on the neonatal unit in Kenya.</td>
</tr>
<tr>
<td>11.15am</td>
<td>Group brainstorming session – how do social ties influence quality of patient care?</td>
<td>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.</td>
</tr>
<tr>
<td>11.45am</td>
<td>Feedback to whole group</td>
<td>Each small group will be encouraged to share their thoughts and take any questions.</td>
</tr>
<tr>
<td>12.15pm</td>
<td>Lunch</td>
<td></td>
</tr>
<tr>
<td>1pm</td>
<td>Presentation of findings from interviews, SNA and non-participant observation</td>
<td>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.</td>
</tr>
<tr>
<td>1.30pm</td>
<td>Group activity – what do we think of the findings? how should these findings be used?</td>
<td>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.</td>
</tr>
<tr>
<td>2pm</td>
<td>Feedback to whole group</td>
<td>Each small group will be encouraged to share their thoughts and take any questions.</td>
</tr>
<tr>
<td>2.30pm</td>
<td>Tea</td>
<td></td>
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<tr>
<td>3pm</td>
<td>Group discussion – what should our recommendations be?</td>
<td>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 involved facilitated group work, facilitated group discussions, and ranking exercises or similar.</td>
</tr>
<tr>
<td>4.30pm</td>
<td>Summary and close</td>
<td>Stakeholders will be thanked for their participation and given information about how findings will be fed back to them and others.</td>
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</table>