

Integrating Mental Health and Neglected Tropical Disease Interventions to Support Equitable People-Centred Care in Ghana (IMAGINE GHANA)

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Background and Rationale

Neglected Tropical Diseases (NTDs) disproportionately affect the world's most impoverished populations, particularly in low- and middle-income countries (Hotez et al., 2016, Singer et al 2012). These conditions lead to severe physical disabilities, chronic pain, and disfigurement, often resulting in stigma and discrimination (Dean et al., 2022). The social exclusion experienced by individuals affected by NTDs significantly impacts their mental health, increasing the prevalence of anxiety, depression, and other psychological distress (Dean et al., 2022, Abdulmalik et al., 2018, Bailey et al., 2019A, Bailey et al., 2019B, Koschorke et al., 2022, Obindo et al., 2017, WHO, 2020, Semrau et al., 2020, Ton et al., 2015). Despite the well-documented burden of NTDs and their mental health consequences, the integration of mental health services within NTD management remains limited (Bailey et al., 2019a). The World Health Organization recently developed an Essential Care Package (ECP) for NTDs, stigma, and mental health conditions to provide a comprehensive framework for managing these diseases (WHO, 2022). However, limited research exists on the best strategies for implementing this package effectively within existing health systems, particularly in Ghana. This study, IMAGINE GHANA, aims to address this knowledge gap by operationalizing key components of the ECP in Ghana to understand what works for who in terms of its implementation, ensuring accessibility, fairness, and effectiveness in its implementation.

Why is the research important in terms of improving the health and/or wellbeing of the relevant populations and healthcare services in the LMIC(s)?

Despite the increasing recognition of the intersection between NTDs and mental health, there remains a lack of integrated approaches for addressing both conditions simultaneously (Osborne et al., 2021). Existing health services in Ghana prioritize the physical manifestations of NTDs, often neglecting the psychosocial consequences such as stigma, social exclusion, and mental health distress (Agyemang et al., 2022; Dua et al., 2020). This results in a fragmented care system that fails to address the full scope of patient needs, contributing to delayed health-seeking behaviour and poor treatment adherence. Furthermore, limited research exists on how to effectively implement the WHO ECP at scale within health systems in Ghana (Owusu et al., 2023). Key questions remain unanswered, including what the most effective, equitable, and sustainable strategies for integrating mental health services within NTD management are and how to ensure that such services are accessible and acceptable to affected individuals and their communities. Addressing these gaps is critical to developing a comprehensive

V1.0 01.04.2025

and person-centered approach to NTD care, ultimately improving health outcomes and quality of life for affected individuals.

This study is essential for multiple reasons. Strengthening the health system through the provision of evidence-based recommendations on how Ghana's health system can incorporate mental health services into NTD care will lead to more holistic and effective interventions (Addo et al., 2020). Additionally, ensuring equitable access by identifying barriers to care and proposing solutions will make certain that services are inclusive, culturally appropriate, and accessible to marginalized populations (Osei et al., 2019). Understanding what works at scale will inform national and regional policies, ensuring long-term sustainability of integrated NTD and mental health interventions (WHO, 2021b). Furthermore, aligning with global health priorities such as WHO's strategic focus on NTD elimination and Universal Health Coverage will provide the necessary foundation for implementing sustainable interventions that address both physical and mental health needs (WHO, 2021c).

Research question

How can mental health be integrated into person centred care for people affected by skin NTDs in Ghana?

Primary Aim and Objectives

IMAGINE Ghana is a collaboration between UHAS, the Ghanaian Health System and Liverpool School of Tropical Medicine, which seeks to co-design, pilot and evaluate an Essential Care Package for skin NTDs, over the course of three years. The programme uses learning from the REDRESS project in Liberia.

Overall Aim

To strengthen person-centred care for the integrated management of mental health and NTDs in Ghana.

Objectives:

Table 1. Study objectives and outcomes

| Objective | Outcome |
|---|--|
| Objective 1: Identifying the most effective, acceptable, equitable, affordable, inclusive and sustainable context-specific community, health and social systems-based strategies for the integrated management of NTDs and MHCs. (Outcome 1) (Situational Analysis Phase) | Outcome 1 Evidence on the most effective, acceptable, affordable, equitable, inclusive and sustainable context-specific community, health and social systems-based interventions for co-occurring NTDs and MHCs integrated into programme strategies by government, regional and international stakeholders. |
| Objective 2: Collaborating with affected persons, communities, health providers, and policy | Outcome 2 Improved capacity among health system and community stakeholders to identify intervention |

| | |
|---|---|
| makers through co-production approaches to support the identification, adaptation and implementation of new and existing interventions that are responsive to biomedical and psychosocial support needs and community development priorities. (Outcome 2 & 3) (Design Phase) | solutions, and to promote a culture of working together to co-produce, implement, assess and adapt interventions to respond to holistic care needs and rights of people affected by co-occurring NTDs and common MHCs. Systematic inclusion of the needs and priorities of affected persons within the design, delivery, monitoring and evaluation of system-based interventions to ensure equitable management of co-occurring NTDs and common MHCs that meets the needs of vulnerable populations and promotes social inclusion and stigma reduction. |
| Objective 3: Enhancing equity of approaches that will support people affected by NTDs and MHCs to receive essential, effective and affordable treatment, care and support at the individual, community and facility level. (Outcome 1) (Implement and Monitor Phase) | Outcome 3 Evidence on the most effective, acceptable, affordable, equitable, inclusive and sustainable context-specific community, health and social systems-based interventions for co-occurring NTDs and MHCs integrated into programme strategies by government, regional and international stakeholders. |
| Objective 4: Strengthening a culture of learning in health systems to make links between past actions, the effectiveness of those actions, and in planning for future activities, to identify generalisable factors that could influence policy, practice and intervention sustainability for NTDs and MHCs. (Outcome 2) (Adapt and Adjust Phase) | Outcome 4 Improved capacity among health system and community stakeholders to identify intervention solutions, and to promote a culture of working together to co-produce, implement, assess and adapt interventions to respond to holistic care needs and rights of people affected by co-occurring NTDs and common MHCs. |
| Objective 5: Strengthening capacity for multi-disciplinary implementation research focused on NTDs and MHCs within the MoH, Ghana, that engages with persons affected, policy makers, practitioners and researchers. (Outcome 4). | Outcome 5 Established technical and community advisory groups of policy makers, practitioners, researchers, persons affected and other community stakeholders collaborating together, and learning from each other, to identify and implement solutions for the integrated management of NTDs and common MHCs. |

Study Sites and Population and Selection

This study will be carried out in Ghana, where we have selected intervention areas that we will use as 'learning sites' to allow us to explore the feasibility of operationalising an ECP for co-occurring NTDs and MHCs. We have chosen to focus our work in specific geographical areas to enable a longer-term process of engagement and collaboration with systems actors and persons affected (Sheikh et al, 2021). Learning sites are an emerging phenomenon in health systems research as they: *'provide an*

opportunity for researchers to understand health systems by seeing their complexity through the eyes of those working at the frontline of care delivery, whilst providing opportunity to support health systems strengthening' (Sheikh et al, 2021). We will extend the process to include the perspectives of persons affected by NTDs and MHCs as part of our learning journey, for example, through their inclusion as co-researchers within this project (Work Package 6- see below). Central to the learning site methodology is flexible reflexive practice to facilitate a process of co-production that is multi-layered, dynamic and independent in each setting (Sheikh et al, 2021). The centrality of co-production will enable us to undergo a process of collective enquiry within each of our 'learning sites' that is guided by collaboration between researchers, persons affected and health systems actors (e.g. district health managers) through regular cycles of planning, implementation and reflection to support decision making related to key activities being implemented within the IMAGINE GHANA intervention activities.

The learning sites have been selected in partnership with Ministry of Health collaborators and based on:

- Disease co-endemicity (i.e. locations where multiple target NTDs (based on MoH priorities) are endemic)
- Geographic and ecological diversity within countries (rural/ peri-urban)
- MoH/FMoH priority areas for integration
- Security- with safe access for the research team

The learning sites selected following discussion and selection in collaboration with Ghana National Programme are:

- Savanna Region (Bole District)
- Western Region (Ellembelle District)
- Volta Region (Ho and Hohoe municipalities)

The study population will include primary participants such as individuals affected by skin NTDs, including LF, BU, Leprosy, CL and yaws. Additionally, secondary participants such as healthcare providers, policymakers, community health workers, and traditional healers will be involved.

Study Design and Phases

A participatory action research (PAR) approach will inform overall design and study phases (design, implement and monitor, evaluate, adjust) as shown in Figure 1.

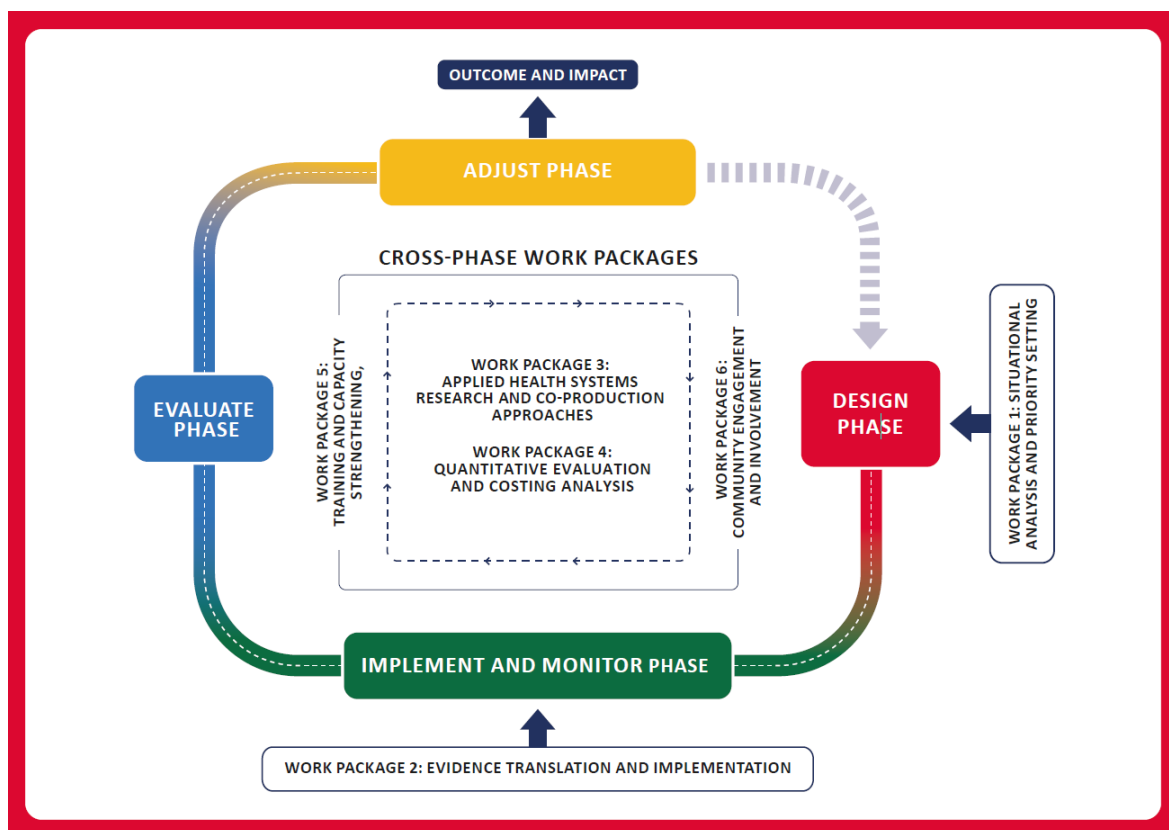


Figure 1. Overview of IMAGINE Ghana study phases and work packages

The underlying principle of co-production and methodology of PAR are critical to our Research approach as they necessitate: working directly with persons affected, policy makers and programme implementers to define the problem, generate and evaluate solutions to facilitate rapid uptake of best practices; and utilising accessible and adaptable communication techniques to ensure that findings are packaged and disseminated to target audiences through a two-way process of dialogue and exchange. Additionally, specific attention will be given to the inclusivity in accessibility of programme outputs, with, for example, easy read versions of outputs being produced. We are working in direct collaboration with the Ministry of Health, Ghana Health Services and persons affected whose needs this research responds to.

Four core and two cross-cutting work packages (WP) will synergistically enable co-production, measurement, implementation and evaluation of interventions to drive forward integrated management of NTDs and MHCs.

A mixed methods approach will be used to achieve the five objectives through the four study phases.

Phase 1: Design phase

In order to respond to workpackage 1, we will seek to document the readiness of the health system to facilitate integrated implementation of interventions for NTDs and MHCs and to catalyse collaborative action amongst regional, national and sub-national stakeholders, including persons affected. This rapid context analysis will take three main approaches:

- 1) A health systems readiness survey will involve the collation a series of key indicators at health facility level, which will be collated based upon review of existing ledgers and data within the facility, as well

as qualitative responses with health workers (the qualitative questions are integrated within existing qualitative tools). The purpose of this tool is to understand the readiness of the health system across levels at hospital, health centre and clinic level to integrate mental health and stigma reduction activities as part of the Essential Care Package for patients with skin NTDs.

2) A qualitative approach to capture the experiences and perspectives of key health systems decision makers, providers, persons affected, their families and communities. We will seek to carry out the following qualitative methods (see table 1 for an overview of the methods and participants). Qualitative methods have been selected in order to provide opportunity to gain in-depth insights of the views, experiences and perspectives of persons with lived experience of skin NTDs and/ or mental health conditions, as well as health workers providing care for people affected by skin NTDs.

- Key informant interviews (KIIs) with health systems actors at national level - these interviews will be conducted to understand the current situation within Ghana regarding existing strategies for the integrated management of co-occurring NTDs and mental health conditions from the perspective of national stakeholders. See table 1 for the range of national stakeholders who will be interviewed.
- KIIs with health systems actors at district level - these interviews will be conducted to understand the current situation within Ghana regarding existing strategies for the integrated management of co-occurring NTDs and mental health conditions from the perspective of district stakeholders.
- In depth interviews (IDI) with health workers at facility level – these interviews will explore the current care available within each level of facility (hospital, health centre, clinic) from the perspective of health workers. As well as exploring through the use of vignettes their current care practices.
- FGDs with CHWs – these FGDs will explore with CHWs their current responses and care practices for persons affected by skin NTDs and mental health conditions.
- Focus group discussions (FGDs) including asset mapping with community groups, e.g. student club for NTDs, men, women and adolescents – these FGDs will map existing community support and explore avenues for strengthening existing assets and forming new partnerships.
- IDIs including asset mapping with community leaders – these IDIs will map existing community support and explore avenues for strengthening existing assets and forming new partnerships.
- IDIs including vignettes with pluralistic providers with traditional healers, herbalists and faith healers – through the use of vignettes this method will explore and understand how pluralistic providers care for persons affected by skin NTDs and mental health conditions.
- FGDs and photovoice with persons affected by skin NTDs and/ or mental health conditions - This method looks at perceptions and experiences of patient’s treatment journey, including enablers and barriers, and the impact of living with an NTD on their mental wellbeing and social participation, captured through photos taken to reflect on patient journey.
- Participatory workshops involving persons affected, utilising problem tree analysis and matrix ranking – these workshops will be used to encourage persons affected to identify their main problems experienced which affect mental wellbeing, as well as exploring the underlying root causes and consequences of these. The matrix ranking will assist them in identifying their priority problems and the priority interventions to address these.

- Illness narrative case studies with persons affected by skin NTDs: these narratives will be completed with persons affected by skin NTDs. Two narrative interactions will be facilitated with persons affected (to form the illness narrative) and one in-depth interview will be completed with a selected family member based on the choice of the person affected as the person who is most critical in their life journey. These case studies will support to understand the syndemic relationships between NTDs, mental health conditions and disability in the Ghanaian context to support to assess the applicability of intervention approaches used to address these interactions from other settings (e.g. Liberia and Malawi).

Table 2 Overview of qualitative and participatory methods, sampling and participants for situational analysis

| Participant | Method | Research question |
|--|-------------------------------------|---|
| National level (7 participants) MOH – MH dept GHS – MH unit GHS - data manager NTD programme (covers LF, Oncho) BU/yaws programme director Leprosy programme director Public health Director | KII | Who are the types of health workers currently managing and delivering NTD and mental health services at all health system levels? What are the governance structures and policies of the health system that are currently helping and hindering collaboration and co-ordination between NTD and mental health service providers? (e.g. policies on organisational interactions and communications between ministerial departments; review of NTD masterplans and associated targets etc). What are the current budgeting processes, financing mechanisms, and resources available to support the delivery of interventions for NTDs and MHCs? |
| District/ DHMS (5 participants*4 districts) Data manager Disease control officer District MH nurse District PH nurse District director of health services | KII | Who are the types of health workers currently managing and delivering NTD and mental health services at all health system levels? What are the views of health providers on the advantages and disadvantages, opportunities and constraints of integrated service delivery for NTDs and MHCs? |
| Facility level (3 facilities*4 districts) One hospital, one health centre and one clinic per district | Health systems readiness assessment | What is the readiness of the health system to integrate mental health within care for people with NTDs? |

| Participant | Method | Research question |
|--|----------------------------|--|
| Health facility (3 facilities*4 districts*6 participants) One hospital, one health centre and one clinic per district Disease control officer (some facilities only) MH nurse PH nurse In charge (facility manager) OPD clinician Adolescent corner | IDI | Who are the types of health workers currently managing and delivering NTD and mental health services at all health system levels? What are the views of health providers on the advantages and disadvantages, opportunities and constraints of integrated service delivery for NTDs and MHCs? |
| Community level (IDI*2CHW per facility*3 facilities*4 districts) CHWs | IDI | |
| Community level (1FGD*3 facilities*4 districts) Community health volunteers/ Community drug distributors | FGD | |
| Community level (3 FGDs*4 districts*6 participants) Leprosy group, Student club for NTD Other NGOs working with MH or NTDs Male group, female group, adolescent group | Asset mapping FGD | Asset mapping to explore what is happening already |
| Community level (2 participants*4 districts) Community leaders | Asset mapping IDI | |
| Pluralistic provider (3*4 districts*6 participants) Traditional Healer Herbalist Faith healer | IDI with vignette | What are the existing and potential roles of pluralistic providers (e.g. religious leaders, traditional healers) in the delivery of interventions for NTDs and/or MHCs? |
| Persons affected and caregivers (2 groups* 4 districts*2) 1 male FGD, 1 female FGD | FGD followed by Photovoice | What do people affected believe are the priority interventions and strategies that could improve their mental wellbeing? |

| Participant | Method | Research question |
|--|--|--|
| NTDs and MHC | | |
| Persons affected (1group* 4 districts) NTDs and MHC | Problem tree Matrix ranking | |
| Narrative Case Study Interviews (20 case studies (5 per district) Person affected leprosy + caregiver Person affected BU + caregiver Person affected LF + caregiver Person affected by cutaneous leishmaniasis + caregiver Person affected by onchocerciasis + caregiver | Narrative Case Study Interviews | What are the syndemic relationships between NTDs, mental health conditions and disability? How applicable are existing intervention approaches from other settings relevant to addressing these interactions in Ghana? |

3) Policy analysis of existing programme documents to understand the necessary tools and resources required to facilitate integrated implementation, as well as the current policy context within Ghana relating to NTDs and mental health.

The primary purpose of the policy analysis will be to develop an understanding of the policy processes, stakeholders and structures that may impact the development and delivery of the integration of mental health within care for people with NTDs in Ghana. This will inform the research design as well as the way that evidence is synthesised, packaged and disseminated. The policy analysis will primarily focus on national policy.

Documents will be obtained by liaising with stakeholders in the Ministry of Health and Ghana Health Service. Once documents are obtained, we will develop a thematic framework to rapidly extract data from the documents, before synthesising the data from all the reports.

Baseline survey with persons affected and general population

At this stage, a census approach will be used to survey all persons affected by NTDs in our study sites. The purpose of this survey is to establish the prevalence of mental health conditions amongst persons affected and examine factors associated with reduced mental health/wellbeing; and gather data that will serve as the baseline for our impact evaluation. The survey will consist of tools recommended in the NTD morbidity toolkit, including the PHQ-9, GAD-7, Warwick mental wellbeing scale, to capture our main study outcomes, namely depression, anxiety and wellbeing. We will also use the EQ-5L-5L

for Quality of Life, Washington Group questionnaire to capture disability, Sari Stigma Scale, and Participation scale, in addition to capturing socio-demographic data (gender, age, education level), disease specific data (NTD type, time since diagnosis, symptom level) and costing questions. Some of these tools have been used previously in our setting; those that have not will be translated and piloted before use.

Participatory intervention design workshops

The final component of phase 1 will be the intervention design workshops, where we will bring together persons affected, key stakeholders from within GHS and MOH and researchers and other key stakeholders e.g. pluralistic providers in a participatory planning workshop. During this workshop findings from phase 1 (policy analysis, health systems readiness assessment, qualitative and participatory research findings) will be presented. Stakeholders will then be asked to reflect on these findings to prioritise and develop interventions to integrated mental health and stigma reduction within care for persons with skin NTDs in Ghana, based on the new and consolidated evidence base. Interventions will draw on global expertise, but will be discussed and reviewed together to ensure these are applicable within the Ghanaian setting.

Phase 2: Implement and monitor phase

This phase will build on the findings from the design phase to introduce a Ghanaian version of the essential care package for NTDs, stigma and mental health. Intervention design and delivery will draw on evidence and expertise. MOH actors will provide technical support during this research phase to ensure interventions developed are feasible and sustainable within routine health systems operations, as well as being aligned to the funding cycles for the NTD programme. This will be led by the national programme, with interventions leveraging on existing programme plans (e.g. updating training materials to include a focus on psychosocial support to be rolled out in routine activities). We will bring together persons affected, health systems stakeholders, researchers and collaborators in a participatory design workshop. This workshop will also engage additional community and health systems stakeholders identified as critical during the design phase and through stakeholder mapping activities linked to the adaption and adoption of final interventions.

Phase 3: Evaluate phase

This phase will involve a multi-disciplinary evaluation of the intervention bundle to make recommendations for future delivery of an essential care package for co-occurring NTDs and MHCs. The details of the evaluate phase will be determined following development of the intervention, and so the methods included in table 2 are provisional for now, and may be adjusted and updated in the amendment to be submitted once details on the intervention are known. Participant numbers for these methods have not yet been estimated and will be included in the subsequent amendment.

Our evaluation takes a realist theory-based approach and is concerned with understanding; what components of our intervention bundle are effective, with which implementation strategies, for whom, in what settings and for how long (Holtrop et al, 2021). We are focused on understanding the impact of the different dimensions of our intervention bundle and the contexts in which they are and

are not effective. Our multi-disciplinary evaluation will be guided by the RE-AIM framework (Holtrop et al, 2021). The RE-AIM framework consists of five core domains that are designed to be considered at different implementation levels from the perspective of different stakeholders: **Reach** and **Effectiveness** (Individual level); **Adoption** and **Implementation** (facility, system and policy level); and **Maintenance** (all levels) (Holtrop et al, 2021).

A range of qualitative methods will be used to evaluate the intervention alongside the quantitative aspects.

The quantitative aspect of the evaluation will consist of a longitudinal cohort study with repeated measures at baseline and 12 months after the start of intervention, to track individual level changes and do an initial assessment of sustainability of the intervention. We will track engagement with the intervention via an 'intervention passport', in which persons affected will collect stamps/stickers for every engagement with the health system in relation to their NTD/Mental Health condition. The evaluation will also include a cost-consequence and cost-effectiveness analysis.

Phase 4: Adjust phase

This phase will work with all stakeholders to review and adapt interventions and to embed successful components within the routine health system management of co-occurring NTDs and MHCs and to make recommendations for the scale-up of the essential care package within Ghana and across the West African region, which may take the form of participation of West African MOH during final dissemination workshop with linked learning visit.

Overview of Methods

Key informant interviews

National and district level KIIs will be conducted with different stake holders to understand the current situation within Ghana regarding existing strategies for the integrated management of co-occurring NTDs and mental health conditions from the perspective of national stakeholders. Envisaged national and district-level stakeholders to be interviewed are listed in Table 3.

Key informants will be purposively selected, according to their knowledge and experience linked to their job role and knowledge of NTD programme, health systems service delivery including human resource management, and broader health and wellbeing in Ghana. The country research teams will approach the key informants through a letter and a follow up telephone call. The purpose of the interview will be made clear to each participant, and they will be asked to provide informed consent and, where relevant, consent of the organisation that they are representing.

Table 3. KII sampling frame and research questions

| Participant | Research question |
|--|--|
| National level (7 participants) MOH – MH dept GHS – MH unit GHS - data manager | Who are the types of health workers currently managing and delivering NTD and mental health services at all health system levels? What are the governance structures and policies of the health system that are currently helping |

| | |
|---|--|
| NTD programme (covers LF, Oncho) BU/yaws programme director Leprosy programme director Public health Director | and hindering collaboration and co-ordination between NTD and mental health service providers? (e.g. policies on organisational interactions and communications between ministerial departments; review of NTD masterplans and associated targets etc). What are the current budgeting processes, financing mechanisms, and resources available to support the delivery of interventions for NTDs and MHCs? |
| District/ DHMS (5 participants*4 districts) Data manager Disease control officer District MH nurse District PH nurse District director of health services | Who are the types of health workers currently managing and delivering NTD and mental health services at all health system levels? What are the views of health providers on the advantages and disadvantages, opportunities and constraints of integrated service delivery for NTDs and MHCs? |

In-depth interviews

IDIs will be conducted with health workers at facility level, to explore the current care available within each level of facility (hospital, health centre, clinic) from the perspective of health workers. As well as exploring through the use of vignettes their current care practices.

IDIs, including asset mapping, will also be conducted with community leaders to map existing community support and explore avenues for strengthening existing assets and forming new partnerships.

IDIs, including vignettes, will also be conducted with pluralistic providers (including traditional healers, herbalists and faith healers) to explore how pluralistic providers care for persons affected by skin NTDs and mental health conditions.

Envisaged stakeholders for IDIs are listed in table 4.

Participants will be purposively selected based on their knowledge and experience linked to their role and knowledge of NTDs, health systems service delivery and broader health and wellbeing in Ghana. The purpose of the interview will be made clear to each participant, and they will be asked to provide informed consent and, where relevant, consent of the organisation that they are representing.

Table 4. IDI sampling frame and research questions

| Participant | Research question |
|-------------|-------------------|
| | |

| | |
|--|---|
| Health facility (3 facilities*4 districts*6 participants) Disease control officer (some facilities only) MH nurse PH nurse In charge (facility manager) OPD clinician Adolescent corner | What is the readiness of the health system to integrate mental health within care for people with NTDs? Who are the types of health workers currently managing and delivering NTD and mental health services at all health system levels? What are the views of health providers on the advantages and disadvantages, opportunities and constraints of integrated service delivery for NTDs and MHCs? |
| Community level (2 participants*4 districts) Community leaders | |
| Community level (IDI*2CHW per facility*3 facilities*4 districts) CHWs | What is the readiness of the health system to integrate mental health within care for people with NTDs? Who are the types of health workers currently managing and delivering NTD and mental health services at all health system levels? What are the views of health providers on the advantages and disadvantages, opportunities and constraints of integrated service delivery for NTDs and MHCs? |
| Pluralistic provider (3*4 districts) Traditional Healer Herbalist Faith healer | What are the existing and potential roles of pluralistic providers (e.g. religious leaders, traditional healers) in the delivery of interventions for NTDs and/or MHCs? |

Focus group discussions

Focus group discussions will be conducted at the community level with two types of respondents: CHWs and community groups e.g. student club for NTDs, men, women and adolescents. FGDs with CHWs will explore their current responses and care practices for persons affected by skin NTDs and mental health conditions. Community group FGDs will include asset mapping and will map existing community support and explore avenues for strengthening existing assets and forming new partnerships.

The envisaged sampling frame is listed in table 5. Respondents will be purposively selected per study site to ensure maximum variation in geography, disease burden and health systems infrastructure.

The discussions will be tape recorded after gaining permission from the participants. One researcher will facilitate the discussion using a topic guide whilst another researcher takes notes and observes the interactions. The discussions will take place in a private room. It is anticipated that most of these FGDs will be conducted in English and will take 1 ½ to 2 hours.

Table 5. FGD sampling frame and research questions

| Participant | Research question |
|---|---|
| Community level (1FGD*3 facilities*4 districts) CHVs/CDDs | What is the readiness of the health system to integrate mental health within care for people with NTDs? Who are the types of health workers currently managing and delivering NTD and mental health services at all health system levels? What are the views of health providers on the advantages and disadvantages, opportunities and constraints of integrated service delivery for NTDs and MHCs? |
| Community level (3 FGDs*4 districts) Leprosy group, Student club for NTD Other NGOs working with MH or NTDs Male group, female group, adolescent group | Asset mapping to explore what is happening already |

Photovoice

Photovoice will be used to make visible the often ‘hidden’ context of everyday lives of persons affected by skin NTDs and/or mental health conditions, not just through the images themselves but through the discussion and interpretation of the images. This method will explore perceptions and experiences of patient’s treatment journey, including enablers and barriers, and the impact of living with an NTD on their mental wellbeing and social participation, captured through photos taken to reflect on patient journey.

Participants will be asked to take photographs of their work, their work environment, their interactions with the health system, with a particular focus on skin NTDs, however, photographs will not be limited to these areas. Participants will choose themselves what they want to photograph and will discuss what this means to them. Should a participant wish to take a photo of people, then participants will be advised to ask verbal consent from the person to be photographed. All participants will initially be provided with a one-day training, facilitated by the researchers to provide an overview of the research, the ethics of taking photos, safeguarding concerns and how to use the cameras or smart phones provided. The photovoice process adapted from Ronzi et al (2019) is described below.

Step One: Participants will be asked to take pictures over a three-month period.

Step Two: Separate monthly reflective meetings between persons affected and the research team will take place. Perceptions and experiences of patient’s treatment journey will be explored through the

following questions: describe your photo, what is happening in the photo, why did you take this photo, how does this photo affect us, what can we do about it. These discussions will be recorded following permission from each of the participants and notes from the discussions taken.

Step Three: At the end of the three month-period, participants will be asked to pick 10-20 key photos that they would be willing to talk about in a group and take forward for further analysis.

Step Four: Focus groups (separated by the categories of participants), where participants will then be asked to present their key photographs using similar questions to those described above will be facilitated by the research team. As each participant presents the group will be asked to group photos that show similar things together and a description of that theme written on flipchart with the support of the research team. Participants will collectively decide which photograph(s) they want to display at the photo exhibition to represent each theme and their associated captions agreed. The group will also be asked to discuss solutions to the challenges identified. This discussion will be recorded following permission.

Step Five: Photos will be disseminated in a photo exhibition which will also involve discussion of solutions to challenges faced with wider stakeholders.

Data analysis will occur alongside the photovoice study with participants identifying the research findings which they want to present and identifying captions to explain their photos as part of the process. The recordings from the discussions will be transcribed verbatim and analysed using the thematic framework approach described within the data analysis section

Illness narratives

Illness narrative case studies with persons affected by skin NTDs: these narratives will be completed with persons affected by skin NTDs. Two narrative interactions will be facilitated with persons affected (to form the illness narrative) and one in-depth interview will be completed with a selected family member based on the choice of the person affected as the person who is most critical in their life journey. These case studies will support to understand the syndemic relationships between NTDs, mental health conditions and disability in the Ghanaian context to support to assess the applicability of intervention approaches used to address these interactions from other settings (e.g. Liberia and Malawi).

Illness narratives will be conducted in the language of preference of the participant by one member of the research team. They will last for approximately one hour. Prior to the activity commencing participants will be approached to take part either in person or through telephone contact. The study will be explained to participants who will have the right to refuse. Information sheets will be shared with participants either verbally or in writing depending on the literacy level and preference of the participant. Participants will be given the opportunity to ask any questions in advance of the activity and the study re-explained prior to the activity commencing. If participants are willing to take part, they will be asked to sign a written consent form or verbal consent taken in the presence of a witness if they are illiterate or unable to sign. As with other methods, participants will be made aware at the outset that they will have the opportunity to be referred to a mental health provider if they feel they need it as a result of workshop participation. All participants will be given the right to withdraw from the study at any time.

Participatory workshops

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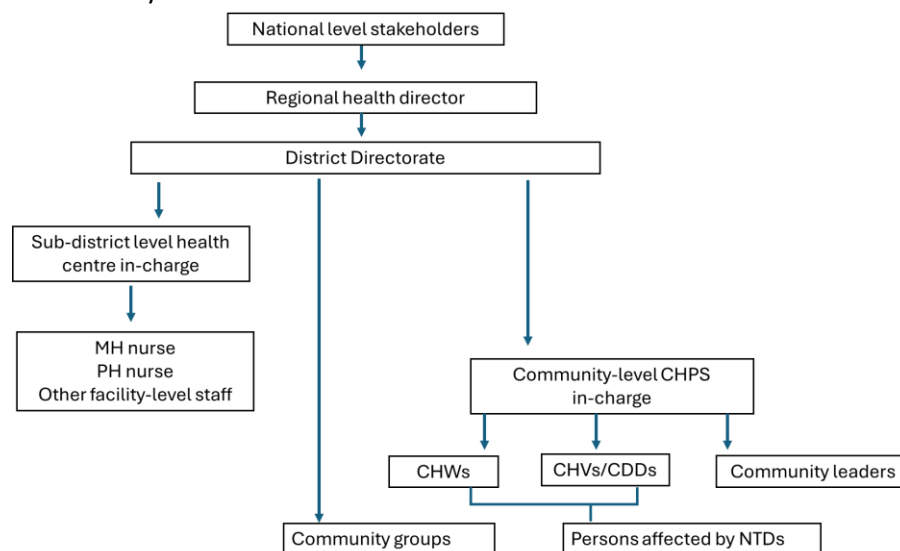
We will conduct a series of participatory workshop with persons affected utilising problem tree analysis and matrix ranking. Workshops will be used to encourage persons affected to identify their main problems experienced which affect mental wellbeing, as well as exploring the underlying root causes and consequences of these. The matrix ranking will assist them in identifying their priority problems and the priority interventions to address these.

For all participatory workshops, participants will initially be approached in person and the study will be explained to them. Information sheets will be shared with participants in advance of the interview either verbally or in writing depending on the literacy level and preference of the participant. Participants will be given the opportunity to ask any questions in advance of the workshop and the study re-explained prior to the activity commencing. If participants are willing to take part, they will be asked to sign a written consent form or verbal consent taken in the presence of a witness if they are illiterate or unable to sign. Participants will be made aware at the outset that they will have the opportunity to be referred to a mental health provider if they feel they need it as a result of workshop participation. All participants will be given the right to withdraw from the study at any time. Each workshop will take no more than 2 hours.

Recruitment and sampling

Qualitative recruitment of participants

The following diagram shows the flow of recruitment of participants for the qualitative components of this study. All information sheets that will be used can be found in our study toolkit.



National level participants:

National level representatives have already been involved in grant development workshops and previous engagements and will be contacted via email or phone by one of our research fellows. Information sheet and consent form will be sent via email, after which the participant will be asked to propose a suitable date and time for a remote or in-person interview. On the day of data collection,

our researcher will go over the information sheet, offer the opportunity for questions, and take informed consent via signature.

District level

We will obtain a letter from relevant regional health directors, to inform district director of our study. After providing approval, the district director will provide the research fellows with contact details for other relevant directorate staff (director MH/PH nurses, data manager). These will be approached via phone to schedule a suitable time for a visit from our research fellow. During the visit, the research fellow will provide a verbal explanation about the study and information sheet and will schedule another appointment for an in-person interview, at least 24 hours later. Written informed consent will be obtained via signature prior to interview.

Health centres:

After they have given permission, district directorates will provide our research fellows with the contact details of the in-charge at selected sub-district health facilities. These will be approached via phone to schedule a suitable time for a visit from our research fellow. During the visit, the research fellow will provide a verbal explanation about the study and information sheet and will schedule another appointment for an in-person interview, at least 24 hours later. The in-charge will also be asked to provide contact details for other facility staff (e.g. MH nurse, PH nurse, etc), for whom the recruitment process will be the same. Written informed consent will be obtained via signature.

Community level (CHPS)

At community level, the District Directorate will also provide contact details for the in-charge of the CHPS facilities, who will put the team in touch with CHWs and CHVs. The study team will visit the CHPS, to speak to the in-charge, CHWs and CHVs. Community groups will be identified through the directorate, CHWs and CHVs. Our research team will make a first approach by visiting the group leaders, together with the CHWs/CHVs. Community leaders (e.g. chiefs) will be identified by the CHPS in-charge, who will be asked to pre-inform the leaders about our study, and who will accompany the study team when making a first approach in person. Persons-affected will be identified through CHWs, CHVs, or through snowballing via other persons affected. The CHW/CHV or person affected will join the research team in making the first approach and introducing the study.

For group/community leaders and persons affected, the rest of the consenting process will be as follows: during a first visit, our research team will verbally explain the study, going over the information sheet. At least 24 hours later, they will return to provide another verbal explanation, the opportunity to ask questions, and obtain informed consent via signature or thumbprint, before proceeding with the interview.

Baseline survey: We will conduct use a census approach to survey the NTD population in the 4 intervention sites (expected n=200). NTD patients will be identified as follows: We will work with the district health directorate to identify health facilities with NTD cases in each intervention district (CHPS and health centres). Where available, we will obtain a list from the district health officer with names and contact numbers of persons affected with NTDs registered in these facilities. We will also visit traditional/faith healers in the vicinity of the selected health facility, to ask if they have any NTD patients under their care. Finally, we will speak to community health workers

attached to the local facility, and, upon completion of the survey, we will ask persons affected if they know of anyone else who is affected by one of the target conditions, to identify any non-registered persons affected via snowballing method. As such, it is expected that our census will contribute to case finding. The number of target health facilities will be expanded until we reach the required sample size; once a health facility is selected, we will complete our census, even if this takes us beyond the required sample size.

The first approach will be made by a research assistant, together with a CHV, who will visit the person affected in the community. The research assistant will verbally explain the purpose of the study and provide an information sheet. If the participant is happy to participate, the research assistant will agree to return the next day, or at a date and time of the participants choosing. On the day of the survey, the research assistant will again explain the purpose of the study, provide an opportunity to ask questions and obtain written informed consent via thumbprint or signature.

Policy brief

The primary purpose of the policy analysis will be to develop an understanding of the policy processes, stakeholders and structures that may impact the development and delivery of the integration of mental health within care for people with NTDs in Ghana. This will inform the research design as well as the way that evidence is synthesised, packaged and disseminated. The policy analysis will primarily focus on national policy.

Documents will be obtained by liaising with stakeholders in the Ministry of Health and Ghana Health Service. Once documents are obtained, we will develop a thematic framework to rapidly extract data from the documents, before synthesising the data from all the reports.

Data Analysis

Analysis will be completed collaboratively between all members of the research team.

Qualitative data

The participatory nature of workshops involved in phase one of this study mean that analysis will be an ongoing process involving study participants. The products of each of the participatory workshops, will each feed into the participatory planning meeting in phase two to allow for informed action planning. To harmonise across activities however, the research team will keep a log of key issues and discussion points from each of the participatory workshops to feed into the participatory planning activities.

For components of participatory workshops phase one, where notes and recordings (with the agreement of participants) are transcribed, these will be analysed thematically using a framework approach as described below³¹. All other qualitative data will also be analysed using this approach.

This thematic analysis will be conducted by the research team and also feed into the participatory planning activities for validation and consideration.

Thematic Framework Approach

Phase 1: Data Management

Step 1: Familiarisation - the analysis team will read and re-read the verbatim transcripts to 'familiarise' themselves with the data. Whilst doing this they take note of key themes emerging.

Step 2: Developing a thematic/coding framework - a framework through which to sort the data will be developed based on original aims and objectives and any inductive themes identified during the familiarisation process.

Step 3: Indexing/coding data - the thematic/coding framework will be applied to all the data. This will be assisted by the use of NVIVO software. If teams are unfamiliar with NVIVO software, training will be provided.

Phase 2: Data Explanation

Step 4: Charting - data will be lifted from its original context based on its allocation to the coding/thematic framework and placed within a chart.

Step 5: Mapping - the final stage of the process will be to interpret, and map the range of polarities and similarities within the data.

Qualitative analysis software NVIVO 12 will be used to support data management and analysis.

Quantitative data

Data will be analysed using R.

At baseline, we will first use the NTD population dataset, to explore our main outcomes (mental health and quality of life of people affected). Using descriptive statistics, we will calculate the prevalence of depression and anxiety and summarise other key variables. The data will be presented separately by sex. We will use inferential statistics (multivariable linear regression analysis) to explore associations between mental health, quality of life, stigma and demographic variables. We will include interaction effects to see if the effect of predictors on our main outcomes differs from sex.

We will also specifically explore the relationship between mental health and time since diagnosis, symptom severity, disability and functioning, using inferential statistics (multivariable linear regression), including interaction terms between key variables and sex.

The endline analysis will include descriptive statistics to summarise outcomes at each time point, stratified by sex. To evaluate changes over time and potential sex differences, we will use linear mixed-effects models with random intercepts for participants. Fixed effects will include time, sex, and a time \times sex interaction term to assess whether the trajectory of mental health outcomes differs between males and females. Model assumptions will be checked, and sensitivity analyses will be conducted as appropriate.

Findings from both qualitative and quantitative analyses will be integrated to provide a holistic understanding of how mental health services can be effectively incorporated into NTD programs. Triangulation of data sources will enhance the reliability and validity of study findings, ensuring that recommendations are evidence-based and actionable.

Dissemination, Outputs and Anticipated Impact

Our approach to impact is guided by our IMAGINE Ghana Theory of Change (Figure1); and which will be regularly reviewed at consortium meetings to reflect any changes in context.

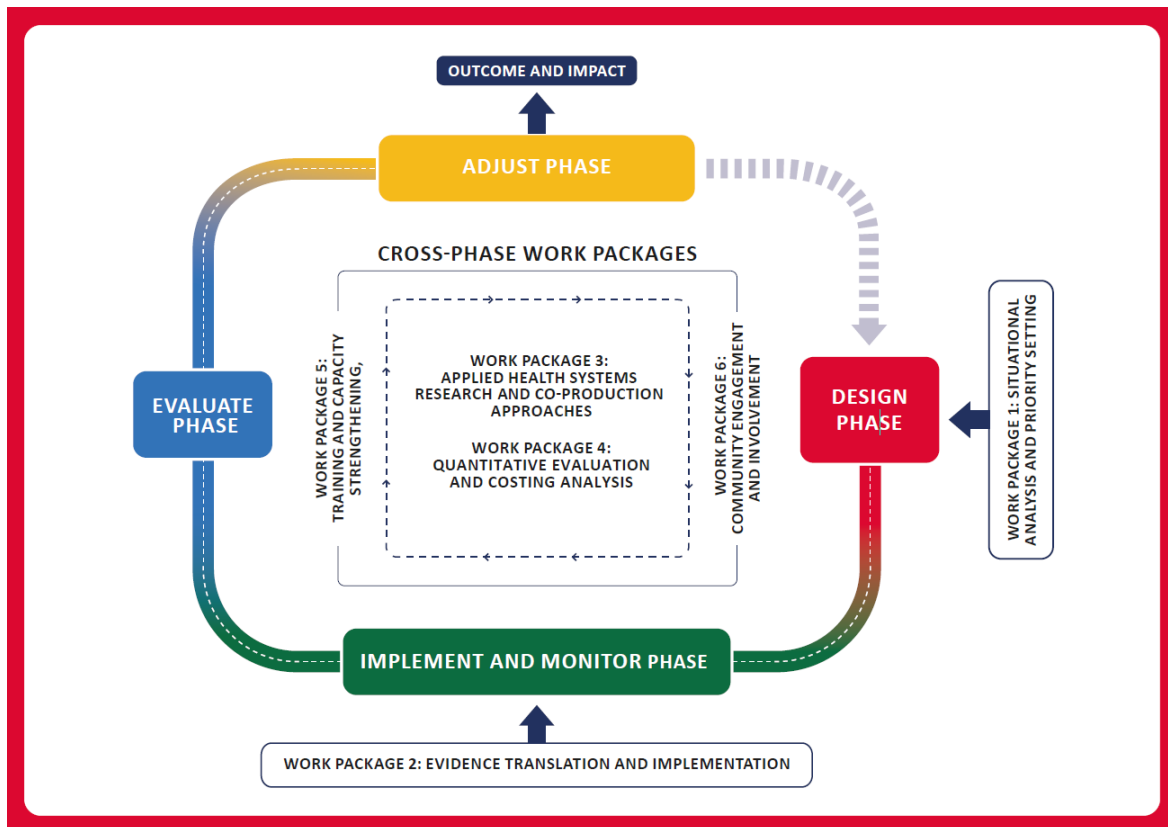


Figure1. Overview of IMAGINE Ghana study phases and work packages

Our impact at the **global level** will be to: Drive advances in the **development and evaluation of interventions and strategies for improved treatment and management of co-occurring NTDs and MHCs within LMICs.**

Our global impact will be accompanied by impact within Ghana at three key levels:

Individual: People affected (and their families) have access to integrated services for the prevention, treatment and management of co-occurring NTDs and MHCs, they experience less stigma and discrimination, and have more opportunity to participate within the life of their community.

Community: Contribute to increasing health literacy related to NTDs and MHCs leading to a reduction in stigma, social exclusion and poverty (through reduced discrimination in social and work spaces).

National: Effective co-ordination collaboration and access to evidence-based information for the provision of an essential care package for co-occurring NTDs and MHCs delivered as part of integrated case management interventions that are embedded within stronger and more responsive health system.

Impacts will be realised through achieving the following **outcomes**:

Outcome 1: Evidence on the most effective, acceptable, affordable, equitable, inclusive and sustainable context-specific community, health and social systems-based interventions for co-occurring NTDs and MHCs integrated into programme strategies by government, regional and international stakeholders.

Outcome 2: Improved capacity among health system and community stakeholders to identify intervention solutions, and to promote a culture of working together to co-produce, implement, assess and adapt interventions to respond to holistic care needs and rights of people affected by co-occurring NTDs and common MHCs.

Systematic inclusion of the needs and priorities of affected persons within the design, delivery, monitoring and evaluation of system-based interventions to ensure equitable management of co-occurring NTDs and common MHCs that meets the needs of vulnerable populations and promotes social inclusion and stigma reduction.

Outcome 3: Evidence on the most effective, acceptable, affordable, equitable, inclusive and sustainable context-specific community, health and social systems-based interventions for co-occurring NTDs and MHCs integrated into programme strategies by government, regional and international stakeholders.

Outcome 4: Improved capacity among health system and community stakeholders to identify intervention solutions, and to promote a culture of working together to co-produce, implement, assess and adapt interventions to respond to holistic care needs and rights of people affected by co-occurring NTDs and common MHCs.

Outcome 5: Established technical and community advisory groups of policy makers, practitioners, researchers, persons affected and other community stakeholders collaborating together, and learning from each other, to identify and implement solutions for the integrated management of NTDs and common MHCs.

Our approach to Engagement, Research Uptake and Maximising Impact

Our approach to research uptake builds on many years' experience of generating policy relevant research in partnership with a range of stakeholders; working directly with program managers and policy makers in the definition of the problem and execution of the research to facilitate rapid uptake of best practices; overcoming barriers to the use of evidence; and applying best practice communications techniques to ensuring that findings are packaged and disseminated to target audiences through a two-way process of dialogue and exchange. We have designed IMAGINE Ghana to maximise impact based on prior experience through REDRESS.

Partners already have strategic platforms for research uptake, with relationships established with persons affected, Ministry of Health Mental Health and NTD programmes, health workers and community actors (e.g. religious leaders or traditional healers). We will engage with digital means of dissemination building on existing networks of persons affected e.g. leprosy patient groups, where these exist. We will engage with key audiences as follows:

With persons affected and community public involvement organisations: We will engage with persons affected through involvement in community advisory board, as co-researchers, during regular participatory workshops and dissemination meetings.

Within government bodies and key stakeholders in Ghana: We will actively communicate through presentations and dialogue at technical review meetings and NTD annual review processes. We will also work with stakeholders such as the NTD ambassador for Ghana, Rev. Dr Joyce Aryee, to reach high-level decision makers; build new platforms and engage with pre-existing coalitions (e.g. National Union(s) of the Disabled); conduct sensitisation meetings with national bodies and supporting their capacity to access, understand and apply research evidence; and participate in national meetings and research forums.

Within the wider LMIC community: We are actively connected to many working groups and networks that are of strategic benefit to the uptake of this work. E.g. NGDO Network on NTDs (NNN) Disease Management, Disability and Inclusion (DMDI) technical working groups, including those which focused on the development of the ECP for NTDs and Mental Health. Members of the IMAGINE GHANA team also serve as members of key bodies to WHO involved in NTD strategy and research, such as WHO Operational Research Working Group on Skin NTDs (Dean). IMAGINE GHANA will also leverage additional formal dissemination channels where there is discussion with the wider LMIC community, for example; COR-NTD, ASTMH, Health Systems Global.

Capacity strengthening

Individual- To meet our capacity and capability strengthening objectives a capacity needs assessment will be carried out followed by working with early career researchers to development plans identifying short, medium and long-term opportunities to develop individual skills against need. Training will be nested in a wider approach to capacity strengthening with the development of individual personal development plans reviewed on an annual basis.

Institutional- we will develop the capacity of all partners and their systems to support the development of research infrastructure for the evaluation of interventions and strategies for improved treatment and management of NTDs and MHCs in Ghana. Plans for areas of strengthening will be established following an institutional needs assessment and planned according to budget.

Given the sensitivity of the issues we are working on, we will focus on generating and sharing lessons from navigating ethical challenges and co-producing and monitoring safeguarding risk assessments and strategies to minimise risk (Mansaray et al, 2022, Aktar et al, 2020). Inclusion will be central within our co-produced safeguarding plans, ensuring that people with disabilities are kept safe and enabled to access reporting mechanisms (e.g. ensuring there is not a single methodology for reporting cases of concern). We also recognise the barriers for many lived experience organisations in participation and will seek to provide organisational support for leadership through the programme to enable them to more consistently be equipped to contribute to IMAGINE GHANA and future programmes.

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