Maintains

Research supporting social services to adapt to shocks

Evaluation of the Second-Generation Health Extension Programme's impact on health post capacity to prevent, prepare for and respond to shocks in selected areas of Ethiopia

Research Plan

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About Maintains
Maintains aims to save lives and reduce suffering for people in developing countries affected by shocks such as pandemics, floods, droughts, and population displacement. The programme is building a strong evidence base on how health, education, nutrition, and social protection can respond more quickly, reliably, and effectively to changing needs during and after shocks, whilst also maintaining existing services. With evidence gathered from six focal countries—Bangladesh, Ethiopia, Kenya, Pakistan, Sierra Leone, and Uganda—Maintains informs policy and practice globally. It also provides technical assistance to support practical implementation.

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Executive summary

The Government of Ethiopia is committed to enhancing effective public health emergency management and the health system's ability to withstand shocks, including through strong primary and community health care. The UK Department for International Development (DFID) is supporting these government efforts through several channels, including Maintaining Essential Services After Natural Disasters (Maintains). Maintains is a five-year DFID-funded global research programme, launched in 2018 and implemented in six countries, Pakistan, Bangladesh, Ethiopia, Kenya, Uganda and Sierra Leone. The programme aims to develop an improved evidence base on how social services can expand and adapt in response to shocks such as floods, droughts, disease outbreaks and population displacement. Enhanced evidence and practice from the six focal countries will inform policy and practice globally. Maintains is implemented through a consortium led by Oxford Policy Management (OPM).

Maintains conducts operationally relevant research on how education, health, social protection, and nutrition services can adapt and expand in response to shocks. In each country one or two social sectors have been selected, based on DFID priorities in country, as well as ongoing national debates relevant to the programme.

The Policy Research into Action Cycle (PRActiCle) approach ensures that research is.

- **Operationally relevant** - will inform the policies and programmes of DFID country offices as well as other stakeholders.
- **Accessible** - building on both demand and supply and is easily internalised in decision making.
- **Nimble, flexible, and highly adaptive** to the strategic direction of the DFID country programmes building on available opportunities.
- **Actionable** – so products can be practically used by DFID country offices and other stakeholders

In Ethiopia, **the Maintains research focuses on health, and specifically on the effect of the Second Generation Health Extension Programme (HEP) on health post shock responsiveness.** The Second Generation HEP is a major government initiative designed to strengthen provision of primary and community health care. This research focus was jointly selected with the Federal Ministry of Health (FMOH), Ethiopian Public Health Institute (EPHI), DFID and other stakeholders**.**

The proposed research focuses on the extent to which implementing Second Generation HEP strengthens health post capacity to prevent, prepare for and respond to shocks, including through enhanced household coverage of key services. The research aims to support the Government of Ethiopia and partners in their efforts to strengthen the ability of the frontline health care system to cope with shocks by assessing the value of the Second Generation HEP approach for enhancing shock responsiveness, scalability of Second Generation HEP, and areas where further support to health posts is needed for effective shock prevention, preparedness and response.

The research will focus on droughts, floods and disease outbreaks (including COVID-19), as particularly significant shocks for public health in Ethiopia, but we will also include some information on Internally Displaced Persons (IDPs).

Specific research questions are as follows:

1. To what extent does the Second Generation HEP enhance health post capacity to prevent and prepare for shocks?

2. To what extent does the Second Generation HEP enhance health post capacity to respond to shocks and maintain delivery of routine services during shocks?

3. To what extent does the Second Generation HEP affect Health Extension Worker (HEW) roles in relation to shock prevention, preparedness and response, and their motivation and capacity to conduct these roles?

4. What factors affect the influence of Second Generation HEP on health post shock responsiveness, including fidelity and intensity of Second Generation HEP implementation, other health system characteristics, wider individual, community or environmental factors, and the nature of the shock?

The research uses a theory-based, mixed-methods design combining the following research activities:

1. **Quantitative baseline and endline surveys** at health post, HEW and household levels. The household-level survey will measure impact on areas such as service coverage and trust in health services as well as HEP contact; the HEW survey will investigate factors such as HEW motivation, capacity and activities; and the health post survey will focus on factors such as Second Generation HEP implementation fidelity and health post capacity.

2. **Quarterly health post phone surveys** to track the implementation of Second Generation HEP (including fidelity and intensity) and the occurrence of shocks, and to collect data on service coverage.

3. **Review of secondary data** on shock occurrence and routine health data, to assess shock exposure and changes in health service coverage.

4. **Key Informant Interviews** (KIIs) at baseline and endline with health managers at national, regional, zonal and woreda level to understand their views on the effects of Second Generation HEP and factors affecting this.

5. **Qualitative research at the health post and community levels**. Qualitative case studies of selected health post catchments (approximately 6 at each of baseline and endline) will be used to understand how Second Generation HEP affects outcomes and factors affecting this, using observation, HEW interviews and community focus group discussions. Case study sites will be selected for areas that are or have recently experienced different kinds of shocks, including presence of IDPs.

The research focuses on rural health posts and will be implemented in one or two regions of Ethiopia with an adequate level of Second Generation HEP rollout, and in woredas with high exposure to shocks.

Research is being conducted over 2020-21, with a baseline in late 2020 and endline in 2021. The research has been adapted to the COVID-19 situation, providing information on responses to and impacts of COVID-19 on primary health care and adapting methods depending on different COVID-19 scenarios and implications for fieldwork.

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AWD	Acute watery diarrhoea
CMAM	Community-based moderate acute malnutrition
DFID	UK Department for International Development
EPHI	Ethiopian Public Health Institute
FMOH	Federal Ministry of Health
HDA	Health Development Army
HEP	Health Extension Programme
HEW	Health Extension Worker
HMIS	Health Management Information System
HP	Health post
HSTP	Health Sector Transformation Plan
IDPs	Internally displaced persons
INFORM	Index for Risk Management
Maintains	Maintaining Essential Services after Natural Disasters
MAM	Moderate Acute Malnutrition
OPM	Oxford Policy Management
PHEM	Public health emergency management
PLW	Pregnant and lactating women
PSM	Propensity Score Matching
SAM	Severe Acute Malnutrition
SNNP	Southern Nations, Nationalities and People
UNICEF	United Nations Children's Fund
UNOCHA	United Nations Office for the Coordination of Humanitarian Affairs
WASH	Water, Sanitation, and Hygiene
WFP	World Food Programme
WHO	World Health Organization
WoHO	Woreda Health Office

1 Introduction

The Government of Ethiopia is committed to enhancing effective public health emergency management and the health system's ability to withstand shocks, including through strong primary health care. A health system that is effectively structured to prevent, prepare for and respond to shocks is essential for reducing the burden of disease and mortality caused by floods, droughts, disease outbreaks and other shocks that affect the need for and delivery of health services. The UK Department for International Development (DFID) is supporting the Government of Ethiopia in these efforts, including through collaboration on the Maintaining Essential Services After Natural Disasters (Maintains) operational research programme.

In this section, we introduce the overall Maintains programme and the research focus in Ethiopia. Following this introduction,

- Section 2 provides background information on the context and shock responsive health systems
- Section 3 explains the approach to developing the research plan
- Section 4 describes the research objectives and overall research design
- Section 5 explains how the research plans will address the COVID-19 pandemic, and
- Section 6 outlines planned dissemination strategies.

1.1 Programme background

Maintaining Essential Services after Natural Disasters (Maintains) is a five-year research programme that aims to develop an improved evidence base on how education, health, social protection, nutrition, and water, sanitation, and hygiene (WASH) services can adapt and expand in response to shocks, such as floods, droughts, cyclones, and disease outbreaks. The project covers six countries (Ethiopia, Kenya, Uganda, Sierra Leone, Pakistan, and Bangladesh) and has three strategic components:

Component 1: Research what works to deliver essential services that effectively respond and flex in response to natural disasters, in other words research on shock responsiveness essential service delivery.

Component 2: Integrating learning from Component 1 back into DFID foal countries through technical assistance.

Component 3: Promoting research uptake from Component 1 across DFID and the international community to ensure that findings lead to maximum impact.

The programme runs over two phases:

Phase I: A design phase, where the approach set out in the bid is refined and tailored to changes in the focus country contexts. Phase I lasts from September 2018 to March 2019.

Phase II: A phase that is focused on the implementation of the agreed design, which will last from March 2019 to June 2023.

According to the business case, *'The ultimate outcome of Maintains will be that countries are more able to effectively manage their risk, with essential services able to respond more quickly, more reliably and at lower cost, during and after a shock.'* Maintains aims to find out why and how essential services may fail in times of shock or disaster, and how they could be

prevented from doing so. In answering five research questions, evidence gathered from Maintains can be used to inform current programming and future programme design:

- How can programmes and systems be designed so that they are not only resilient to disasters but can also expand and adapt their provision of essential services in response to shocks?
- How should decisions be made about targeting shock-responsive essential services?
- What should be in place before a shock strikes so that a scaled response can be implemented efficiently?
- How should risk financing be designed to support a timely, reliable, and cost-effective response?
- How feasible is a shock-responsive approach in different contexts?

1.2 The research focus in Ethiopia

Through discussion with the Federal Ministry of Health (FMOH), Ethiopian Public Health Institute (EPHI), DFID and other stakeholders, it was agreed that the Maintains research in Ethiopia should focus on the health system, and specifically on evaluating the effect of the Second Generation Health Extension Programme (HEP) on health post shock responsiveness[1]. The Second Generation HEP is a major government initiative designed to strengthen provision of primary health care through more qualified community health workers, upgraded health post infrastructure and an expanded package of community health services (explained in more detail in Section 2). Understanding the impact of the Second Generation HEP is a priority for FMOH and also in line with DFID's health systems support in Ethiopia.

The research will support the Government of Ethiopia's efforts to enhance health systems resilience and public health emergency management. Improved Health Emergency Risk Management is a strategic objective in the national Health Sector Transformation Plan, with a focus on capacity to prevent, detect, mitigate, respond and rapidly recover from crises such as disease outbreaks, acute malnutrition and natural disasters [1]. The Ethiopia Public Health Institute's Public Health Emergency Management Directorate is responsible for coordinating and assisting national efforts to prevent and respond to shocks [2]. Activities to enhance preparedness include strengthening risk assessment, surveillance and early warning systems, development of the Public Health Emergency Operating Centre, and strengthening the health emergency workforce [1]. However, the Health Sector Transformation Plan also emphasises the need to strengthen "health system resilience by reinforcing a community-centred primary health care approach" [1]. This highlights the role of the HEP in public health emergency management, shock prevention and response.

The Maintains research seeks to gather relevant and robust evidence to support the Government of Ethiopia and partners in these efforts to strengthen frontline health care capacity to cope with shocks. The research will inform policy thinking on the value of the Second Generation HEP approach for enhancing shock responsiveness, scalability of the Second Generation approach, and areas where further support to health posts is needed for effective shock prevention, preparedness and response. As well as supporting effective interventions for shock responsive community health care, the focus on Second Generation HEP has the potential to contribute evidence on health system strengthening more broadly.

[1] Agreed based on options circulated to FMOH and EPHI 22 January 2020 'MAINTAINS - Ethiopia research question options', and meeting with FMOH HEP Directorate and DFID on 3 February 2020.

1.3 Overarching research objective

In line with the DFID Maintains business case, 'shock-responsive' is defined as "the ways in which systems and programmes can be adapted to make them more resilient to shocks and more able to adapt to change in demand following shocks so that those affected are able to continue receiving the services that they need" [3]. For the Ethiopia research plan, we operationalise this definition by considering four components of health system shock responsiveness: shock prevention, preparedness, response to shocks and continuing delivery of routine services during shocks.

Based on this, the overall objective of this research is to generate evidence on the extent to which implementing Second Generation HEP strengthens the capacity of health posts to prevent, prepare for and respond to shocks, and to continue delivering routine services during shocks. Specific objectives and outcomes related to these areas are indicated in Section 3.1, based on the background understanding set out in Section 2.

This overarching research objective relates to the global Maintains research questions on:

- How can programmes and systems be designed so that they are not only resilient to disasters but can also expand and adapt their provision of essential services in response to shocks?
- What should be in place before a shock strikes so that scaled response can be implemented efficiently?

Specifically, in relation to these questions, the research in Ethiopia will generate evidence on whether more qualified community health workers, a broader service package and enhanced infrastructure (the Second Generation HEP components) make primary health services more resilient and able to support shock response.

The research will focus on droughts, floods and disease outbreaks, as particularly significant shocks for public health in Ethiopia, but we will also include some information on Internally Displaced Persons (IDPs). In relation to disease outbreaks, the research will include examination of the health post response to COVID-19 as one particularly significant shock (see Section 5). The research will focus on rural health posts in woredas with high exposure to these types of shocks in selected regions.

2 Background on the HEP and shock responsive health services

In this section, we provide background information that has informed the research questions and design. This includes information on health system shocks in Ethiopia, Second Generation HEP, requirements for shock responsive health systems, the role of community health workers, preliminary ideas about how Second Generation HEP may contribute to shock responsiveness, aspects of context that may affect this, and considerations related to the influence of gender and other aspects of social inclusion. This background material has been developed through reference to global literature on health systems, community health workers, and resilient and shock responsive health systems; research and policy documents on the health system, Health Extension Workers (HEW) and shocks in Ethiopia; and information obtained from stakeholders including FMOH and Regional Health Bureaus.

2.1 Health system shocks in Ethiopia

The Government of Ethiopia's focus on public health emergencies reflects the high frequency of droughts, floods, disease outbreaks, internal displacement and other health system shocks. The INFORM Global Risk Index uses 50 indicators to identify countries at risk from humanitarian crises and disasters that could overwhelm national response capacity. Ethiopia is one of three countries where the risk is classified as ‘very high and increasing’ [4]. For both the annual expected exposure of people to floods and people affected by droughts, Ethiopia has the maximum rating [5]. In addition, Ethiopia is in the highest 6% of countries globally for risk of epidemics [6].

Droughts are frequent in some areas of Ethiopia, and lead to water borne diseases and acute malnutrition [2]. Vulnerability to drought is affected by dependence on rain-fed agriculture, land degradation, climate change, rapid population growth, and low crop and livestock productivity [2]. In 2019, erratic and below-normal rainfall resulted in water and pasture shortages and poor conditions for livestock and crops, and conflict exacerbated food insecurity [7]. Analysis in six regions indicated that around 8 million people were severely food insecure between July and September 2019 [7]. The ongoing Desert Locust infestation is further threatening food insecurity, having damaged around 200,000 hectares of cropland and with new swarms appearing [8, 9]. Food insecurity combines with disease outbreaks, water shortages and poor sanitation to increase malnutrition, which creates disease complications and further heightens the risk of disease outbreaks [7].

Catastrophic flooding is also a regular event. In early September 2019, floods affected over 5,400 households and displaced around 2,000 people, and also destroyed crops and livestock [7]. Further floods in October and November 2019 affected additional households [7].

Disease outbreaks are also common, sometimes related to floods, drought, food insecurity and displacement but also reflecting gaps in vaccination coverage and poor living conditions, especially in rural areas [7]. Acute watery diarrhoea/cholera is a major risk, leading to significant mortality and morbidity throughout the country [2]. Risk factors include lack of safe drinking water, poor hygiene and sanitation, religious gatherings, flooding, mobile populations and displacement [2]. Improved surveillance and response, including reactive vaccination, contributed to a lower cholera caseload in 2019, but the risk of outbreaks remains [7]. Measles, polio, malaria and chikungunya outbreaks were also pronounced in 2019 [7]. Most recently, Ethiopia has been affected by the global pandemic COVID-19, with 126 cases and 3 deaths as of 28 April 2020 [10]. As well as these direct health effects, reports suggest that concern about COVID-19 infection at health facilities has reduced

screening and treatment for severe acute malnutrition in some areas of Ethiopia [11]. Measures designed to mitigate the spread of COVID-19 may also have secondary health effects; for example, restrictions on transport and movement and closure of markets in some regions are affecting livelihoods and food security [11, 12], with potential consequences for health outcomes.

Internal displacement also creates a shock to the health system. Conflict and climate shocks have led to significant displacement within Ethiopia: between January and April 2019, 3.2 million people were displaced [7]. While many conflict-induced IDPs returned and integrated in their home communities during 2019, an estimated 2 million people remain displaced [7]. The risk of communicable disease outbreaks is particularly high in IDP collective sites due to crowding and the lack of water and hygiene facilities, placing an additional burden on health care facilities [7]. IDPs are more likely to need support for pre-existing and new disease conditions, physical and mental trauma, and sexual and gender based violence (GBV). Host populations are also at risk from disease outbreaks and strained health services [7].

As shown by the effects of COVID-19, shocks often have secondary health impacts through the effects on routine health services. Health workers and resources are diverted to deal with the response, disrupting the essential health services required to prevent future outbreaks, promote health and treat other conditions [7]. Communities may also be reluctant or unable to access health services during shocks, and may be more vulnerable to disease due to the impacts of shocks on their livelihoods and food security [13].

Some of these shocks tend to be slow-onset and anticipated, particularly drought, while others are more sudden such as floods, or unexpected, such as COVID-19. As implied above, different types of shock and public health emergency often overlap and may be interdependent, with for example drought and floods potentially causing malnutrition, displacement and water-borne disease outbreaks, and malnutrition and displacement increasing vulnerability to disease outbreaks.

2.2 The Second Generation HEP

2.2.1 Ethiopia's HEP

Delivery of public health services in Ethiopia is divided between primary, secondary and specialised tertiary care [14]. The HEP falls under primary care, which consists of health posts, health centres, and primary hospitals. Health posts are situated at kebele level (one per kebele) and designed to serve populations of 3000 in pastoralist areas and 5000 in more densely populated agrarian areas [15]. Every 5 health posts are linked to a primary health centre, which covers 15,000–25,000 people in rural areas and 40,000 people in urban areas and delivers basic inpatient services and non-specialised outpatient services [14]. The 5 health posts and health centre together form the Primary Health Care Unit (PHCU). Health centres are responsible for managing and supporting health posts within their catchment, including provision of equipment and drugs, supportive supervision and review meetings [16]. Primary hospitals cover 60-100,000 people and serve as referral points for health posts and health centres in their catchment areas. They deliver the same services as health centres as well as some emergency surgical services [17].

The HEP operates at the level of the PHCU. It is a community-based approach and designed as the main vehicle to achieve universal coverage of primary health care, particularly among rural and pastoralist populations and less privileged urban communities [18]. The HEP was launched in 2003 with a focus on agrarian regions, then expanded and adapted to pastoralist communities in 2006 and urban areas in 2010.

HEW are the drivers and delivery agents for the HEP [17]. These community health workers are usually female (except in pastoralist regions), aged 18 years or over, with at least a 10th grade education, and resident in the communities around the health post where they work [19]. Each health post is designed to be staffed by two HEW [19], although this depends on kebele population size.

The HEP has a strong focus on community and household engagement, with an emphasis on awareness raising, behaviour change and community organisation [18]. The Health Development Army (HDA) or Women Development Army (WDA) is a key structure for this community component. The HDA/WDA is a network of community volunteers, with women from neighbouring households organised into 1:5 household networks to disseminate information and support household behaviour change [18]. Development of these HAD/WDA networks is supported by health centres, HEW and kebele administrations [18].

2.2.2 The Second Generation HEP

The HEP is credited with a significant success, including improvements in maternal and child health, control of communicable diseases, hygiene and sanitation, and community knowledge and health seeking [14]. The Second Generation HEP was launched in 2015 to build on these achievements, accommodate changing socioeconomic and epidemiological conditions, and ensure high quality and equitable services [20, 21]. To inform development of a roadmap for the Second Generation HEP, a national assessment of the existing HEP was undertaken in 2019-20, funded by the Bill and Melinda Gates Foundation (BMGF) and implemented by Monitoring, Evaluation, Research and Quality Improvement (MERQ, a national consultancy organisation). The roadmap is currently under development, using findings from the MERQ assessment as well as other evidence to develop detailed strategies. While some aspects of the new HEP are still being defined, three core components are that health posts have at least one Level 4 HEW, upgraded infrastructure, and an expanded package of services.

- Level 4 HEW: Level 3 HEW complete one year of training covering 14 modules, while the Level 4 HEW has an additional year of training covering a further 21 modules (two years in total). Level 3 training focuses on health promotion, disease prevention, campaign-based services and community mobilisation. In contrast, the Level 4 role includes basic clinical services such as diagnosis and treatment of disease.

- Infrastructure: Second Generation HEP health posts require three rooms and a cemented floor that can be cleaned. It is desirable if the health post has working toilet, clean compound and a water supply.

- Packages: the HEP was initially designed with 16 health packages, focusing on family health, disease prevention and control, hygiene and environmental sanitation and health education and communication. Additional elements have been added over time. Second Generation HEP has 18 packages, based on merging some packages, removing others, changing some and adding new services. The main additions relate to institutional hygiene (including promoting hygiene at schools and the health post, not just households), non-communicable diseases (NCDs), neglected tropical disease (NTDs) and mental health. There are also changes within packages, such as adding provision of long-lasting family planning methods [21]. Some details of these packages are under review as part of the Roadmap development process.

These Second Generation changes apply primarily to the rural HEP, which is the focus for this research; alternative reforms are underway for the urban HEP, such as adoption of the Family Health Team [18].

Alongside these 18 packages, Second Generation HEP includes cross-cutting issues to be integrated in all package, including the Community Health Information System and Public Health Emergency Management (particularly surveillance). These include:

Implementation of Second Generation HEP is now being initiated at specific health posts. Due to resource requirements, implementation is phased, with regions and sub-regional authorities determining how many and which health posts will begin Second Generation HEP each year.[2] As of February 2020, FMOH indicated that 4300 health posts were expected to be upgraded to Second Generation HEP in the current Ethiopia fiscal year (September 2019 - August 2020). However, these figures are likely to be affected by disruption to the health system and training related to COVID-19 (see Section 5).

2.3 Shock responsive health systems

A growing literature has examined health system shock responsiveness and related concepts of resilience, public health emergency management, health security and disaster risk management. A number of frameworks have been developed that highlight key requirements for a shock responsive health system [22–24]. The specific focus varies between frameworks, but there are common themes.

Shock responsiveness can be considered in terms of a continuum of activities, from prevention and preparedness to response and later recovery [25]:

- Shock prevention measures reduce the likelihood and severity of emergencies (for example, immunisation to prevent vaccine preventable disease outbreaks)
- Preparedness measures enable a timely and effective response (for example, surveillance systems that can predict and detect potential emergencies)
- Response measures reduce harm for affected populations (for example, by addressing new or intensified health needs).

Alongside specific measures related to prevention, preparedness and response, continued delivery of routine services during shocks is also a key activity [26]. Disruption to routine services through shocks is often a major contribution to disease and morbidity, for example through reducing vaccination coverage or maternal health services [13]. Communities may also be reluctant or unable to access services during shocks, for example due to travel restrictions or fear of infection [13]. Ensuring continued delivery alongside emergency response is therefore a requirement for shock responsive health systems.

Strong health systems are an essential basis for shock responsiveness [25]. The importance of health system strengthening was highlighted by the effects of the Ebola outbreak in West Africa, where weak health systems contributed to disease spread and mortality [27]. Primary health care in particular is recognised as playing an essential role in prevention, preparedness and response as well as for continued service delivery [25]. However, shock responsiveness also requires specific health system characteristics and functions, related to both the ‘hardware’ and ‘software’ [28–30]. In relation to hardware, requirements for shock responsive systems can be considered in relation to each health system pillar [22, 23, 26, 31–36]:

[2] This regional and sub-regional decision making is in line with overall decentralisation of health and other sectors in Ethiopia.

- **Human resources for health:** including a sufficient, committed, well-distributed and skilled workforce, clarity of roles, redistribution and task-shifting to meet new demands, and management capacity of district or local health teams.
- **Medical supplies:** including sufficient supplies, logistics and infrastructure, emergency stocks and procurement plans, and functioning supply chains.
- **Information systems:** including surveillance infrastructure, early warning systems, contact tracing systems, integration of other sector data with health management information, and use of informal and local data sources that can provide more rapid information and feedback.
- **Finance**: including adequate and predictable funding, robust expenditure management systems, adequate financial protection, and ability to shift resources to meet need and reallocate funds in emergency.
- **Governance:** including a legal and policy foundation and emergency coordination system to guide shock response that covers all health system levels, private and non-profit actors, international agencies and related sectors (e.g. water), authority and capacity for rapid local decision making and flexibility of plans, and effective communication channels.
- **Service delivery:** including ability to adapt service delivery platforms, determine appropriate reallocation of resources between services, triage and adjust patient flow and scale up to meet new or expanded needs, preventive services, public health education, and routine provision of a high quality services to promote confidence in the system.

In relation to health system software, key requirements include [22, 23, 28, 36, 37]:

- **Skills for learning and adaptation:** including cognitive capacity to collect, integrate and analyse formal and informal information, make sense of it and develop appropriate responses; and planning and management capabilities to anticipate and cope with uncertainties and manage interdependencies, relationships and feedback.
- **Organisational culture**: including an institutional culture of learning, underpinned by good leadership, to support individuals and teams in identifying ways to adapt.
- **Community relationships**: including trust in the health system, which affects use of health services, reactions to public health advice and willingness to share information with health workers or authorities, effective community engagement and platforms for dialogue with community leaders.

Through these activities and characteristics, the aim is that health systems can absorb the shock, continuing to provide same standard of healthcare and without negative consequences, adapt to the shock, providing the same standard of healthcare and adjusting to meet new health needs, or transform, changing the health system in a way that enhances future services and resilience [31, 32].

2.4 Community health workers and shock responsive systems

First and Second Generation HEP operate through HEW. The role of HEW in shock responsiveness is therefore key to the impact of Second Generation HEP on shock responsive health services.

Community health workers are recognised as playing a range of essential roles in shock responsive health services [25, 36]. Key activities include early detection of cases and rapid containment to limit disease spread; community engagement to build trust and promote health seeking and preventive behaviour; and delivery of health interventions that prevent and treat disease [38, 39]. Key roles for community health workers have also been identified in the ongoing COVID-19 pandemic, including community surveillance, contact tracing, and promoting hygiene and behavioural change [40]. Many of these roles apply in Ethiopia, where stakeholder discussions and policy documents indicate a range of roles for HEW in preventing, preparing for and responding to shocks (see 2.5).

While community health workers have the potential to support shock responsiveness health systems through these roles, various factors can affect their performance. Immediate influences on community health worker performance can be considered in terms of their means or capacity to perform, for example their knowledge, skills and confidence; their motivation to perform, for example related to beliefs, incentives and job satisfaction; and their opportunity to perform, considering aspects of system support such as access to required resources, workload and community legitimacy [41].

In Ethiopia, similar factors of capacity, motivation and system support have been identified as affecting HEW performance. For example, the HEP assessment found that nearly half of HEW could not correctly describe the EPI schedule, and that health posts had frequent shortages of essential equipment and a lack of basic utilities [15]. In addition, the population served by health posts was often higher than the guidelines, and 89% of HEWs reported that they need additional staff to implement the full HEP packages [15]. The Assessment also identified gaps in supervision, with 22% of HEW reporting no supervision in the last 6 months [15]. Other research on HEW in Ethiopia suggests that supervision can emphasise record checking rather than support and problem-solving [42], and may be limited and lack clear role definition [43]. Inadequate supervision, low salary, limited career options and workload contribute to demotivation [15, 43], with 75% of HEWs having some sign of burnout [15].

Given the central role of HEW in delivery of health post services and Second Generation HEP, HEW capacity, motivation and opportunity to perform is critical to the success of Second Generation HEP and enhancing shock responsiveness.

2.5 Second Generation HEP and shock responsive health systems

Second Generation HEP is primarily a health system strengthening intervention. However, it can also be expected to enhance health post shock responsiveness. As previously noted, strong community and primary health systems are emphasised as part of emergency management within government policy documents, and the government has emphasised the role of the HEP in shock prevention and response [44]. Beyond the general contribution through health systems strengthening, Second Generation HEP may contribute to specific activities and characteristics that are part of shock responsive services. The potential impact of Second Generation HEP particularly involves the presence of a Level 4 HEW, in line with the importance of community health workers and HEW for prevention, preparedness and response described above. Second Generation HEP may strengthen the role and position of HEW, including their motivation, capacity and opportunity to perform. However, the Second Generation HEP components of an expanded service package and improved infrastructure may also enhance shock responsiveness. Key ways that Second Generation HEP may support shock responsiveness are identified below, building on the HEW roles outlined above and based on literature and discussions with federal and regional health officials.

2.5.1 Provision of services that prevent shocks

The health packages under both First and Second Generation HEP include delivery of services that can prevent disease outbreaks, including hygiene and sanitation, vaccination and nutrition screening. Currently, there are gaps in provision of these services. For example, only 43% of children age 12-23 months have received all basic vaccinations, and 19% have not received any vaccinations [45]. HEWs contribute to vaccine coverage through providing vaccination and through community education and mobilisation to encourage uptake. The role of HEW and the HEP in nutrition varies between regions. In Tigray, Amhara, Oromia, SNNP, Harari, Dire Dawa and Addis Ababa, the nutrition outreach service is integrated in routine HEP, with health posts responsible for growth monitoring and promotion (GMP), nutritional screening, Vitamin A supplementation and deworming services. In other regions, these services are conducted through Child Health Days. Early identification of malnutrition takes place through GMP, which involves monthly screening of children under 2, and outreach monthly screening. GMP coverage varies between regions, but is below target [18].

More qualified HEW may be more confident and potentially more motivated to provide these services. The HEP Assessment found that health posts with a Level 4 HEW had higher coverage of routine services and activities such as home visits [15], and government stakeholders considered Level 4 HEW more confident in providing immunisation services. Beyond immunisation and nutrition, Level 4 HEW are expected to be better placed to diagnose and manage basic illnesses (for example, childhood diseases due to ICCM training), which could contribute to prevention of other kinds of disease outbreak such as diarrhoeal disease. Identification and referral of patients in need of support may also support prevention, and FMOH staff have observed that Level 4 HEW have improved practices in screening and referral of patients from the community to higher levels.

Further background literature review and stakeholder discussion regarding constraints to immunisation and nutrition screening is needed to understand the likely effect of Second Generation HEP. For example, vaccination coverage reflects a range of constraints, including factors not explicitly targeted through Second Generation HEP such as vaccine stock outs [46].

2.5.2 Provision of services in response to shocks

HEW have played important roles in responding to disease outbreaks, including health education, house-to-house case identification and reporting of cases for AWD/cholera and other outbreaks [47]. Their role in immunisation means HEW may also support emergency vaccination campaigns in response to disease outbreaks. HEW have also supported diarrhoea treatment [48] and distribution of chemicals for water treatment, for which there may be increased need during a shock. They are responsible for management of community-based moderate acute malnutrition (CMAM), a key area of response during periods of food insecurity. Additional duties may be assigned to HEW to tackle specific shocks. For example, suggested roles for HEW during COVID-19 include contact tracing as well as community education and promotion of preventive measures [47]. HEW may also play roles in response to early warning, before actual arrival of shock, for example more intensive awareness or screening. Level 4 HEW may have more training, confidence and skill to perform these tasks. They also have more training in emergency management and first aid, and so are expected to play an increased role in management of emergencies in the village (FMOH pers. comm.).

2.5.3 Ongoing delivery of services during shocks

Disruption to routine services during shocks reduces access to essential services, contributing to death and disease and to a lack of access to services such as family planning or antenatal care. As above, the HEP Assessment suggests that health posts with a Level 4 HEW have higher service coverage [15]. This suggests that a Second Generation health post with more qualified HEW may potentially be better placed to maintain services during shocks.

Enhanced infrastructure under Second Generation HEP may also enable ongoing service delivery, including through providing adequate space for examination and treatment services, but the role of Level 4 HEW is considered more significant by government stakeholders.

2.5.4 Surveillance

Health posts are the “main source of information” for surveillance in Ethiopia [2], and HEW have an important role in collecting information on community health and reporting any cases of severe acute malnutrition, measles, cholera and other events of public health concern [2, 17]. This surveillance contributes to early warning as well as preparedness and response [49]. HEW work with HDA leaders as the community health surveillance focal points. The focal points are responsible for reporting diseases within their household network during routine times, and house to house active searching is required during outbreaks. Beyond specific disease surveillance, registering and recording of population health information and health service utilisation is a HEW responsibility, and may provide information that can help in planning and response. Currently, community surveillance only operates in some locations and stakeholders suggested that the quality of surveillance is inadequate. There are gaps in HEW knowledge and practice regarding surveillance: the HEP Assessment found that only 40.4 % of HEW were trained in community surveillance. 65.9% of HEW knew immediately notifiable events and 78.8% knew weekly reportable events [MERQ HEP Assessment PHEM sub-study, pers. comm.]. Discussions with regional health authorities also suggested that HEW surveillance activities do not happen as expected. Data management and reporting in general have also been identified as activities that HEW conduct infrequently and where they lack skills and confidence [50]. Level 4 HEW are expected to have stronger disease surveillance expertise and skills, helping to strengthen early warning, detection, prevention and preparedness of outbreaks. For example, FMOH has observed that the Level 4 HEWs are now reporting acute flaccid paralysis and suspected measles cases as their knowledge and skill in diagnosing childhood diseases has improved with further training.

2.5.5 Community engagement and education

HEWs are a key link between the health sector and communities [1]. HEW therefore provide channels for sharing information from communities to the health service and vice versa, helping to communicate information about shocks or identify disease rumours. In addition, health promotion and community education is a core HEP package and HEW role, including promotion of hygiene and environmental sanitation [1]. For example, this may include helping communities to construct latrines for prevention and in case of flooding or diarrhoea outbreaks. As well as outreach meetings and home visits, the role of HEW in organising women into health development army teams provides a further communication channel. This can support behaviour to prevent and mitigate shocks. The HEP assessment suggested that current services are insufficient to promote sustained household behaviour change [15]. Community education may be strengthened under Second Generation HEP if Level 4 HEW are more active and confident in performing these responsibilities.

2.5.6 Building community trust

Community trust is essential for effective community health worker activity and shock response and supports implementation of all activities above i.e. preventive services, response services, routine service delivery, surveillance and community education and engagement. A more qualified HEW may enhance community trust in health post services and HEW: HEW performance has been identified as promoting community trust, creating a virtuous circle as this trust can then enhance ability and motivation to deliver services [42]. Provision of a range of services that meet population needs is also recognised as enhancing trust [23], and there is community demand for additional services in Ethiopia [15]. The HEP Assessment found that availability of more comprehensive services at health posts increases community acceptance of HEWs and service uptake [15]. This suggests that the expanded package of services may enhance community trust in health post services. Enhanced infrastructure under Second Generation HEP may also strengthen community trust in services and acceptability, with a more attractive health facility increasing demand for services [FMOH pers. community.]. FMOH officials particularly noted the value of a clean health post compound for attracting community attendance.

2.5.7 Coordination

HEWs are expected to be members of various local committees, including the emergency response committee, which is responsible for conducting assessments, developing preparedness plans, organising the response and sending reports and support to response teams when they arrive in kebeles. HEW are also part of kebele food security and development committees, and responsible for liaising with other actors such as development agencies or education staff [48]. This liaison and committee involvement may allow HEWs to contribute to coordination between actors and sectors for shock preparedness and response. However further information is needed on the strength of current coordination activities, and likely Second Generation HEP effects if any.

2.5.8 HEW capacity, motivation and system support

Many of these areas where Second Generation HEP may enhance health post shock responsiveness rely on the role of HEW, and so depend on HEW's capacity, motivation and system support or opportunity. The influence of Second Generation HEP on enhancing HEW capacity, motivation and opportunity to perform will therefore be important for success. Second Generation HEP has a clear link to HEW skills (through the requirement for a Level 4 HEW). Second Generation HEP may also enhance motivation through expanded career opportunities via Level 4 training, although some stakeholders suggested that further training without an expansion of roles creates demotivation among Level 4 HEW. In relation to opportunity, the expanded package of services, potential contribution to community trust and enhanced infrastructure may enable HEW performance. However, further information is needed regarding the potential influence of Second Generation HEP on HEW motivation, incentives and system support, including remuneration. This will be identified through further stakeholder discussions and preliminary key informant interviews.

2.5.9 Unintended consequences

While these potential channels indicate ways that Second Generation HEP may enhance shock responsiveness, there are also risks. In particular, workload is already recognised as limiting HEW delivery of expected packages [15]. It will be important to understand the effect of additional packages under Second Generation HEP on performance of existing activities, and to identify any other positive or negative unintended consequences.

These potential links between Second Generation HEP and shock responsive health services require further exploration. For example, we lack data on whether Level 4 HEW actually do provide stronger immunisation and nutrition screening services, and whether more qualified HEW, improved infrastructure and an expanded package of services contribute to community trust. For now, these links are tentative hypotheses; they will be discussed and refined through further stakeholder consultation and initial key informant interviews, and then tested through the Maintains research.

2.6 Contextual influences on HEW and health post shock responsiveness

The impact of Second Generation HEP on shock responsiveness will be affected by the surrounding context. A wide range of factors can affect community health workers' ability and motivation to fulfil their roles, whether in routine service delivery or shock prevention and response. Important areas include community factors such as social norms and gender roles, economic factors such as livelihood options and poverty levels, environmental factors such as topography and distance, health system policy including human resources policies on areas such as incentives and training, and health system practice, for example supplies, procedures and guidelines, supervision, decision-making processes, information sharing, health service costs, and coordination between programmes [51–53].

Similar aspects of context may affect HEW performance and the influence of Second Generation HEP. In relation to the health system context, recent analysis suggests HEP performance is affected by aspects of health system hardware (such as infrastructure and facilities, the number of HEW, their level of education, and availability of other cadres of health worker), but also by coordination, supervision and support (including adequate guidelines, links between the health centre and health post, and woreda and kebele leadership support); trusting community relationships and the strength of community engagement platforms (e.g. health development army networks); strong referral systems; use of data for problem solving; and HEW motivation [16, 43].

Second Generation HEP directly affects some of these aspects of context, including infrastructure and HEW training, and may indirectly influence aspects such as HEW motivation and the strength of community networks. However, the impact of Second Generation HEP is likely to be influenced by other aspects of health post context not directly targeted by Second Generation changes, such as availability of medical supplies, the number of HEW, and supervision.

Beyond the health system, other aspects of context at multiple levels have been identified as affecting HEW and health post performance, and may affect health post shock responsiveness. These include individual factors, such as HEW experience or gender [54], community level factors, such as population size and community values [16], and wider environmental factors, such as policy frameworks or the presence of other humanitarian actors in the health post catchment area. On the latter, presence of non-governmental and humanitarian actors is a significant feature of the health and emergency context in some areas of Ethiopia. NGO support affects strength of routine health service delivery [55], and during emergencies, humanitarian actors provide surge capacity for services and surveillance through support such as additional health workers and medical supplies [56]. Where these actors undertake or support community health services and emergency response, reliance on government systems and consequent Second Generation HEP impact may be more limited.

Shocks are a significant aspect of context that may influence many of these dimensions and so affect community health worker performance. For example, shocks can destroy health facilities, disrupt supply chains, delay payment, increase insecurity, change personal family

dynamics and livelihood security, and increase workloads [53, 57]. The specific nature of a shock is also likely to affect response capacity, including whether the shock involves droughts, flood or disease outbreak, is slow or rapid onset, its intensity, and familiarity.

2.7 Gender, equity and social inclusion

Equity and gender are key considerations within the Ethiopia Health Sector Transformation Plan, including equitable health access and outcomes and supporting female empowerment [1]. Maintains aims to support equitable shock responsive services that minimise disparities and address the needs of vulnerable groups. Integrating attention to gender equity and social inclusion throughout the research can help to promote health services that "leave no one behind".

In this research, gender, equity and social inclusion will be considered in relation to both supply and demand of health services. Key areas of focus include the influence of gender roles on HEW performance and protection, gender-specific health needs, and equitable coverage of health services, including access to services for IDPs.

2.7.1 Gender and health service provision

In relation to HEW, a growing literature considers the influence of gender roles on community health worker performance and position. This includes influences related to safety and mobility, intra-household dynamics, community acceptance and health systems support [51, 54]. HEW are predominantly female (except in pastoralist regions), a deliberate policy based on traditional gender roles and designed to enable their role in improving maternal and newborn health [58]. Female HEWs are also more acceptable to communities for home visits [15]. The HEP is potentially empowering for HEW, providing employment and a community position. However, gender relations can also constrain HEW's ability to perform their roles and have negative personal affects. For example [15, 58, 59]:

- The gendered division of household labour can create high workloads and stress, through trying to balance domestic and care activities alongside health service delivery. This in turn contributes to demotivation and attrition.
- Patriarchal gender relations can limit HEW opportunities to support kebele coordination: committees are predominantly male, which can reduce confidence and opportunities to contribute to the discussions
- Travel within kebeles or to the health centre may be constrained by concern about safety and security, including GBV.
- Family responsibilities and financial constraints can limit relocation for training.
- Household behaviour change often requires male involvement, and this may be harder for female HEW

Partly because of these constraints, there is now discussion about increasing the number of male HEW [15].

2.7.2 Gender and health service needs and access

Gender and other aspects of social identity influence the impact of a shock on an individual and their need for services. Whilst men and boys will have specific needs, in all focus countries structural gender inequalities mean women and girls are disproportionally exposed

to risks including increased loss of livelihood, security and life. Violence against women and girls (VAWG), which often increases and takes new forms during and after shocks, is particularly significant both as a determinant of needs and a barrier to delivery of, and access to, services. Women may also be differently affected by changes in routine services during shocks, such as maternal, reproductive and child health services. Financial and physical access to services may also be constrained for women. The way that health services are designed and delivered before, during and after shocks can either worsen or ameliorate gender exclusion and inequalities.

In Ethiopia, gender inequalities are evident in health status and the impact of shocks. For example, partly due to fewer income-generating opportunities, food insecurity particularly affects women and girls; females have higher levels of food deprivation and micronutrient deficiencies, especially during reproductive years [7]. Drought also increases women's workload, as they are more likely to be responsible for fetching household food and water, and girls are more likely to drop out of school to help with chores or be married [7]. Gender-based violence is a significant risk, including related to conflict or travel for firewood and food relief [7]. In relation to routine services, coverage of basic maternal services and family planning has improved, but there remain significant geographical disparities [60]. Disruption to these services due to shocks can result in threats to health such as complications related to pregnancy and childbirth, unwanted pregnancies and unsafe abortions [7]. Gender relations can also limit access to routine health services that might contribute to prevention or preparedness. For example, limited autonomy and financial resources and restrictions on movement after childbirth can restrict participation in health education activities and access to services [61].

2.7.3 Equitable service coverage

Alongside gender, other aspects of social identity such as age, ethnicity, disability and economic status can influence health needs and access to routine and emergency services. In Ethiopia, coverage of key services varies between groups based on characteristics such as the mother's education, household wealth, rural or urban location and regional variations [45]. For example, on vaccination (a key service to prevent disease outbreaks), 65% of children in the highest wealth quintile have received all basic vaccinations, compared to 25% of children in the lowest quintile (25%). Children whose mothers have more than secondary education are also twice as likely to have received all basic vaccinations as children whose mothers have no education [45]. Similarly, stunting is much higher for children whose mothers have less education and who are in the lower wealth quintile [45]. These inequalities also affect access to maternal services: coverage of IFA tablets and ANC services is lower for women with less education and from poorer households [45].

Displacement is also a key influence on equitable service provision and shock response. As discussed in section 2.1, IDPs are particularly vulnerable to health risks and have specific health needs. Access to health services is often constrained, including due to a lack of legal identify documents required to access care [7].

These dimensions of gender and equity will be important to consider through the research, including considering the influence of gender norms on HEW performance and health service access, the role of Second Generation HEP in enhancing equitable service coverage, and the operation of Second Generation HEP in areas with IDPs.

2.8 Summary

This section has highlighted important considerations for the research focus and design, including:

- the range of shocks facing the health system in Ethiopia, with overlaps between shocks and different intensities, durations and response needs.
- the requirements for a shock responsive health system, including activities to support prevention, preparedness and response as well as continued delivery of routine services during shocks, and the role of both system hardware and software
- the central role of HEW in the HEP
- roles played by both HEW and community health workers more widely in shock prevention, preparedness and response
- the importance of means (including knowledge and skills), motivation and system support (including supervision and required resources) for HEW to play an effective role
- the components of Second Generation HEP, including presence of a Level 4 HEW, upgraded infrastructure and an expanded package of health services
- ways that these Second Generation HEP components may enhance shock responsiveness, including through strengthened provision of services for prevention and response, stronger routine delivery during shocks, surveillance, community awareness, trust and coordination
- the influence of other aspects of context on the likely effects of Second Generation HEP, with potential for outcomes to vary depending on aspects such as individual HEW experience and circumstances, health system hardware and software, and community and environmental characteristics
- the influence of gender roles and relations on HEW ability to perform their work and the influence of gender, displacement and other social stratifiers such as income and education on health service needs and access.

These areas have informed the research objectives and framework set out in the next section.

3 Approach to developing CRPs

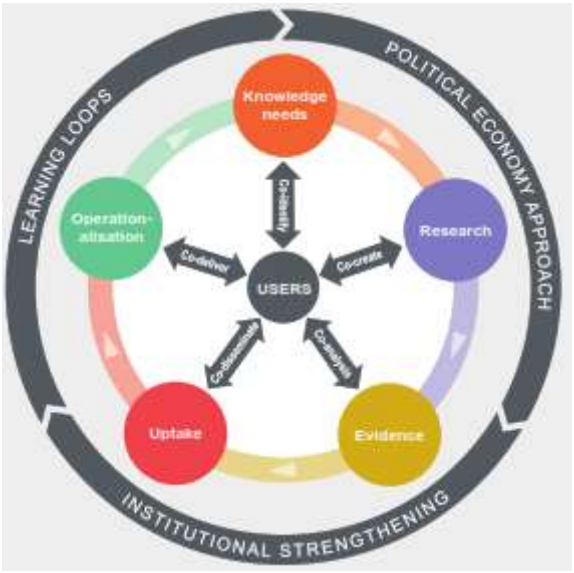
This section summarises our approach to developing the Maintains Country Research Plans (CRP), with a particular focus on the process in Ethiopia. We have adopted OPM's Policy Research into Action Cycle (PRActiCle) approach as it keeps the end-user of the research as the focal point throughout.

The objective of the PRActiCle approach is that the research will be:

- Operationally **relevant** and will inform the policies and programmes of DFID Country Offices, as well as other stakeholders.
- **Accessible**, building on both demand and supply research needs and being easily internalised in decision-making. Demand research needs refers to the needs of DFID Country Offices, while supply needs refer to gaps in national and international evidence.
- **Actionable** – able to be used in practical terms by DFID Country Offices and other stakeholders.

The concept of PRActiCle should be at the core of all stages of programme delivery and fully mainstreamed into Maintains processes (project design and delivery; monitoring, evaluation, and learning; communications; and value for money). This is demonstrated in Figure 1.

Figure 1 The PRActiCle diagram



As shown in Figure 1, the PRActiCle approach is comprised of five steps:

- Identify the **knowledge needs**, considering local context and existing insights.
- Conduct the **research**, adapting our approach as findings suggest more productive routes or as circumstances change.
- Analyse the **evidence** to deliver the answers required to effectively inform policymaking and programme design.
- Produce research **uptake** / dissemination mechanisms, tailored to different stakeholder groups' operational interests.
- Support the **operationalisation** of the research by providing appropriate technical assistance (Maintains Component 2).

In Ethiopia, this approach was applied through a series of discussions with DFID Ethiopia, FMOH and EPHI as the primary research users, alongside input from other stakeholders such as humanitarian partners, researchers and NGOs.

4 Research overview

This section introduces the research objectives and overall research design, building on the understanding of Second Generation HEP and shock responsiveness outlined in Section 2. We first set out the specific research objectives (4.1), and then explain the overall research approach and outline methods (4.2). Finally, we introduce the conceptual framework that shows how these methods map onto different research questions and areas of information (4.3).

4.1 Specific research objectives

As indicated in Section 1, the overall objective of this research is to generate evidence on the extent to which implementing Second Generation HEP strengthens the capacity of health posts to prevent, prepare for and respond to shocks, and to continue delivering routine services during shocks. Based on the background understanding set out in Section 2, specific research objectives are as follows:

1. To what extent does the Second Generation HEP enhance health post capacity to prevent and prepare for shocks?
2. To what extent does the Second Generation HEP enhance health post capacity to respond to shocks and maintain delivery of routine services during shocks?
3. To what extent does the Second Generation HEP affect Health Extension Worker (HEW) roles in relation to shock prevention, preparedness and response, and their motivation and capacity to conduct these roles?
4. What factors affect the influence of Second Generation HEP on health post shock responsiveness, including fidelity and intensity of Second Generation HEP implementation, other health system characteristics, wider individual, community or environmental factors, and the nature of the shock?

Within these objectives, we will consider not just the extent of Second Generation HEP impact but also the processes through which Second Generation HEP influences these outcomes.

Specific outcomes related to the ability of health posts to prevent, prepare for and respond to shocks, and to continue delivering routine services during shocks include:

- Household coverage of health services that contribute to shock prevention, for example, immunisation and nutrition screening.
- Coverage and quality of community surveillance, as an activity that contributes to prevention, preparedness and response.
- Delivery of services in response to shocks or early warnings, such as community education or emergency vaccination (this is dependent on shocks occurring during the research period).
- Continued delivery of essential health services during shocks, for example ANC as well as routine immunisation and nutrition screening (this is dependent on shocks occurring during the research period).
- Community trust in health post services, as a prerequisite for effective shock prevention, preparedness and response.

- HEW activities, motivation and capacity, as an intermediate outcome affecting service coverage, community trust and surveillance.

Many of these outcomes relate to core essential services (e.g. immunisation, ANC) and aspects of a strong health system (e.g. community trust, HEW motivation). As such, **the evaluation will provide learning on general health system strengthening as well as shock responsiveness**. To further support this, indicators on routine services used to assess continuity of services during shocks will be measured regardless of whether there is a shock, to assess general coverage of these services (e.g. ANC, NTDs, NCDs).

4.2 Research design: a theory-based, mixed methods approach

This section explains the overall research design, including the approach to determining causal links between Second Generation HEP and health post shock responsiveness and the combination of data collection methods proposed for the research.

The research will use a theory-based design, based on an explicit articulation of expected outputs and resulting outcomes and impacts of Second Generation HEP. Within this framework, the research will follow a mixed methods approach that combines quantitative attribution of Second Generation HEP's effects through a quasi-experimental design with examination of the processes or causal mechanisms through which Second Generation HEP affects outcomes and the conditions that affect progress, including the fidelity and intensity of Second Generation HEP implementation. In this way, the research combines assessment of outcomes, implementation, context and mechanisms, in line with frameworks for evaluation of complex interventions [62]. This combination of approaches will provide a comprehensive assessment of Second Generation HEP's impacts, including an estimation of the overall effect of Second Generation HEP and opening the 'black box' to explain how Second Generation HEP affects health post performance and how the effects vary between contexts. Together, these approaches help to determine the overall value of Second Generation HEP and to support learning regarding scalability and programme improvement. Specifically, the assessment of causal links between Second Generation HEP and shock responsiveness, including the impact on household-level indicators directly attributable to the Second Generation HEP, will be based on a combination of the following strategies:

- **A quasi-experimental design** that provides a quantitative measure of impact directly attributable to the Second Generation HEP. The objective of a quantitative impact evaluation is to understand whether the intervention has an effect on the target population of households and individuals served by the Second Generation health posts, and to quantify with statistical confidence the magnitude of the impact detected. If rigorously designed, a quasi-experimental quantitative impact evaluation can meet this objective and its results are generalisable. This will be based on a comparison between a treatment group (i.e. health posts upgraded to Second Generation and households located within their catchment areas) and a matched comparison group (i.e. health posts not upgraded to Second Generation and their related households)[3]. This estimation of attributable impact will only apply to household-level outcomes, mainly due to sample size considerations. The health post and HEW-level analysis will still represent a valuable indication of descriptive patterns and trends related to implementation of the Second Generation HEP, but would not on its own support causal claims of impact. A descriptive analysis of trends will also be run at the household level to enrich the findings

[3] Specifically, we will employ Propensity Score Matching (PSM) at the household level and we will augment the PSM approach with a Difference-in-differences (DID) analysis, thus taking advantage of the inter-temporal nature of the study, which will collect data on health posts, HEWs and the households they serve at two points in time.

of the impact evaluation. Finally, we will also assess the fidelity and intensity of Second Generation HEP implementation. Assessing fidelity will provide evidence on whether the Programme was implemented as intended, whilst investigating intensity will determine whether Programme packages and activities were delivered according to the planned frequency and reach. This assessment does not represent a full implementation review and it is primarily used to support the QIE, through considering the way in which the implementation modalities of the Second Generation HEP affects its ability to have the desired impact.

- Evidence on the **mechanisms** through which Second Generation HEP lead to change (or mechanisms that block change), and the **contexts** affecting these mechanisms. For example, this might involve identifying how Second Generation HEP training or the presence of a Level 4 HEW affects community trust and service coverage, and how this varies depending on contexts such as health centre support or the nature of a shock. Identifying these mechanisms helps to support a plausible link between Second Generation HEP and outcomes. Identifying variation between contexts strengthens the understanding of causality by indicating additional factors beyond the initiation of Second Generation HEP that are required to produce outcomes, and helps to indicate scalability to different contexts.

- **Stakeholder perceptions** of Second Generation HEP's effects, considering experiences and accounts among those directly involved such as HEW, communities, and managers at health centre, woreda and regional level. As part of this, we will examine the relative importance of different causal factors within and beyond Second Generation HEP [63]. This is of particular value given that Second Generation HEP operates in a context where other initiatives may also support or influence health post shock responsiveness. This approach includes examining questions such as the role played by Second Generation HEP in relation to other interventions (for example, providing a support role through development of essential foundations in terms of health post capacity that other shock response interventions can then build on); the perceived influence of different Second Generation HEP components (e.g. Level 4 HEW, expanded packages); and the perceived influence of Second Generation HEP components in relation to other forces and interventions affecting health post performance. These stakeholder perceptions will provide further evidence of a plausible effect of Second Generation HEP on health post shock responsiveness.

To implement this framework, the research will combine quantitative and qualitative data from a series of different research activities designed to assess outcomes, implementation, mechanisms and contexts:

1. **Quantitative baseline and endline surveys** at health post, HEW and household levels. The household-level survey will measure impact on areas such as service coverage and trust in health services, the HEW survey will investigate factors such as HEW motivation, capacity and activities, and the health post survey will focus on factors such as implementation of Second Generation HEP and health post capacity.

2. **Quarterly health post phone surveys** to track the implementation of the Second Generation HEP (to understand implementation fidelity and intensity) and the occurrence of shocks, and to collect data on service coverage.

3. **Review of secondary data** on shock occurrence and routine health data, to assess shock exposure and changes in coverage of health services.

4. **Key Informant Interviews** (KIIs) at baseline and endline with health managers at national, regional, zonal and woreda level to understand their views on the effects of Second Generation HEP and factors affecting this.

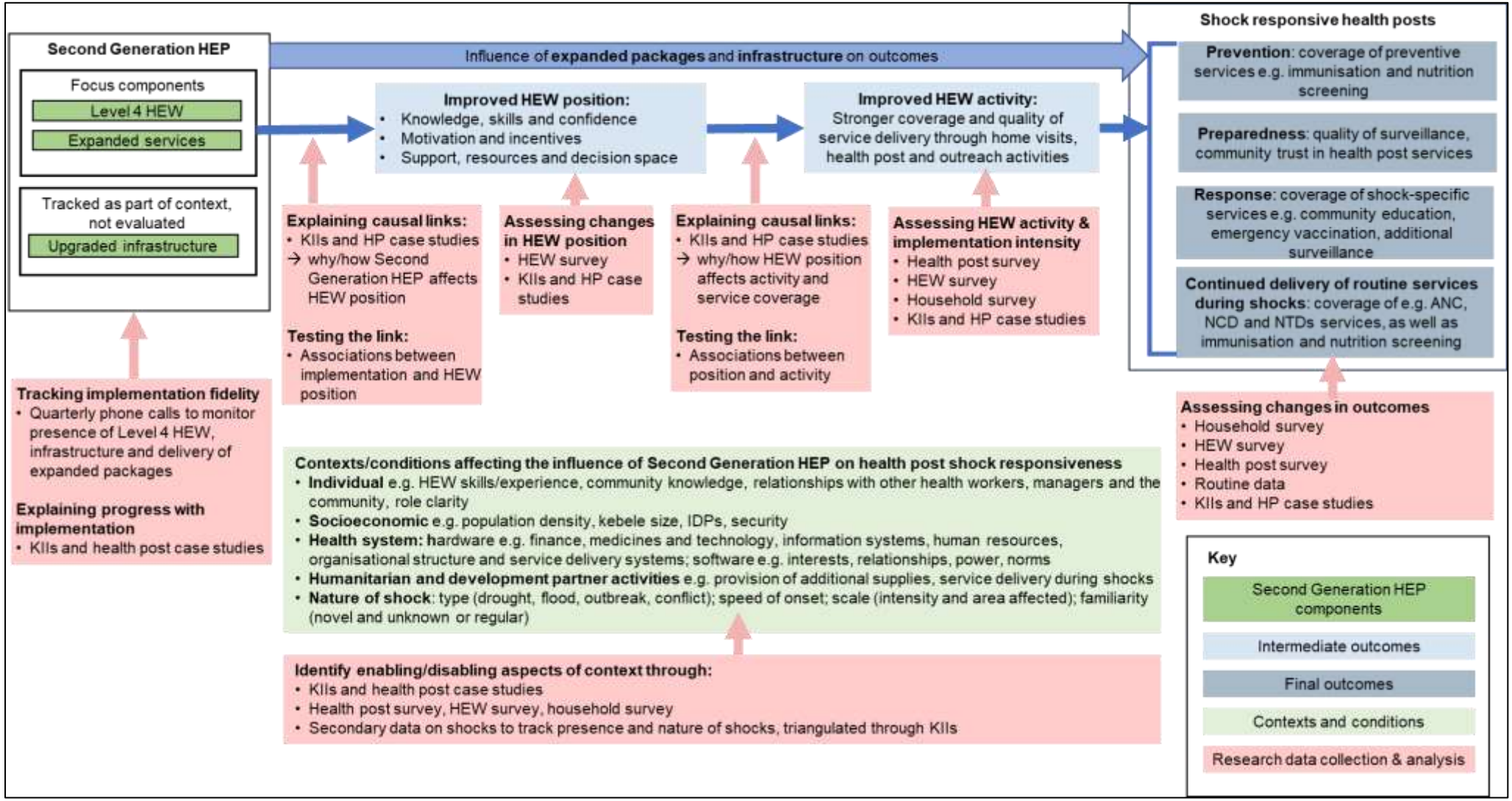
5. **Qualitative research at the health post and community levels**. Qualitative case studies of selected health posts (approximately 6 at each of baseline and endline) will be used to understand how Second Generation HEP affects outcomes and factors affecting this, using observation, HEW interviews and community focus group discussions. Case study sites will be selected for areas that are or have recently experienced different kinds of shocks, including presence of IDPs.

4.3 Conceptual framework

Based on the understanding of HEP and health system shock responsiveness described in Section 2, Figure 2 indicates potential pathways through which Second Generation HEP may affect shock responsiveness, and factors that may affect these impacts. This framework represents preliminary thinking and will be interrogated and adapted through further stakeholder consultation and then through the empirical research. The figure also indicates key areas for examination through the research, and the methods and approaches that will be used to examine each area. Summarising, the research will examine:

- **Final outcomes** related to the four areas of shock responsiveness (prevention, preparedness, response to shock, and continued delivery of routine services) that are expected to be affected by Second Generation HEP.
- **Intermediate outcomes** related to HEW capacity, motivation, position and activities that are expected to be influenced by Second Generation HEP and to lead to changes in the final outcomes.
- **Fidelity and intensity of implementation** measured through inputs and outputs related to the components of the Second Generation HEP that are implemented at health post level and that are expected to lead to changes in intermediate outcomes and ultimately final outcomes. The extent of HEP activity (captured under intermediate outcomes) is a further measure of intensity.
- **Contextual factors** that are expected to enhance or reduce the impact of Second Generation HEP on shock responsiveness by affecting the linkages between inputs, outputs and intermediate outcomes, and between intermediate outcomes and final outcomes, including the degree of shock exposure and health system characteristics.
- **Mechanisms** through which Second Generation HEP influences shock responsiveness, to explain causal links and indicate how and why Second Generation HEP brings about outcomes.

Figure 2 Conceptual Framework



5 The implications of COVID-19 for the research

Ethiopia reported the first confirmed case of COVID-19 in Addis Ababa on 13 March 2020. As in many countries, COVID-19 is a significant challenge for the Ethiopian health system. Health-care providers are being diverted to address the outbreak, straining capacity to provide routine services for conditions such as malaria and diarrhoeal diseases and risking outbreaks in other diseases [64]. COVID-19 has also disrupted supply chains, causing shortages of medicine [64]. Indirect effects on health are also likely through economic impacts and increases in food prices; the prices of some staple foods have doubled, risking increased acute malnutrition [64].

Preparedness and response activities are ongoing. The Ethiopian Public Health Institute's Emergency Operation Centre is focusing on activities such as risk communication and community engagement, points of entry screening, surveillance and laboratory capacity, case management, infection prevention and control, logistics and supplies [64]. Schools and many government offices have been closed (with the exception of government health agencies such as FMOH and EPHI) and meetings and training activities have been cancelled to ensure social distancing and reduce transmission. Further planning and development of response activities is underway.

The Maintains research is designed to examine the ability of health posts to prevent, prepare for and respond to shocks. COVID-19 is one such shock, and the research can contribute to informing recovery and generating lessons for future preparedness and response. in particular, the methods outlined in this report can be used to contribute information on:

- Health post response to COVID-19: the HEW survey and qualitative interviews can provide information on HEW involvement in the response, their knowledge and support needs, and factors affecting their response activities (e.g. health post capacity, support from other partners), to generate learning for ongoing support or future preparedness.

- Impacts of COVID-19 on coverage of health services for individuals/households: the health post, household and HEW surveys and qualitative data can provide information on the effect of COVID-19 on coverage of routine essential services (such as immunisation), to support situation analysis of health posts that can inform recovery, and to generate learning for future response

- Understanding community responses to COVID-19: the household surveys and qualitative data can be extended to include, understanding of COVID-19, perceptions of the COVID-19 response, behaviour change and impacts on health status, needs and access to health care.

- Impact on and response in areas with IDPs: the health post case studies will include at least one area with IDPs. Information from this case study can inform ongoing recovery efforts and future response.

Alongside its substantial effects on population health, COVID-19 is likely to affect implementation of Second Generation HEP, for example through delays to training, deployment of Level 4 HEW and the need for government officials and health managers to focus on the COVID-19 response. These potential changes, along with possible restrictions on fieldwork, may necessitate changes in the research focus and methods. We are closely monitoring the situation and will adjust the research plan as necessary.

6 Reporting and dissemination

Maintains is focused on operationally-relevant research that informs programme design and practice. To ensure the research is relevant and can be implemented, the research will be undertaken in partnership between OPM and government partners. A Research Steering Committee will provide a forum for ongoing engagement with senior decision makers and input at key points in the design.

Key primary audiences for the findings include:

- The FMOH, including the Health Extension Programme and Primary Health Care, Maternal Child Health and Nutrition, and Disease Control directorates.
- The EPHI, particularly the Public Health Emergency Management (PHEM) directorate and Health System & Reproductive health research directorate.
- DFID and other donors supporting health systems strengthening /shock response in Ethiopia e.g. UNICEF.
- Regional health bureaus, particularly in the region(s) included in the research.

The main channels for disseminating findings will include:

- Baseline and synthesis reports: full reports will be produced at baseline stage and then after the endline, along with executive summaries
- Dissemination workshops: there is a potential for baseline and then endline dissemination workshops involving stakeholders the above.
- Policy briefs: policy briefs will be developed on key findings.
- Journal articles: ideally journal articles will be developed in collaboration with government partners to share the learning beyond Ethiopia. This may require additional resourcing due to the time required for article development.
- Blogs or other short articles summarising findings, including on the Maintains website.

Findings may also be shared through relevant national or international conferences.

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