Maintains

Research supporting social services to adapt to shocks

Health system shock responsiveness: summary findings from Maintains research

Working paper

Kate Gooding

June 2021

UKaid from the British people

Oxford Policy Management

About Maintains

Maintains was an operational research programme designed to build a strong evidence base on how health, education, nutrition, and social protection systems can respond more quickly, reliably, and effectively to changing needs during and after shocks, whilst also maintaining existing services. Over 2019–21, Maintains worked in six focal countries—Bangladesh, Ethiopia, Kenya, Pakistan, Sierra Leone, and Uganda—undertaking research to build evidence and providing technical assistance to support practical implementation. Research was due to continue until 2023, but Maintains was closed in early 2021 due to cuts in UK aid.

Maintains was funded with UK aid from the UK government; however, the views expressed in this material do not necessarily reflect the UK government's official policies. Maintains was implemented by Oxford Policy Management.

Acknowledgments

We would like to thank all the Maintains teams who have conducted country and cross-country research, and the national governments, country partners, and FCDO country offices who supported the research. Particular thanks to Debbie Hillier, Dr Matt Fortnam, Philip Amara, and Professor Sophie Witter for reviewing a draft of this summary. We would also like to acknowledge FCDO for funding the Maintains research and the preparation of this summary report.

Citation

Gooding, K. (2021) 'Health system shock responsiveness: summary findings from Maintains research', working paper, Oxford Policy Management, Oxford.

Contacts

maintains@opml.co.uk

www.maintainsprogramme.org

@MaintainsProg

www.linkedin.com/company/maintains/

Maintains is implemented through a consortium led by Oxford Policy Management Limited as the managing agent. Oxford Policy Management is registered in England: 3122495. Registered office: Clarendon House, Level 3, 52 Cornmarket Street, Oxford, OX1 3HJ, United Kingdom. www.opml.co.uk.

Executive summary

Over 2019–21, the Maintains programme conducted research on health system capacity to manage shocks in Bangladesh, Kenya, Pakistan, Sierra Leone, and Uganda. Background preparations for research were also conducted in Ethiopia. The research examined health sector responses to shocks such as floods, drought, and COVID-19, considering experience in scaling up to address needs that arise due to the shock, while also maintaining essential service delivery. Research was due to continue until 2023, but Maintains was closed in early 2021 due to cuts in UK aid.

This summary paper highlights selected findings from the Maintains research that was conducted. The purpose is to highlight key learning from the research, bringing together material on similar issues from different countries and providing a high-level overview of factors that affect health system shock responsiveness. A framework of shock-responsive health services developed through Maintains was used to guide the summary, considering formal health system building blocks, including supplies, health workers, information, and funding; health system and wider governance; community health systems; and gender and social inclusion in shock response. Key issues in each area include the following:

- **Supplies and infrastructure:** shock responsiveness requires adequate supplies for response measures, as well as continued provision of routine supplies, and appropriate infrastructure. Supplies are affected by delays related to reliance on bureaucratic, single or centralised providers; adequacy of logistics and systems for distribution and redistribution; availability of buffer stocks and storage facilities, at the required levels and locations; accuracy of information systems and forecasts, and flexible supply that responds to new information; sufficient funding, from government or aid agencies; and coordination between government and aid agencies for efficient supply.
- **Human resources for health:** an adequate workforce for shock response involves sufficient availability and capacity, and consideration of staff wellbeing. Key issues include the number and distribution of health workers; skills and training; transport and travel for health workers; provision of personal protective equipment (PPE); and financial and other support.
- **Information and learning:** shock responsiveness requires effective surveillance and information systems, and ongoing learning. The effectiveness of information and learning systems depends on functional systems for data collection and sharing, including adequate technology, skills, and incentives to collect accurate information; usability of information; capacity and motivation to respond to information; and support for learning and innovation, including flexible and long-term donor funding.
- **Finance:** adequate funding for shock responsiveness requires sufficient availability, timeliness, and predictability, and appropriate allocation. Important factors include contingency funding; flexibility in budget reallocation; decision-making systems for allocation of funds that have sufficient technical input and pre-agreed criteria; transparency, flexibility, and predictability of donor funding; donor support before emergencies arise and while needs continue; and accountable use of available funds. Wider economic systems, such as debt and tax revenue, also affect availability of funding.

- **Health system and wider governance**: effective governance for shock response includes areas such as leadership, coordination, policies, and plans, both within the health system and beyond. Key aspects of governance include the existence of coordination structures between different stakeholders, including between government and aid agencies; clarity on the roles of different coordination structures; institution focus areas and mandates that address the range of priority shocks; the power of coordinating bodies or lead agencies over those charged with implementing the response; ongoing coordination before crises occur; effective partnership between the health sector and wider government institutions; two-way partnership and communication between national and local governments; established plans for shock response; and wider political stability.
- **Community health systems:** shock responsiveness requires effective engagement of community actors and effective community health-seeking behaviour. Aspects of engagement and health seeking indicated by the research include engagement with local leaders and organisations, including involvement of leaders and groups representing women; the role of self-organising by community groups; use of community knowledge and information; effective communication and listening with communities; and the influence of fear and trust in health services. Fear and trust are in turn affected by concerns about low-quality and disrespectful treatment in government systems; familiarity with emergency systems; and wider government policies and approaches, including punitive approaches to emergency response.
- **Gender equality and social inclusion**: gender and other dimensions of equity and exclusion are significant for all health system building blocks and wider governance. Specific considerations for supporting women and vulnerable groups in shock response include continued provision of essential services for women's health; gender-sensitive response services; service provision for vulnerable groups, such as refugees and pastoralists; risk of marginalised groups experiencing oppression; and the effects of public health measures on service access and social determinants of health.

Across these areas, overarching issues highlighted by the research include the need for both core health systems capacity and specific public health capacities; the role of health system hardware (such as sufficient staff and supplies), and health systems software (such as knowledge, attitudes, and relationships); close interactions between different health system building blocks; and the influence of wider factors beyond the health sector and of international, national, and sub-national factors on health system shock responsiveness. These links underline the importance of an integrated and multisectoral approach to supporting health system shock responsiveness, as well as the value of a systems approach for research in this area.

The challenges identified through the research, and indications of strategies that have supported shock response, suggest potential areas for interventions to strengthen health system emergency capacities (see Table 1). Many are specific health sector activities, but some involve wider or longer-term intervention. These areas are listed as areas to consider, not areas of proven intervention effectiveness; some are proposed based on evidence of gaps in country systems, rather than evidence that interventions in these areas support shock response, and further research would be needed to assess their relevance and value in different contexts.

Table 1: Areas to consider in supporting health system shock responsiveness

Framework area	Intervention areas to consider
Supplies and infrastructure	• High-quality isolation and quarantine facilities, including respectful treatment, adequate sanitation, and low/no cost to residents, to avoid spread of infection, and so that concerns about low-quality facilities do not discourage testing or presentation with symptoms. • Laboratory capacity, including supplies for testing. • Storage for supplies, at facility and sub-national levels, to enable buffer stocks in case of transport disruptions or delays in procurement and distribution from higher levels. • Logistics capacity for transporting supplies, including vehicles, vehicle maintenance, and staff, for national suppliers and sub-national health systems. • Streamlined procurement systems that allow rapid turnaround while also ensuring accountability. • Supply forecasting and monitoring systems, to support accurate prediction of required stocks, and improved stock management. • Frequent opportunities to order supplies, or scope for placing additional orders, to increase flexibility when needs change or if forecasts were inaccurate. • Coordination of procurement between government departments, to support efficiency and ensure supplies are appropriate for needs. • Donor procurement and/or distribution of supplies when government systems are unable to meet needs, with close coordination and information sharing between government and aid agencies, and systems to ensure continued supply if needs continue after donor emergency programmes end. • Robust and appropriately located health facility infrastructure that can withstand shocks such as floods.
Human resources for health	• Longer-term support for sufficient health worker training and retention to meet required health worker to population ratios. • Government protocols to redeploy staff during emergencies, to facilitate transfer to hotspots with increased service demands. • Budgets for additional recruitment to meet increased demand during shocks. • Training for health workers in skills and systems required for shock preparedness and response, including use of virtual or other approaches that can be used when face-to-face training is impossible. • Adequate training for staff who take on new responsibilities through task shifting, to reduce the support for these staff that is needed from higher levels, and so to maximise the value of task shifting for easing workloads. • Adequate consideration of additional domestic burdens for female health workers in workload planning and health workforce management • Transport for health workers to reach facilities and provide services, including sufficient vehicles and alternative systems when public transport is disrupted. • Sufficient and appropriate PPE to reduce health worker infection and support their confidence to provide services. • Compensation and incentives for health workers and community volunteers, and consistent and timely payment of agreed compensation, to support motivation. Compensation and incentive systems should be structured to support provision of all required services, rather than potentially encouraging a focus on incentivised activities at the expense of other essential services. • Systems to support team morale among health workers in challenging times, such as platforms for peer support. • Secondment of aid agency staff when governments are unable to meet emergency needs.

Information and learning	• Building on the Community-based Management of Acute Malnutrition (CMAM) Surge approach, using facility information as part of systems with agreed thresholds and procedures for shock response. • Functional information system capacity, including adequate technology and connectivity, and motivation and skills among staff responsible for collecting or collating data. • Regular monitoring and review of response activities, to enable learning and adaptation. • Timely and sufficiently granular information to support action, for example by ensuring early warning systems provide sufficient detail on likely timing and locations of shocks. • Inclusion of community knowledge and information in early warning systems, including input from community volunteers and groups that are attuned to shocks (such as pastoralists). • Building trust in information systems, for example through effective media and political engagement to avoid conflicting messages. • Capacity to respond to information: this involves action in other building blocks, for example human resources, supplies, and funding. • Time to reflect and identify alternative approaches among practitioners, to support learning and innovation. • Funding that allows both piloting of new innovations and time to build government ownership, for sustainability.
Finance	• Longer-term advocacy and support for adequate health budgets, at international, national, and sub-national levels. • Contingency budgets that are sufficient and ring-fenced, and that have clear procedures for allocation. • Streamlined systems for budget reallocation, to reduce bureaucracy, enhance flexibility, and enable rapid response. • Agreed and evidence-based criteria and processes for allocation of funds and sufficient technical input to decision-making, to enable rapid decisions and alignment of allocation with needs, and to reduce the influence of politics or personal incentives on use of funds. • Gender-responsive allocation of funding, including sufficient resources to address gender-based violence (GBV) as well as continued provision of routine reproductive and maternal health services. • Clear and advance information regarding funding from different aid agencies, to enable planning and coordination. • Transparency in provision and use of funding from all stakeholders, to support accountable use. • Ensuring aid funding is aligned to needs (in terms of geography and activities), and that there are systems in place to meet continued needs when funding is reduced or ends. • Provision of disaster financing before situations become emergencies, and sufficient funding of *ex ante* financing mechanisms that allow rapid response. • Support for wider economic stability and systems, such as debt relief.
Governance	• Functioning coordination structures that include relevant stakeholders and health system levels, to share information, agree roles and activities, and enable effective input from aid agencies. • Clear roles for different coordinating structures, to avoid overlapping remits. • Sufficient health sector representation in coordination structures to ensure plans and activities consider all relevant health system needs. • Mandates for disaster coordination bodies or lead agencies that are sufficiently wide to support response to the range of relevant shocks.

	• Legitimacy and authority of coordinating bodies or lead agencies that ensures the implementation of agreed plans by other actors. • Ongoing structures for coordination before crises occur, to enable proactive anticipatory planning. • Established and agreed plans for disaster management at local and national levels, to support swift and coordinated action when shocks occur, and to support long-term preparedness. • Two-way coordination and communication between national and sub-national levels, such as clear systems for reporting information upwards, and national government responsiveness to district needs and activities.
Community health systems	• Engagement with local leaders and organisations, to share information and support response activities. • Recognising, and where needed supporting, response activities initiated by community groups. • Effective communication to communities, including systems to track and respond to rumours and misinformation, and ensuring information is understandable and actionable. • Trustworthy and respectful shock response systems and activities, such as acceptable quarantine or isolation infrastructure, supportive treatment by health workers, and enforcement of public health measures in a way that builds community collaboration.
Gender equality and social inclusion	• Representation of female leaders and women's organisations in national and local decision-making and response activities. • Guidelines and systems for continued provision of and access to essential services for reproductive and maternal health services during shocks. • Gender-sensitive response services, including action to prevent and address GBV, and emergency infrastructure that takes account of women's needs (for example, gender-segregated quarantine facilities and private space for camp settings). • Service structures that take account of the increased domestic burdens on women during shocks, such as outreach services to reduce the time needed to access health services. • Support for camps for refugees and internally displaced persons during shocks, including continued access for aid agencies, provision of information, and appropriate infrastructure and water, sanitation and hygiene (WASH) to avoid infection. • Outreach services to support remote populations who may be missed by shock response, as well as by routine services. • Addressing potential negative impacts of public health measures (such as movement restrictions and reductions in public transport) on health service provision and access, for example through exemptions to travel bans. • Support to address the social determinants of health when these are negatively affected by public health measures (for example, WASH and social protection).

Table of contents

Executive summary i
List of abbreviations vii
1 Introduction 1
2 Summary findings 4
2.1 Formal health system building blocks 4
2.2 Governance 15
2.3 Community health systems 18
2.4 Gender equality and social inclusion in shock impacts and response 20
3 Conclusion 23
References 28
Annex A Maintains research studies included in this summary 29

List of abbreviations

CHV	Community health volunteer
CMAM	Community-based Management of Acute Malnutrition
COVID-19	Coronavirus Disease 19
FCDO	UK Foreign, Commonwealth and Development Office
GBV	Gender-based violence
KEMSA	Kenya Medical Supplies Agency
Maintains	Maintaining Essential Services After Natural Disasters
MoH	Ministry of Health
MoHS	Ministry of Health and Sanitation (Sierra Leone)
NaCOVERC	National COVID-19 Emergency Response Centre (Sierra Leone)
NDMA	National Drought Management Authority (Kenya)
PPE	Personal protective equipment
WASH	Water, sanitation, and hygiene

1 Introduction

The Maintains programme was an operational research programme designed to build a strong evidence base on how health and other social services (nutrition, social protection, and education) can respond more quickly, reliably, and effectively to changing needs during and after shocks, whilst also maintaining existing services. Maintains worked in six focal countries: Bangladesh, Ethiopia, Kenya, Pakistan, Sierra Leone, and Uganda. In each country, research was driven by Foreign, Commonwealth and Development Office (FCDO) country priorities, to build evidence and support practical implementation nationally while also contributing to global learning and policy change. Research was undertaken from 2019 to 2021 and was due to continue until 2023, but Maintains was closed in early 2021 due to cuts in UK aid.

This working paper has been written to capture some of the key learning produced through Maintains research (albeit that research remains incomplete), and to bring together findings across different country research agendas and contexts so that Maintains' legacy will be more than the sum of its parts. The purpose is to provide a high-level overview that outlines key findings on issues affecting health system shock responsiveness and highlights areas to consider in strengthening health system capacity to manage shocks.

The Maintains programme undertook a range of research on health system capacity to manage shocks in Pakistan, Bangladesh, Kenya, Uganda, and Sierra Leone, with research plans being adapted to respond to the COVID-19 pandemic. This included rapid studies on the initial response to COVID-19 across five countries, and more in-depth research in Kenya, Pakistan, and Sierra Leone (published in the case of Kenya and Sierra Leone, but in internal draft form for Pakistan). Background preparations for research were also conducted in Ethiopia, including document reviews and discussions with national and regional stakeholders. The research examined health sector responses to shocks such as floods, drought, and COVID-19, considering experience in scaling up to address needs that arise due to the shock and in maintaining essential service delivery. For a list of Maintains research studies that were used for this summary, please see Annex A.

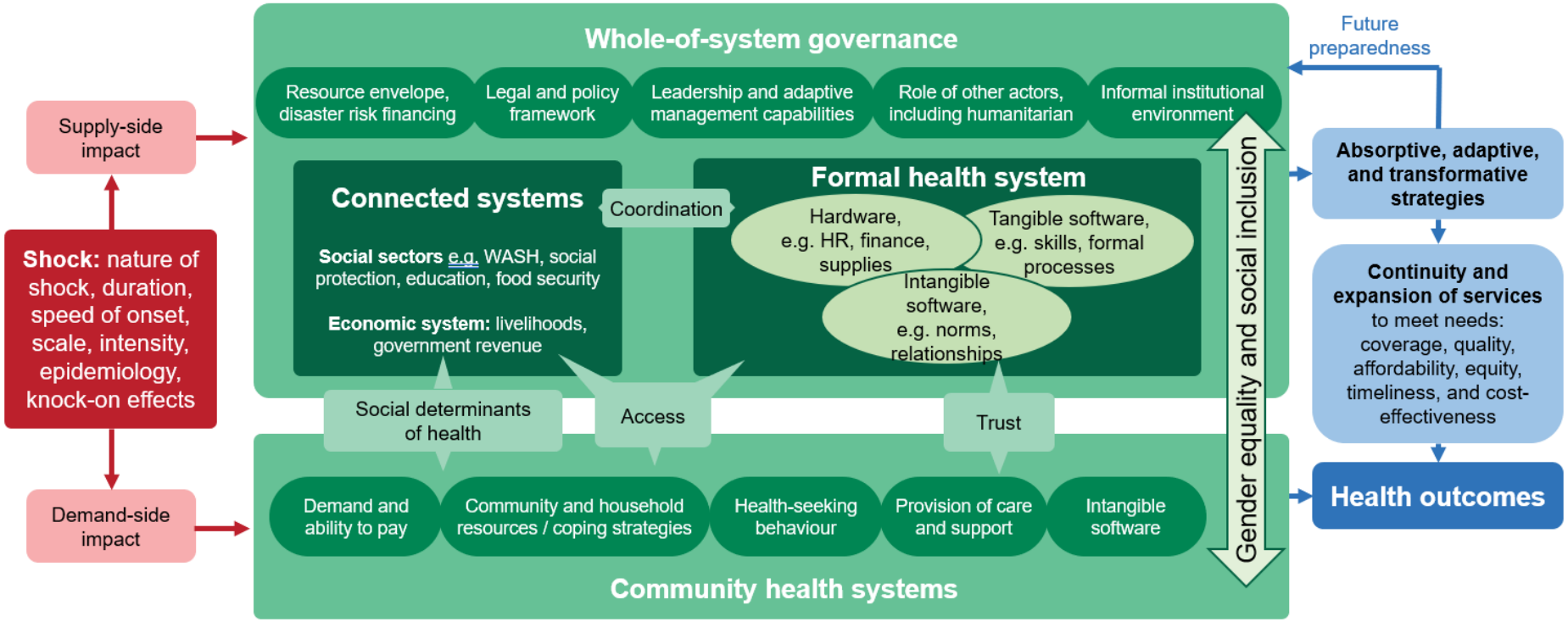
A conceptual framework on health system shock responsiveness was developed through Maintains, based on existing literature (see Figure 1 and Newton-Lewis *et al*., 2021). As set out in the framework, and in line with the Maintains business case, a 'shock-responsive' health system is defined as one that can adapt and scale up to address needs that arise due to a shock whilst maintaining essential service delivery. Shock responsiveness overlaps with health system resilience, but resilience is a broader concept that considers the ability to manage all kinds of change and stress, not just shocks. The framework indicates the wide range of factors that affect whether the quality and coverage of essential health services is maintained during shocks, and whether countries can effectively respond to additional demands arising from shocks through scaling up and providing additional services. These include factors related to building blocks within the formal health system (including supplies, information, health workers, finance, and service delivery); health sector and wider governance (for example, leadership and coordination systems); community factors (including engagement, trust, and health-seeking behaviour); aspects of the wider national context and related social sectors (such as WASH systems); and the nature of specific shocks.

This framework was used to support development of this summary, and has been drawn on to structure the paper. We start by examining key building blocks of the formal health system, including supplies and infrastructure, human resources, information systems, and finance. We then consider governance, both as a health system building block and in relation to wider national governance structures. Finally, we consider findings related to community health systems, and gender equality and social inclusion (GESI). Within these areas, we highlight effects on service delivery and shock response, and links to wider structures and systems beyond the health sector.

We have not attempted to cover all aspects of the Maintains shock-responsive health systems framework in this summary paper. In particular, we focus primarily on health system factors (rather than wider government and social systems), and, within this, on key aspects of the health system raised by the research, rather than all aspects discussed in the Maintains framework.

The summary was developed through rapid analysis over a short time-frame. As such, the summary is restricted to highlighting selected issues from the research. The summary does not provide an in-depth or comprehensive analysis of the complete Maintains findings on health system shock responsiveness. Further work would be needed to fully synthesise the findings and to conduct cross-country analysis that examines why and how issues vary between national contexts, as well as between different types of shock. Further, while the summary indicates the significance of key areas indicated within the Maintains framework, fully testing the framework or producing a refined framework were beyond the scope of this rapid summary. Comparing findings against existing evidence on shock responsiveness was also beyond what was possible for this paper; for a brief review of relevant literature, please see the Maintains shock-responsive health systems framework and individual country reports.

Figure 1: Framework for analysing a shock-responsive health system



2 Summary findings

This section highlights key findings related to the health system building blocks, governance, community health systems, and gender equality and social inclusion. Interactions among different building blocks and with wider national contexts were widely indicated in the research, and the sections below provide examples of these interactions.

2.1 Formal health system building blocks

2.1.1 Supplies and infrastructure

Shortages of medical supplies hinder effective shock response and continuation of service delivery in all Maintains countries. Such shortages have been evident during COVID-19, affecting COVID-19 care and control, and provision of other essential services. For example, stakeholders in **Sierra Leone** identified limited PPE, limited laboratory testing for COVID-19, and a lack of laboratory materials, including test kits, as key factors in the spread of COVID-19 (Grieco and Yusuf, 2020). Shortages of test kits and related supplies were also seen in other countries, including **Uganda**, and in **Bangladesh**, laboratory surveillance was initially limited by insufficient capacity (Hillier *et al*., 2020). Shortages of PPE and other materials for infection prevention and control were also reported in **all countries** during COVID-19, affecting availability and safety of COVID-19 care and other essential services. For example, in **Bangladesh**, shortages of PPE reduced health worker compliance with infection prevention and control guidelines (Hillier *et al*., 2020). Lack of PPE also reduced service provision indirectly by contributing to shortages of health workers, through loss of health workers due to illness and death, and reluctance to provide services due to risk of infection (see Section 2.1.2). As well as supplies specifically related to COVID-19, the pandemic affected provision of routine medications. For example, in **Pakistan**, supply of routine vaccines was disrupted by gaps in the international supply and a refocusing of national and provincial supply chains towards COVID-19 materials (Hillier *et al*., 2020).

Shortages of supplies also hinder response to other shocks. In **Pakistan**, effective outreach and service delivery during drought and floods is affected by stockouts, in some cases of oral rehydration salts but also of other essential commodities such as vaccines and family planning supplies (Najmi *et al*., 2021). Inadequate supply can damage community trust in the health system: in **Pakistan**, some Lady Health Workers reported receiving expired medicines from the district health department, which reduced the quality of services and brought tensions with the community (Najmi *et al*., 2021). This loss of trust potentially reduces future health seeking and efforts at community engagement.

Infrastructure has also been significant for shock responsiveness in the Maintains countries. For COVID-19 response, particular issues are the limited availability and poor quality of institutional isolation and quarantine facilities, and limited functionality of laboratory services, including at sub-national levels (Grieco and Yusuf, 2020; Hillier *et al*., 2020). Low-quality quarantine and isolation centres, including insanitary conditions, in turn affected community trust, engagement, and willingness to undertake COVID-19 tests. Experience with other shocks indicates the effects of damage to infrastructure during shocks: in **Pakistan**, floods often damage health facilities, as well as houses and road networks. This hinders service

provision and access, and creates additional health needs for households whose properties are affected, including through displacement (Najmi *et al*., 2021).

Experience with COVID-19 and other shocks points to a range of factors that affect adequate supplies and infrastructure. Many difficulties are longer-term health system issues, rather than specifically related to shocks. Some issues are international, such as diversion of global vaccine efforts, disruption of international supply chains, and reduction in vaccine production due to lockdowns, as seen with COVID-19 (Hillier *et al*., 2020). The research also identified a range of national and sub-national requirements. Many of these national and sub-national issues are highlighted by differing experiences with supplies reported in **Kenya**, where there were only limited stockouts of nutrition commodities during the 2019 droughts, but frequent stockouts of medical products (such as vaccines, anti-malarial drugs, and antibiotics) during 2018–19 (Fortnam *et al*., 2020b). Several factors were identified as contributing to effective nutrition supplies and gaps in medicines in Kenya, and experience in other countries indicates similar issues. Based on experience across the countries, key factors include the following:

- **Centralised systems and reliance on single providers:** in **Kenya,** medical and nutrition products for counties and facilities are procured, stored, and distributed by the Kenya Medical Supplies Agency (KEMSA), a state corporation under the Ministry of Health (MoH). KEMSA sometimes experiences stockouts, and distribution from the national KEMSA warehouse is sometimes disrupted by transport failures (see below). Counties also compete for limited KEMSA supplies, which are distributed on a 'first come, first served' basis. As KEMSA is the only accredited supplier of medicines, these stockouts, shortages, and disruptions to distribution then delay provision to counties. Nutrition products are also procured by aid agencies, providing an alternative supply if KEMSA stocks are unavailable (Fortnam *et al*., 2020b). In **Pakistan**, procurement for major emergencies is centralised through the National Disaster Management Authority. This can create delays due to bureaucratic procedures, as well as the time required for distribution (Najmi *et al*., 2021).
- **Logistics and systems for distribution and redistribution:** in **Kenya,** transport systems affect distribution of medical supplies from KEMSA, with frequent breakdown of delivery vehicles and road disruptions contributing to medicine shortages at county levels in 2018–19. Road disruption due to floods also led to nutrition stockouts in some areas in late 2019. Redistribution of medical products within counties is also limited by lack of delivery vehicles, as well as budgets for fuel or out-of-office allowances, and by inadequate communication channels and protocols between health facilities, sub-counties, and county managers. Aid organisations provide more support for redistribution of nutrition products from KEMSA and among facilities, and redistribute their own stocks from other parts of Kenya, or Somalia (Fortnam *et al*., 2020b). Logistics for distribution were also indicated as a constraint in other countries. For example, in **Pakistan**, shortages of medicines during droughts are related to long distances and sparse populations in drought-affected areas, and a lack of staff, transport, and infrastructure to redistribute supplies from head offices to peripheral facilities (Najmi *et al*., 2021).
- **Buffer stocks and storage facilities, at the required levels and locations:** health facilities in **Kenya** require at least two months of buffer stocks, for use in the event of disrupted supply from KEMSA, but facilities have limited storage space. Sub-county storage capacity is also limited, and disruptions to the road network can hinder re-supply

from county warehouses. Buffer stocks and storage for nutrition products are more adequate, with more pre-positioning at facility and outreach level, and warehouses for buffer stocks (mainly managed by aid organisations). Pre-positioning has also supported supply of other products, for example medication for waterborne diseases before the 2019 floods (Fortnam *et al*., 2020b).

- **Information systems and forecasts, and flexible and responsive supply:** in **Kenya**, information on health facility stocks is sometimes unavailable when county and sub-county managers prepare distribution plans, or facilities inaccurately estimate demand. Orders to KEMSA are usually made three months in advance, so inaccurate forecasts lead to inadequate supplies. For nutrition products, technical assistance from aid agencies has improved government ordering and monitoring systems, reducing stockouts (Fortnam *et al*., 2020b). In **Pakistan**, forecasting has varied between shocks and provinces. Systems have been stronger in Khyber Pakhtunkhwa: routine medicines and supplies are doubled during flood months, and this is reflected in contingency plans, and a three-month average is used to assess needs for future months and to prepare supply requests (Najmi *et al*., 2021).
- **Funding, from government and aid agencies:** in **Kenya,** supplies from KEMSA are affected by late payment from counties and outstanding county debts, which blocked new orders in 2018–19. These funding gaps are in turn related to delays in release of national government funding to counties. Aid agency funding is significant, particularly for nutrition products, and has helped to mitigate stockouts. Support from aid agencies was also seen by stakeholders as less bureaucratic and without the facilitation payments sometimes associated with government supply. The end of time-limited aid agency emergency programmes can lead to stockouts, and Kenya's move to lower middle-income country status, and associated reductions in donor support for direct implementation, also affects supply. For example, increased nutrition product stockouts in 2020 were partly attributed to donors withdrawing funding and responsibility for procurement then shifting to government (Fortnam *et al*., 2020b).
- **Coordination within government and between government and aid agencies:** effective partnership between aid agencies (such as UNICEF) and county governments in **Kenya** contributed to adequate buffer stocks and redistribution of nutrition supplies. In contrast, experience during COVID-19 suggests gaps in coordination and information sharing regarding supplies, in Kenya and other countries. For **Kenya**, some stakeholders reported a lack of coordination among aid agencies and with government in relation to laboratory supplies and testing, partly reflecting a lack of forums for coordination (Ekirapa, 2020). In **Sierra Leone**, there was conflicting information regarding the number of test kits, and the government emergency committee reported that they were unaware of widely-publicised donations from Jack Ma via the Chinese embassy (Grieco and Yusuf, 2020). Lack of clear, shared information is likely to reduce effective provision and use of supplies. In **Pakistan**, several government departments have a role in supplies, and inadequate coordination and communication can lead to inefficiency or inappropriate supplies. For example, lack of communication between the food and nutrition departments can mean ration bags do not have appropriate contents for all age groups (Najmi *et al*., 2021).

- **Robust infrastructure, for health facilities and more widely:** quality of health facility infrastructure affects the risk of disruption from shocks. In **Pakistan**, ageing health facility

buildings, as well as location next to rivers, increased the damage to facilities and disruption to service provision caused by floods (Najmi *et al*., 2021). Quality of wider public and private infrastructure also affects shock responsiveness. This includes quality of housing, which affects health risks and household needs during shocks. For example, overcrowded housing in **Pakistan and other countries** during COVID-19 increased the risks of infection and made self-isolation impractical (Hillier *et al*., 2020), and households in **Pakistan** lacked adequate materials to protect or repair their homes during floods (Najmi *et al*., 2021).

2.1.2 Human resources for health

Gaps in human resources were widely indicated as affecting response to shocks and provision of routine services during shocks, for COVID-19 and other emergencies. For example, lack of trained health workers reduced capacity to implement COVID-19 control activities in **Pakistan** (Najmi *et al*., 2021); stakeholders in **Sierra Leone** saw challenges related to health workers as a key factor affecting essential health services during COVID-19 (Amara *et al*., 2021); and in **Kenya**, staff shortages, combined with the lack of a shock-responsive human resource strategy, hindered transfer of staff to hotspots experiencing increased demand for services during climate shocks (Fortnam *et al*., 2020a, 2020b). Factors affecting the adequacy of human resources include overall availability, skills, mobility, support with required supplies, and compensation. As for supplies, many issues are longstanding health system gaps, exacerbated during shocks.

- **Number and distribution of health workers:** all Maintains countries have a shortage of health workers, with staffing rates below World Health Organization-recommended levels (Hillier *et al*., 2020). With staff shortages, reassignment of health workers to focus on shock response creates gaps in staffing for routine services, as seen with COVID-19 (Hillier *et al*., 2020). For example, frontline health workers in **Pakistan** were assigned to COVID-19 screening at entry points, and immunisation staff formed the rapid response teams who were assigned for contact tracing and sample collection (Najmi *et al*., 2021). In **Sierra Leone**, community health workers were trained in contact tracing, reducing the time they had available for providing other medical services for communities (Grieco and Yusuf, 2020). Assignment of staff to the COVID-19 response also reduced provision of other services in **Kenya** (Ekirapa, 2020).

  With insufficient staff, countries sought to increase the health workforce through strategies such as rapid recruitment, cancelling leave, requesting university health staff to support service delivery, and mobilising retired professionals (Ekirapa, 2020; Hillier *et al*., 2020).

  Beyond COVID-19, inadequate staff availability also limits responses to other shocks. In **Kenya**, the CMAM Surge approach provides warning of spikes in malnutrition, and indicates requirements for additional staff at health facilities experiencing admissions surges. However, overall staff shortages leave limited spare staff for redeployment, there is insufficient budget to recruit temporary staff, and MoH human resource management is insufficiently flexible and lacks protocols to redeploy staff to malnutrition hotspots (Fortnam *et al*., 2020a).

  Strategies to manage staff shortages can increase health worker stress and demotivation. In **Kenya**, strategies to cope with increased demand during drought and

floods in 2018–19 included reductions in staff leave, more multitasking, and longer facility opening hours. These strategies increase workloads for frontline staff – a particular issue for female health workers, as their domestic burdens (such as sourcing water) also increase during droughts (Fortnam *et al*., 2020b).

Aid agencies can support expansion of the health workforce. During drought in **Kenya,** aid agencies provided budgets to the MoH to recruit additional staff, recruited staff directly, or seconded their own staff to health facilities and outreach services, and lobbied county governments to recruit and retain staff in the longer term. However, this depends on aid agencies being present, and strict agency operating procedures can limit movement of aid workers to high-risk remote areas during shocks (Fortnam *et al*., 2020a, 2020b).

- **Skills and training:** across the Maintains countries, substantial efforts were invested by government and aid agencies in training related to COVID-19, but gaps in training were also widely identified. For example, in **Sierra Leone**, not all frontline workers were trained in COVID-19 protocols, and stakeholders saw training as a key area for improvement in the response (Amara *et al*., 2021). Logistics during shocks affect training: in **Pakistan**, provincial and federal governments recruited short-term health workers to enhance surge capacity, but physical distancing and inadequate virtual training systems hindered provision of appropriate training for new recruits (Hillier *et al*., 2020).

  Insufficient training also affects the results of task shifting to cope with staff shortages: if newly delegated staff lack the required skills, this can reduce service quality and increase burdens on other staff. In **Kenya**, the responsibilities of facility staff have been increasingly shifted to Community Health Volunteers (CHVs) to cope with understaffing and dispersed populations. CHVs have played important roles in screening for malnutrition and diarrhoea, as well as community education. When CHVs have sufficient skills, this alleviate workloads among higher cadres, but some CHVs are inadequately trained and so require increased supervision by facility staff (Fortnam *et al*., 2020b).

  Lack of training also affects ongoing preparedness for emergencies. For example, in **Ethiopia**, health extension workers are responsible for working with community volunteers to identify reportable diseases and conduct community surveillance. However, national and regional stakeholders reported inadequate frequency and quality of community surveillance, partly due to a lack of skills (Gooding *et al*., 2020): a national assessment of the Health Extension Programme found that only 40.4% of health extension workers were trained in community surveillance, and there were gaps in knowledge of notifiable events (MERQ HEP Assessment PHEM sub-study, pers. comm., in Gooding *et al*., 2020).
- **Transport and travel for health workers:** the ability of health workers to access patients and provide services is affected by lack of vehicles, and by road damage and travel restrictions related to shocks. In **Sierra Leone**, stakeholders saw a lack of motorbikes, other vehicles, and fuel for health workers to reach communities as reducing effective service provision during COVID-19 (Amara *et al*., 2021). In **Pakistan**, disrupted road networks during floods and insufficient vehicles affect health workers' ability to reach communities and facilities (Najmi *et al.*, 2021).
- **PPE to support health worker confidence and safety:** as discussed above, there were shortages of PPE during COVID-19 in all Maintains countries, and this affected

health workers' willingness to provide services, as well as contributing to infection of health workers. Shortages of PPE in **Pakistan**, particularly during the early stage of the pandemic, as well as hesitation in adapting to infection control practices, were reported to result in a loss of health workers through COVID-19 infection (Najmi *et al.*, 2021). In **Sierra Leone**, a significant number of health workers tested positive for COVID-19, and the risk of infection contributed to fear among health workers and reluctance to work (Grieco and Yusuf, 2020). The Maintains survey in Sierra Leone found that 75% of respondents whose primary work location was a health facility were extremely or very worried about being infected with COVID-19, mainly due to irregular PPE supplies (Amara *et al*., 2021). PPE shortages have also contributed to health worker unrest. In **Kenya**, for example, lack of PPE led health workers to threaten a nationwide strike, and doctors in Balochistan, **Pakistan**, went on strike when delayed PPE finally arrived and was the wrong type, thus providing inadequate protection (Hillier *et al*., 2020).

- **Provision of financial support:** health worker unrest and disagreements with government have also related to the provision of financial support for work during COVID-19. In **Kenya**, health workers in Kisumu County went on strike in June 2020, citing delays in salaries, promotions, and COVID-19 allowances (Hillier *et al*., 2020). In **Sierra Leone,** the government indicated support measures for frontline health workers in 2020, including life insurance, a weekly allowance for some positions, and other incentives (Grieco and Yusuf, 2020). However, the October 2020 survey found the most frequently mentioned challenge for the health workforce in responding to COVID-19 was inadequate compensation, including late payment of salaries and other incentives like risk allowances, insufficient salary and incentive schemes, and lack of health insurance. Compensation is a longstanding concern among health workers in Sierra Leone, perhaps exacerbated by COVID-19 (Amara *et al*., 2021).

  Financial compensation also affects the role of less formal health workers, including community volunteers. In **Kenya**, CHVs are expected to screen and refer children with acute malnutrition to health facilities. Their role is particularly important because of community mobility and long distances to health facilities. Without support from CHVs, caregivers can miss signs of acute malnutrition. However, CHVs are normally not paid a stipend for their work, or payments are inconsistent, reducing their motivation to screen and refer. Consequently, children are typically only referred when mass screening is undertaken, resulting in a spike in admissions and reducing health facilities' ability to prepare for and manage the response (Fortnam *et al*., 2020a).

  The structure of financial compensation influences health worker activities, with potential unintended consequences. In particular, additional allowances related to shock response can negatively affect other services: in **Kenya**, non-government organisations have provided allowances for outreach and associated training during climate shocks. While these allowances can support motivation, they also incentivise outreach work at the expense of health facility provision, as well as creating a financial sustainability issue (Fortnam *et al*., 2020b).

2.1.3 Information and learning

Experience with COVID-19 and other emergencies indicates the role of effective information, surveillance, and learning systems in supporting preparedness and shock response. One example is the CMAM Surge approach, examined in **Kenya**. CMAM Surge involves health

facilities setting thresholds (normal, alert, alarm, and emergency) for acute malnutrition caseloads based on a self-diagnosis of their capacity, monitoring trends in caseloads against the thresholds, and actioning internal health facility surge actions or seeking support from higher levels of government or aid agencies when higher thresholds are crossed. Enhanced monitoring, analysis, and reporting of caseloads under CMAM Surge has strengthened capacities to manage seasonal and shock-related surges in demand for nutrition services. For example, admission trend analysis is used to adjust seasonal preparations, and surge information helps aid agencies to target their support geographically. The system has also empowered health workers to use their own admissions data to better understand malnutrition drivers, seasonality, and their local area, and to take actions themselves to prepare for and respond to shocks (Fortnam *et al*., 2020a).

The COVID-19 response also indicates the role of information and surveillance in monitoring risks, health needs, and system capacities. For example, in **Pakistan**, data on COVID-19 cases were collected through surveillance systems, dashboards for COVID-19 cases were developed, and data were shared and linked to a national electronic database. There were daily situation reports, and analysis of trends over time. Data on cases were used in several ways, including to maintain records of patients to track requests for plasma, to amend guidelines and standard operating procedures, to project supply needs, and to support decisions about lockdowns, including whether these would be general or 'smart' (i.e. focused on particular locations) (Ali, 2020; Najmi *et al*., 2021). There are also examples of effective information use in response to other shocks in Pakistan. For example, during floods in Shangla, there was daily reporting on immunisation, including a record of clients immunised and those who declined vaccination. This information was used by district teams to revisit households that were not vaccinated, to encourage vaccine uptake (Najmi *et al*., 2021).

Ongoing learning and adapting have also been important for shock responsiveness. This is again illustrated by CMAM Surge in **Kenya**, which developed due to aid agency and government staff learning from previous experience and experimenting with alternative systems. Following major drought in 2011, Concern identified a lack of preparatory planning, despite early warning, and insufficient understanding of the context or use of available data. This learning and reflection contributed to development of ideas for CMAM Surge (Fortnam *et al*., 2020a).

Learning from previous shocks has also been important for the COVID-19 response. In **Sierra Leone**, four out of five respondents to the stakeholder survey felt lessons from Ebola were applied to COVID-19, and most thought the health system was better prepared for COVID-19 than it was for Ebola. Key areas of government learning included swift activation of coordination structures and systems, early and proactive leadership to declare a state of emergency and launch a risk communication campaign, systems for contact tracing, and active community engagement and involvement of traditional leaders (Amara *et al*., 2021; Grieco and Yusuf, 2020). Health worker learning from previous shocks was also important, including familiarity with systems for infection prevention and control through experience with Ebola (Grieco and Yusuf, 2020).

Ongoing learning during shocks also supports shock responsiveness. This is seen with the COVID-19 response in **Sierra Leone**, where pillar teams changed strategies in response to information that current approaches were not working (at least partially, though not all

difficulties were resolved). For example, when it was clear that lockdown would create difficulties in accessing water, drop-off water was arranged (Grieco and Yusuf, 2020).

Key factors that influence the effectiveness of information and learning relate to functional information systems, use of information, and support for learning and adapting.

- **Functionality of information systems:** effective information systems require hardware, skills, coordination, and incentives to collect accurate information. In **Pakistan**, accurate information to support shock response from lower health system levels is limited by insufficient technology and connectivity, insufficient administrative capacity, unfamiliarity with information systems, incentives related to self-reporting, and gaps in the integration and coordination of data across the public, private, and social sectors. Connectivity is further limited during floods, which can disrupt electricity, internet access, and other communication systems, so hindering data collection and reporting (Najmi *et al*., 2021). Availability of specialist materials for data collection affected information and surveillance for COVID-19 in several countries, as indicated by the gaps in supplies for test kits described in Section 2.1.1.

  The previous experience with information and surveillance systems, for shocks or ongoing health needs, can help to establish information system capacities. **Kenya** had more capacity for COVID-19 testing due to experience of viral load diagnostic activities for antiretroviral treatment (Hillier *et al*., 2020). In **Pakistan**, existing surveillance systems for polio and influenza were repurposed for COVID-19. For example, National Stop Polio Teams, Provincial Technical Officers, and fellows of the Field Epidemiology Laboratory Training Programme worked with provincial and district health authorities on event-based disease surveillance (Ali, 2020).

  However, previous systems are not always applicable: **Sierra Leone** has significant surveillance experience from Ebola, but, compared to COVID-19, Ebola has a clearer case definition and clearer demarcation of onset by symptoms. Transmission of Ebola also requires close and direct contact, whereas COVID-19 involves airborne transmission. These differences mean a surveillance system previously based on relatively clear-cut decisions and assessments now requires consideration of probabilities, while uncertainty about likely infection extends the requirements for (and consequent costs of) containment. This limited the value of previous systems and experience for COVID-19 surveillance capacity (Grieco and Yusuf, 2020).
- **Usability of information:** For information systems to support shock responsiveness, they need to provide actionable and timely analysis. In **Kenya**, the early warning system for drought is functioning, with bulletins and drought phases referred to and communicated. However, the early warning bulletins are not predictive because they mainly use outcome indicators, such as milk prices, and do not project or provide early warning of health and nutrition service demand surges. Health actors felt that the bulletins were too general – indicating that drought is expected, rather than indicating the timing or location of effects at the scale needed for decision-making. This limits the value of early warning information for health system preparedness and response. National health information systems, such as District Health Information System 2, cannot currently support planning, due to lag times between data collection and publication (Fortnam *et al*., 2020b).

- **Capacity and motivation to respond to information:** when information indicates a need for action to prepare for or respond to shocks, ability to take the required action depends on sufficient financial, human, or other resources. CMAM Surge provides information indicating the need for additional support to manage increased admissions. However, response to this information is limited by a lack of contingency budgeting or other financial mechanisms to support health facility surge actions; insufficient availability of nutrition products to pre-position at and restock health facilities; and a lack of spare human resources to redeploy to health facilities experiencing surges. Health facilities can implement small-scale surge actions themselves to deal with minor spikes (such as leave management), but resources from higher levels are needed when facilities' coping capacities are exceeded (Fortnam *et al*., 2020a).

  Use of data also requires motivation to act on information, which can be reduced by lack of trust in the data, political interference, and apathy. In **Kenya**, there was little preparation for floods in 2019, despite early warnings, partly due to a culture of only responding once floods occur, as well as some previous 'false alarms'. The frequency of droughts was also seen as creating apathy regarding response. Media reports contradicting or questioning early warning information, and political interference, may also undermine the credibility of information, and thus willingness to act upon it (Fortnam *et al*., 2020b).
- **Support for learning and innovation:** The CMAM Surge approach indicates the value of evaluation, reflection on information, learning, and piloting to enable development of new strategies for shock responsiveness. The research in **Kenya** indicated several factors that enabled this learning, or that hindered such learning and innovation in other contexts. These included practitioners having or making time to examine problems, and to publish their reflections and ideas for possible solutions to share ideas with a wider audience; sufficiently flexible programme funding to enable piloting of new approaches and donor willingness to support innovation; and government openness to experiment, supported by trusting relationships with the non-government organisation implementing partners (Fortnam *et al*., 2020a). Sufficiently stable and long-term funding was also important to enable government ownership, and consequent sustainability, of innovations. In Kenya, long-term investment by aid agencies and the government allowed time to develop activities together. In contrast, CMAM Surge was primarily funded as a nutrition emergency response in West Africa, where the short project timelines left insufficient time and resources for MoH engagement and capacity development (Fortnam *et al.*, 2020a).

2.1.4 Finance

Adequate funding is a key influence on the strength of health system building blocks discussed above, and has affected capacity to prepare for and respond to shocks in the Maintains countries. The influence on other building blocks is illustrated by experience with COVID-19 and other shocks. In **Sierra Leone**, for example, funding is a key influence on ability to procure adequate supplies for COVID-19: the government outlined a required budget for the first year of the COVID-19 response, nearly half of which was allocated to PPE (Grieco and Yusuf, 2020). Lack of funds also contributed to gaps in support for human resources during COVID-19, such as delayed or inadequate risk allowances, and limited training (Amara *et al.*, 2021). Other examples of the influence of funding on health system

building blocks come from the response to climate shocks in **Kenya** (Fortnam *et al*., 2020a, 2020b). County health budgets are considered insufficient to meet normal demand for health and nutrition services, and emergency situations are a further stretch. Funding shortfalls contribute to stockouts of medical and nutrition products, and to late payment of health workers. They also affect governance by undermining coordination mechanisms, for example when nutrition coordination meetings cannot be hosted due to lack of funds (Fortnam *et al.*, 2020b). As discussed in relation to CMAM Surge in Section 2.1.3, funding also influences the effectiveness of information systems and learning: pre-agreed actions to support health facilities when their capacities are exceeded are not always financed; limited response then demotivates health workers; and short-term funding limits opportunities to build government ownership, and so affects development and sustainability of shock-response innovations (Fortnam *et al*., 2020a).

Appropriate funding involves not just the overall availability and amount of funds, but also their timeliness, predictability, and allocation. For example, the CMAM Surge experience in **Kenya** suggests that delays sometimes mean funds arrive at facilities once the emergency situation has already eased (Fortnam *et al*., 2020a). Budgets from government and aid agencies are also unstable, making it difficult to plan for future surges in demand and to respond quickly when shocks occur (Fortnam *et al*., 2020a, 2020b). Allocation of funding among different priorities, within and beyond the health sector, also affects the strength of specific components of preparedness and response. For example, government funding for the COVID-19 response in some **Pakistan** provinces focused on testing, hospitals, and intensive care units, with limited attention to funding services for mental health, sexual and reproductive health, or GBV (Najmi *et al.*, 2021).

A range of issues at international, national, and sub-national levels affect the adequacy of funding systems.

- **Contingency funding:** contingency funding can support financial flexibility for shock response. **Kenya** has a National Drought Emergency Fund, and health and nutrition have benefited from these national contingency funds. For example, national funds were allocated *ad hoc* to surge actions during the 2019 droughts. However, at county level, the MoH lacks flexible financing or contingency funds for emergency response, and county governments do not set aside a budget for CMAM Surge actions. The wider county governments are permitted to retain up to 2% of their annual budget as a County Emergency Fund, for response to unexpected events. However, county contingency funds tend to be underfinanced and not ring-fenced, and tend not to prioritise health needs (see allocation below) (Fortnam *et al*., 2020a, 2020b).
- **Flexibility in budget reallocation:** new needs for shock response can require reallocation of funding from previous plans. Given lack of contingency budgets, funding for shock response in **Kenya** is typically sourced through redistribution from other spending (often non-essential administrative tasks, such as refreshments for meetings). However, redistribution is bureaucratic because health budgets are fixed annually by the county assembly, with any changes needing to be approved by the Office of the Governor, and this delays funding (Fortnam *et al*., 2020b).
- **Decision-making for allocation of funds:** decisions on allocation of available funds, both between sectors and within health, affect availability and timeliness of funds release. These decisions are often political. The influence of political will and leadership

for allocation and timely release of funds was emphasised by stakeholders in **Pakistan**. For example, leadership and commitment from provincial Chief Ministers was seen as influencing allocation of funds to the COVID-19 response, with variation between provinces (Najmi *et al*., 2021).

In **Kenya**, the health sector competes with other sectors for county emergency funds, and funding may be allocated to other priorities, such as food relief and WASH. Allocation is negotiated through county and sub-county discussions, rather than being automated. The county decision makers have limited engagement in technical discussions on drought preparedness and response, and decisions are affected by politics. This negotiation delays release of contingency funds and reallocation of budgets (Fortnam *et al*., 2020a, 2020b).

At local level, allocation of emergency funds may be influenced by personal incentives. For example, funding for CMAM Surge actions tends to be used for outreach and mass screening (which are attractive, as stipends supplement salaries), rather than for lower-cost actions, such as transport to supply additional products or out-of-office allowances for staff who are transferred to hotspots (Fortnam *et al*., 2020a).

- **Donor funding:** aid agency funding has played an essential role in supporting shock response in Maintains countries. For example, as discussed earlier, aid agency support has contributed to reducing nutrition product stockouts in **Kenya**, and this support has also enabled increased outreach during droughts (Fortnam *et al*., 2020b). All Maintains countries received significant donor support for the COVID-19 response, with major donors reallocating funding or providing supplementary budgets (Hillier *et al*., 2020). This support is particularly critical for the lowest income countries; **in Sierra Leone,** the government is largely dependent on external support to fund the COVID-19 response (Grieco and Yusuf, 2020).

  However, reliance on donor funding also brings difficulties. Experience with climate shocks in **Kenya** indicates a range of problems in this regard (Fortnam *et al.*, 2020a, 2020b). First, aid agencies focus on particular activities and locations; as seen with CMAM Surge, this leaves some facilities without support. Second, aid agency support may only be available when the situation becomes an emergency. In Kenya, international planning and appeals only start when the government officially declares a drought. Aid agencies' prearranged (*ex ante*) financing mechanisms tend to involve relatively limited funds, so *ex post* funding is dominant, and this delays release of resources. Third, time-limited emergency funds can mean activities such as outreach and product supplies stop despite continued needs. Fourth, aid agencies may have limited flexibility themselves to provide funds, when they do not have existing budget lines and when donor requirements limit budget reallocations. Agencies may also need to wait for successful fundraising, which can take time and involve piecing together funds from different donors. Finally, and partly linked to uncertain fundraising, aid agency funding is unpredictable, due to changing aid and donor programmes.

  Similar issues are seen in other countries. For example, in **Pakistan**, humanitarian aid budgets are short-term and unpredictable, and food shortages have occurred when donor support ends (Najmi *et al*., 2021). Longer-term development aid does not usually cover preparedness and response for shocks. Reductions in funding to aid agencies can leave previously supported groups vulnerable. For example, in **Uganda**, new arrivals to refugee settlements have high malnutrition rates and rely on aid, but the World Food

Programme had to reduce assistance by 30% due to a lack of funding (Hillier *et al*., 2020).

Overall declines in donor funding also affect the availability of support. In **Kenya**, as indicated earlier, this is affected by the move to lower middle-income country status, and the associated transition of donor funding towards technical assistance (Fortnam *et al*., 2020b). Economic shocks in donor countries can also affect aid: in **Sierra Leone**, some stakeholders thought the economic impacts of COVID-19 in high-income countries would reduce donor support (Amara *et al.*, 2021).

- **Accountable use of available funds:** accountable management of emergency and health sector funding affects support for shock response. There have been concerns about corruption in relation to COVID-19 funding in several Maintains countries, including in relation to procurement of supplies in **Bangladesh** and **Pakistan**, and inappropriate award of allowances to MPs in **Uganda** (Hillier *et al*., 2020; Najmi *et al*., 2021). In **Sierra Leone**, a Coronavirus Disease Response Transparency Task Force was established to support accountable and transparent use of COVID-19 funds, reflecting concerns about corruption during the Ebola response (Hillier *et al*., 2020). In **Kenya**, there are concerns about insufficient transparency regarding when and to what sectors government contingency funds are allocated. Multiple actors and sources of funding, with support from different donors, complicate the picture and make it harder to know whether funds are used as indicated. This creates potential for misuse, as well as hindering effective coordination with aid agency funding (Fortnam *et al*., 2020b).
- **National economic systems:** overall national government finances and allocation of funding to health affect the availability of funding for health system shock responsiveness. For example in **Kenya**, limited county and MoH funding for shock response partly reflects significant national underfunding of healthcare (Fortnam *et al*., 2020b). In **Sierra Leone**, availability of funding for the COVID-19 response is affected by wider budget deficits and international debt distress. The economic impacts of COVID-19 exacerbate the situation, with policy measures to control COVID-19 leading to a decline in tax revenue (Grieco and Yusuf, 2020).

2.2 Governance

Governance of the health system includes areas such as leadership and management, coordination, policies and plans, regulation, and structures for accountability. Shock responsiveness is also affected by wider governance beyond the health sector, such as other national policies and cross-government coordination systems. Effective governance in turn affects other health system pillars, as seen in previous sections: for example, coordination between government and aid agencies affects provision of supplies, sustainability of innovations, and funding; and government leadership and accountability affect the provision of supplies and funding for crisis response. The Maintains research indicated areas of more effective and weaker governance, related to planning, coordination, and wider governance conditions.

- **Existence of stakeholder coordination structures:** structures for coordination between different government departments and health system levels, and with other stakeholders, can support shock response. In **Kenya**, a range of county government coordination structures have been established since devolution, including Directorates of

Disaster Management, and Disaster Management Committees at each governance level. Emergency response is also coordinated through WhatsApp. These structures have improved stakeholder engagement, cross-sector coordination, sharing of early warning and other information, and clarity on roles, and they were seen as contributing to faster response to the 2019 drought (Fortnam *et al*., 2020b).

Coordination structures can also support an effective role for aid agencies. In **Kenya**, county coordinating structures facilitated partnership between county health officials and aid organisations, which in turn has helped to maintain buffer stocks, particularly for nutrition commodities (as noted under supplies), and to scale up integrated health outreach (Fortnam *et al*., 2020b). However, as noted under the discussion of supplies, there was less coordination in the response to COVID-19, with no clear joint decision-making platform (Ekirapa, 2020). In **Sierra Leone**, there are a range of fora for government–donor coordination, but a third of stakeholders thought coordination for the COVID-19 response was poor, suggesting these structures are not working effectively (Amara *et al*., 2021).

- **Clarity on the role of coordination structures:** where multiple institutions are involved in shock response, overlapping or unclear remits can hinder shock response. In **Sierra Leone**, some stakeholders thought multiple parallel institutions and unclear terms of reference led to lack of clarity in the response and delays in provision of information (Amara *et al*., 2021).
- **Coordination between the health sector and other institutions:** while cross-government bodies can support a cross-sector response, there have been concerns in some countries about inadequate representation of the health sector. In **Sierra Leone,** stakeholders (particularly within the Ministry of Health and Sanitation (MoHS)) felt that coordination of the COVID-19 pandemic response between the MoHS and the National COVID-19 Emergency Response Centre (NaCOVERC) was weak. MoHS staff felt side-lined by NaCOVERC's role, and there were complaints from stakeholders that the response was led by personnel with insufficient medical background, partly due to political appointments. (Amara *et al*., 2021). However, there are also situations of effective coordination between health and other government bodies: in Kono District, the District Health Management Team and Office of National Security representative were effectively collaborating and sharing roles for the COVID-19 response (Grieco, 2020).

  There are also gaps in health sector representation for emergency planning and coordination in **Kenya**. County-level MoH planning for emergencies is largely limited to disease outbreaks, and there is limited clarity on, or attention to, MoH roles for drought or other climate shocks within county disaster management plans. MoH roles in drought response tend to focus on nutrition, rather than on other areas of preparedness or response. This partly reflects underrepresentation of the MoH in disaster coordination structures, with MoH nutrition officers often the only MoH representatives on county steering groups for emergencies (Fortnam *et al*., 2020b).
- **Focus areas and mandate of institutions leading coordination:** the remit of institutions with the most capacity and leading disaster management can affect areas of action for shock response. In **Kenya**, the National Drought Management Authority (NDMA) tends to be stronger than newer multi-hazard institutions and often provides leadership for county coordination bodies. Shocks such as floods and disease outbreaks

fall outside the NDMA's official mandate, and this contributes to a focus on droughts in county disaster management plans (Fortnam *et al*., 2020b).

- **Power of coordinating bodies over implementing bodies**: the authority and legitimacy of lead institutions affects response planning and implementation. In **Kenya**, while the NDMA has played a leading role in coordination, implementation of disaster management plans depends on county line ministries. The NDMA has no authority over line ministries, and some stakeholders saw this as limiting implementation of agreed plans (Fortnam *et al*., 2020b).
- **Ongoing coordination before crises occur:** coordination sometimes only becomes active during emergencies, slowing response and limiting preparedness activities. In **Kenya**, coordination meetings are irregular outside of emergencies, and tend to react to early warning bulletins, rather than enabling the continuous and anticipatory planning needed given increased regularity of climate shocks (Fortnam *et al*., 2020b). Similarly in **Pakistan**, cross-sector collaboration between departments is limited to emergency situations (Najmi *et al*., 2021). In both Kenya and Pakistan, this is reflective of a wider mode of a reactive approach to shocks, rather than proactive advance planning (Fortnam *et al*., 2020b; Najmi *et al*., 2021).
- **Established plans for shock response:** agreed plans for shock response can support swift and coordinated action. This is seen at a local level with CMAM Surge: the approach provides clarity on health facility action and the support that should be provided from higher levels. This predetermined approach has the potential to trigger faster responses, including leave management, provision of nutrition products, and outreach activities (Fortnam *et al*., 2020a).

  At national level, some countries had plans for health security that could support the COVID-19 response. In **Sierra Leone**, partly due to the experience with Ebola, there were a range of plans for national health security and emergency response, and most stakeholders thought the COVID-19 response followed pre-existing emergency plans (Amara *et al*., 2021). In **Pakistan**, national plans and guidelines were not in place for an infectious pandemic like COVID-19, and a lack of clarity on appropriate approaches contributed to initial closure of facilities and essential health services. Lack of planning has also affected response to other shocks in Pakistan: for example, local governments lack a long-term strategy for managing droughts, contributing to a reactive response (Najmi *et al*., 2021).
- **Decentralisation and coordination between national and local governments**: effective roles for local government, and coordination and cooperation between levels, support shock response. In **Sierra Leone**, emergency response decision-making for COVID-19 and allocation of resources are centralised in Freetown, potentially delaying response at district level: more stakeholders in Freetown than at district level thought the response was 'very timely' (Amara *et al.*, 2021). However, district leadership and coordination with national government bodies were seen as effective in some districts. In Kono, the District Health Management Team has played an active role, and the national government sought to understand what actions were being taken by the district, and to provide additional support where it was needed, rather than overriding or replacing District Health Management Team activity (Grieco, 2020).

  In other countries, there have been tensions between national and local levels. In **Kenya**, decentralisation has brought some strengths for disaster management, including

the coordination structures discussed above. However, devolution was perceived to have strained relationships and weakened coordination between county and national levels, within the MoH and wider government. For example, structures for reporting county disaster activities to the national MoH are unclear (Fortnam *et al*., 2020b). Gaps in coordination and cooperation were seen with the early COVID-19 response, with limited integration of sub-national priorities into national response plans, and inadequate communication from national to county levels regarding processes for planning, funding, procurement, and other aspects of the response (Hillier *et al*., 2020).

In **Pakistan**, there has been friction between national and provincial governments in the COVID-19 response, with open disagreement regarding some provincial policies (such as a more complete lockdown in Sindh). This tension partly reflects wider political systems, with different political parties in government in different provinces and at federal level (Ali, 2020).

- **Wider political stability:** insecurity affects the capacity of government and other actors to provide services during shocks. In **Kenya**, ability to provide outreach services during shocks in 2019 was affected by conflict, between tribes and related to natural resources, and by security risks from Al-Shabaab militants. Insecurity can make it dangerous for local populations and staff to travel to health facilities and also prevents delivery of nutritional and medical supplies (Fortnam *et al*., 2020b).

2.3 Community health systems

A range of local actors affect health system shock responsiveness and community health, including households, community health workers, and local leaders. We focus here on selected aspects of community engagement and household health seeking in shock response, including the influence of trust.

- **Engagement with local leaders and organisations:** effective collaboration with local leaders can support shock response. This was seen in **Sierra Leone**, where the government worked with traditional leaders on the COVID-19 response, reflecting the important role of these leaders in relation to Ebola. In Kono, traditional leaders have been involved in district decision-making for COVID-19. They monitored district and international borders to support compliance with the travel ban, and undertook community sensitisation regarding COVID-19 health measures. Some District Health Management Teams have also worked with youth leaders to disseminate information. However, there are concerns regarding gender equity in involvement of traditional leaders: traditional women's leaders, called Mammy Queens, were not represented in district decision-making in Kono, and the chiefs who are represented are all male. The lack of women's involvement in decision-making may reduce consideration of women's needs in the response (Grieco, 2020). A similar lack of women's involvement in decision-making is seen in **Bangladesh**, where women's rights organisations reported being left out of local and national consultations on the COVID-19 response (Hillier *et al*., 2020).

  While local leaders can support the response, they can also hinder implementation of public health measures. In **Pakistan**, religious leaders refused to accept closure of mosques during lockdown, hindering implementation of physical distancing (Hillier *et al*., 2020).

- **Self-organising by community groups:** beyond government-initiated involvement of local groups and leaders, shock responsiveness can be supported through initiatives from the community. In **Sierra Leone**, examples include youth leaders organising COVID-19 sensitisation training in informal settlements (Grieco and Yusuf, 2020). In **Bangladesh**, women's networks and self-organised groups in Cox's Bazaar led community outreach and awareness-raising sessions on COVID-19, and worked with women in communities to produce and distribute face coverings (Hillier *et al*., 2020).
- **Use of community knowledge and information:** community actors may have knowledge or data regarding shocks that can support planning. In **Kenya**, indigenous knowledge regarding shocks is often reliable, with pastoralists migrating in search of water and pasture before early warning information is disseminated. However, NDMA early warning bulletins do not use this community-level knowledge. Similarly, bulletins do not draw on CHVs' information and data on community health and nutrition needs (Fortnam *et al*., 2020b).
- **Effective communication to communities:** shock response can be supported by provision of information to communities, and action to reduce or correct misinformation. Governments in all Maintains countries used a range of channels to share information regarding COVID-19 and control measures, such as traditional and social media, text messages, and in some cases local leaders, as discussed above (Hillier *et al*., 2020). Surveys in some countries suggest high levels of awareness regarding COVID-19 symptoms, although this did not always translate into effective use of preventive measures, such as masks (Hillier *et al*., 2020). There has also been widespread misinformation, both through a lack of accurate information and the promotion of misinformation and conspiracy theories. Some countries have made efforts to counter this misinformation: for example, the governments of **Bangladesh** and **Uganda** used a range of media to address rumours (Hillier *et al*., 2020).

  For communication to be effective in supporting community response, it needs to be understandable and actionable. In **Kenya**, stakeholders suggest that early warning information does not support household decision-making because it is too technical and lacks explicit advice on actions that households should take in response to alert phases (Fortnam *et al*., 2020b).
- **Fear and trust in health services:** in several countries, fear of COVID-19 infection was seen as reducing the use of essential health services (Hillier *et al*., 2020). However, community concerns relate not just to fear of infection, but also to fear regarding treatment if they are found to display COVID-19 symptoms. For example, in **Sierra Leone**, fear of death reduced community visits to hospitals during the Ebola outbreak, but there are indications of continued use of facilities during COVID-19, and reports that community members are more concerned about the implications if they are identified as having COVID-19 than about the risk of infection (Grieco and Yusuf, 2020).

  Concern about the implications of being identified as COVID-19-positive reflects a lack of trust in government services, including perceptions of low quality and disrespectful treatment. These concerns affect uptake of COVID-19-specific services. In **Kenya**, fear of enforced isolation in government COVID-19 facilities reduced uptake of voluntary testing (Hillier *et al*., 2020). In **Pakistan**, reports of stigma and mistreatment by health workers following a positive COVID-19 test discouraged uptake of testing, and fear of enforced isolation or quarantine reduced community reporting of COVID-19 cases, and

made it harder to track contacts (Najmi *et al*., 2021). This distrust reflects the low quality of quarantine and isolation centres, as discussed in relation to infrastructure.

Community familiarity with emergency systems can support trust. In **Sierra Leone**, communities were familiar with contact tracing, due to experience with Ebola, and this enhanced trust in the process and made it easier to implement for COVID-19 (Amara *et al*., 2021).

- **Trust in wider government policies and approaches:** punitive approaches to emergency response can reduce trust in and cooperation with government systems and public health measures. In **Kenya**, quarantine was initially implemented in a way that partly implied punishment for those contravening lockdowns, and in **Kenya and Uganda** there was severe police enforcement of lockdowns and suppression of protests. This reinforced fears of state caprice and coercion, and reduced trust in the government response (Hillier *et al*., 2020).

  In **Kenya**, government sedentarisation policies and programmes have reduced trust in government among pastoralist communities, who see sedentarisation as eroding their livelihoods and undermining migratory strategies for coping with climate variability. This lack of trust can reduce coordination and involvement in disaster preparedness and response (Fortnam *et al*., 2020b).

2.4 Gender equality and social inclusion in shock impacts and response

Gender equality and other dimensions of equity and exclusion are significant for all health system pillars. For example, health workers, particularly at primary and community level, are often women, so they are particularly affected by the provision of support. Funding may not be allocated to services that particularly affect women, as illustrated by limited attention to sexual and reproductive health and GBV in Pakistan. Inclusion in decision-making structures may also affect consideration of gender, as seen with the involvement of traditional leaders in Sierra Leone. These links have been illustrated in previous sections. Here, we focus on support for women and vulnerable groups in shock response, including service provision and access, and the effects of public health measures. The Maintains research points to the uneven effects of shocks and the measures taken in response, and varied consideration in the response.

- **Continued provision of essential services for women's health:** protecting women's health requires continued provision of routine reproductive and maternal health services, response to specific needs that arise or increase during shocks, and consideration of gender in other response services. Disruption to routine service provision – for example, due to lack of supplies or health workers – as indicated in previous sections, can reduce essential services for women. For example, there was widespread closure of clinics and community-based outlets for delivering sexual and reproductive healthcare during COVID-19 (Hillier *et al*., 2020). In **Pakistan**, outreach services by lady health workers were stopped during lockdown. This reduced access to hormonal injections, an important service for discrete family planning, exacerbating barriers related to longer-term supply gaps and contributing to stress among women regarding unplanned pregnancy (Najmi *et al*., 2021).

- **Gender-sensitive response services:** services provided in response to shocks need to address increased gender-related needs for services, as well as ensuring that other response services adequately support women. One area of increased need for support during COVID-19 is GBV. There were indications of increased GBV in several Maintains countries, including **Uganda, Bangladesh, Kenya, and Pakistan.** There was some government response, including helplines for reporting crimes against women in Kenya and Sierra Leone, and public awareness campaigns in Kenya and Uganda. However, the overall response to GBV was limited, without clear funding, policy commitments, or monitoring (Hillier *et al*., 2020).

  Additional burdens on women during shocks can reduce their use of health facilities, so other service delivery strategies are required to meet their needs. In **Kenya**, women often prioritise collection of water, fuel wood, and wild food during droughts and floods, and deprioritise use of hospital services, which can occupy productive members of the household for at least a day, particularly due to long distances to facilities. More frequent outreach activities and outreach to a wider range of locations are therefore important to ensure women and those they care for can access services (Fortnam *et al*., 2020b).

  Other response services also need to be gender responsive to protect women. This includes infrastructure for services established in response to shocks. In **Pakistan**, women in camps for populations affected by shocks find it difficult to breastfeed due to a lack of private space, combined with conservative social norms. This encourages use of formula milk supplied by private pharmaceutical companies. While some provincial governments have banned distribution of formula milk in camp settings, further action is needed to ensure camps have secure space for breastfeeding mothers (Najmi *et al*., 2021).
- **Service provision for vulnerable groups:** refugees, internally displaced persons, and undocumented migrants have been at particular risk during COVID-19. In the six Maintains countries there are more than 5 million refugees and around 4.26 million internally displaced persons, with **Bangladesh, Uganda, and Kenya** hosting some of the largest refugee camps in the world. Service provision in camps has been affected by COVID-19 restrictions. In Bangladesh, camps were under strict lockdown during the initial COVID-19 response and access for humanitarian staff was severely reduced, affecting service provision. Lack of information, dense housing, and lack of clean water and sanitation increased the risks of infection (Hillier *et al*., 2020). Indicating the overlap of dimensions of marginalisation, increased risks of GBV were seen in some refugee camps during COVID-19, and women and girls faced a lack of gender-responsive facilities and services (Hillier *et al*., 2020).

  Pastoralist populations may also be excluded from services that can prevent or respond to shocks. In **Kenya**, the health system is ill-equipped and slow to respond to population mobility, with immunisation defaults increasing as pastoralists migrate away from health facilities. Sparse populations and long distances to health facilities limit access to formal health services at all times, and particularly during drought and floods, and distances are particularly far for nomadic and remote populations in the border regions. This underlines the importance of outreach services during shocks (Fortnam *et al*., 2020b).
- **Oppression of marginalised groups:** as well as a lack of support for marginalised groups, there are examples of using shock situations to increase the exclusion and oppression of certain groups. In **Uganda**, 19 LGBT+ people were jailed due to the

claimed risk of spreading COVID-19, and many saw this as a targeted attack that had little to do with public health (Hillier *et al*., 2020).

- **Effects of public health measures on service access and social determinants of health:** measures designed to protect public health can reduce service provision and access, with effects on women's health and uneven effects among social groups. This is seen with requirements for physical distancing and reductions in travel and transport during COVID-19. For example, restrictions on public transport in **Pakistan**, combined with inability to afford private transport, reduced access to antenatal care and skilled birth attendance (Najmi *et al*., 2021). In **Uganda**, movement restrictions curtailed access to essential routine medical services. Pregnant women were exempted from the total transport ban after a series of maternal deaths, but there was concern that this exemption did not address the health needs of children and people living with chronic conditions (Hillier *et al*., 2020).

  Lockdowns have also affected the social determinants of health, particularly for low-income communities. In **Sierra Leone**, most community members in Freetown rely on wells for water and have only minimal storage facilities for water and food, and insufficient savings to purchase bulk supplies of food. An initial strict lockdown early in the COVID-19 response therefore created concern about access to water and food. The government has sought to address this through distributing water and arranging markets to reduce infection (Grieco and Yusuf, 2020). There are also well-recognised trade-offs with livelihoods, as restrictions limit economic activity. With reduced income-earning opportunities, urban residents often return to families 'up country' for support; travel restrictions to limit the spread of COVID-19 would close this option and potentially increase hardship (Grieco and Yusuf, 2020). This highlights the importance of related systems, including functional WASH provision and social protection.

3 Conclusion

The Maintains research highlights the influence of formal health system building blocks, governance, and community health systems on health system shock responsiveness. The research indicates shared challenges across countries, such as insufficient training for health workers, gaps in supply chains, and community distrust. There are also examples of approaches that have supported more effective response, such as stronger information systems under CMAM Surge, close working between national and local government representatives, and collaboration with traditional leaders to share information.

The challenges identified through the research, and indications of strategies that have supported shock response, suggest potential areas for interventions to strengthen health system emergency capacities (see Table 1). The areas listed in this table focus primarily on specific health sector activities that could potentially be incorporated as part of health system strengthening and health security programmes, but some involve wider or longer-term intervention. The table indicates areas to consider, not areas of proven intervention effectiveness; many areas are proposed based on evidence of gaps in country systems, rather than evidence that interventions in these areas have supported shock response. Further piloting and research would be needed to assess the relevance of these areas for intervention, to determine specific approaches, and to understand their effectiveness in different contexts. The Maintains country research reports provide additional and more contextualised recommendations.

Table 1: Areas to consider in supporting health system shock responsiveness

Framework area	Intervention areas to consider
Supplies and infrastructure	• High-quality isolation and quarantine facilities, including respectful treatment, adequate sanitation, and low/no cost to residents, to avoid spread of infection, and so that concerns about low-quality facilities do not discourage testing or presentation with symptoms. • Laboratory capacity, including supplies for testing. • Storage for supplies, at facility and sub-national levels, to enable buffer stocks in case of transport disruptions or delays in procurement and distribution from higher levels. • Logistics capacity for transporting supplies, including vehicles, vehicle maintenance, and staff, for national suppliers and sub-national health systems. • Streamlined procurement systems that allow rapid turnaround while also ensuring accountability. • Supply forecasting and monitoring systems, to support accurate prediction of required stocks, and improved stock management. • Frequent opportunities to order supplies, or scope for placing additional orders, to increase flexibility when needs change or if forecasts were inaccurate. • Coordination of procurement between government departments, to support efficiency and ensure supplies are appropriate for needs. • Donor procurement and/or distribution of supplies when government systems are unable to meet needs, with close coordination and information sharing between government and aid agencies, and systems to ensure continued supply if needs continue after donor emergency programmes end. • Robust and appropriately located health facility infrastructure that can withstand shocks such as floods.

Human resources for health	• Longer-term support for sufficient health worker training and retention to meet required health worker to population ratios. • Government protocols to redeploy staff during emergencies, to facilitate transfer to hotspots with increased service demands. • Budgets for additional recruitment to meet increased demand during shocks. • Training for health workers in skills and systems required for shock preparedness and response, including use of virtual or other approaches that can be used when face-to-face training is impossible. • Adequate training for staff who take on new responsibilities through task shifting, to reduce the support for these staff that is needed from higher levels, and so to maximise the value of task shifting for easing workloads. • Adequate consideration of additional domestic burdens for female health workers in workload planning and health workforce management • Transport for health workers to reach facilities and provide services, including sufficient vehicles and alternative systems when public transport is disrupted. • Sufficient and appropriate PPE to reduce health worker infection and support their confidence to provide services. • Compensation and incentives for health workers and community volunteers, and consistent and timely payment of agreed compensation, to support motivation. Compensation and incentive systems should be structured to support provision of all required services, rather than potentially encouraging a focus on incentivised activities at the expense of other essential services. • Systems to support team morale among health workers in challenging times, such as platforms for peer support. • Secondment of aid agency staff when governments are unable to meet emergency needs.
Information and learning	• Building on the Community-based Management of Acute Malnutrition (CMAM) Surge approach, using facility information as part of systems with agreed thresholds and procedures for shock response. • Functional information system capacity, including adequate technology and connectivity, and motivation and skills among staff responsible for collecting or collating data. • Regular monitoring and review of response activities, to enable learning and adaptation. • Timely and sufficiently granular information to support action, for example by ensuring early warning systems provide sufficient detail on likely timing and locations of shocks. • Inclusion of community knowledge and information in early warning systems, including input from community volunteers and groups that are attuned to shocks (such as pastoralists). • Building trust in information systems, for example through effective media and political engagement to avoid conflicting messages. • Capacity to respond to information: this involves action in other building blocks, for example human resources, supplies, and funding. • Time to reflect and identify alternative approaches among practitioners, to support learning and innovation. • Funding that allows both piloting of new innovations and time to build government ownership, for sustainability.
Finance	• Longer-term advocacy and support for adequate health budgets, at international, national, and sub-national levels. • Contingency budgets that are sufficient and ring-fenced, and that have clear procedures for allocation. • Streamlined systems for budget reallocation, to reduce bureaucracy, enhance flexibility, and enable rapid response.

	• Agreed and evidence-based criteria and processes for allocation of funds and sufficient technical input to decision-making, to enable rapid decisions and alignment of allocation with needs, and to reduce the influence of politics or personal incentives on use of funds. • Gender-responsive allocation of funding, including sufficient resources to address gender-based violence (GBV) as well as continued provision of routine reproductive and maternal health services. • Clear and advance information regarding funding from different aid agencies, to enable planning and coordination. • Transparency in provision and use of funding from all stakeholders, to support accountable use. • Ensuring aid funding is aligned to needs (in terms of geography and activities), and that there are systems in place to meet continued needs when funding is reduced or ends. • Provision of disaster financing before situations become emergencies, and sufficient funding of *ex ante* financing mechanisms that allow rapid response. • Support for wider economic stability and systems, such as debt relief.
Governance	• Functioning coordination structures that include relevant stakeholders and health system levels, to share information, agree roles and activities, and enable effective input from aid agencies. • Clear roles for different coordinating structures, to avoid overlapping remits. • Sufficient health sector representation in coordination structures to ensure plans and activities consider all relevant health system needs. • Mandates for disaster coordination bodies or lead agencies that are sufficiently wide to support response to the range of relevant shocks. • Legitimacy and authority of coordinating bodies or lead agencies that ensures the implementation of agreed plans by other actors. • Ongoing structures for coordination before crises occur, to enable proactive anticipatory planning. • Established and agreed plans for disaster management at local and national levels, to support swift and coordinated action when shocks occur, and to support long-term preparedness. • Two-way coordination and communication between national and sub-national levels, such as clear systems for reporting information upwards, and national government responsiveness to district needs and activities.
Community health systems	• Engagement with local leaders and organisations, to share information and support response activities. • Recognising, and where needed supporting, response activities initiated by community groups. • Effective communication to communities, including systems to track and respond to rumours and misinformation, and ensuring information is understandable and actionable. • Trustworthy and respectful shock response systems and activities, such as acceptable quarantine or isolation infrastructure, supportive treatment by health workers, and enforcement of public health measures in a way that builds community collaboration.
Gender equality and social inclusion	• Representation of female leaders and women's organisations in national and local decision-making and response activities. • Guidelines and systems for continued provision of and access to essential services for reproductive and maternal health services during shocks. • Gender-sensitive response services, including action to prevent and address GBV, and emergency infrastructure that takes account of women's needs (for example, gender-segregated quarantine facilities and private space for camp settings).

	• Service structures that take account of the increased domestic burdens on women during shocks, such as outreach services to reduce the time needed to access health services. • Support for camps for refugees and internally displaced persons during shocks, including continued access for aid agencies, provision of information, and appropriate infrastructure and water, sanitation and hygiene (WASH) to avoid infection. • Outreach services to support remote populations who may be missed by shock response, as well as by routine services. • Addressing potential negative impacts of public health measures (such as movement restrictions and reductions in public transport) on health service provision and access, for example through exemptions to travel bans. • Support to address the social determinants of health when these are negatively affected by public health measures (for example, WASH and social protection).

Across different building blocks and shocks, the research highlights several overarching issues for shock-responsive health systems:

- **The need for both core health systems capacity and specific public health capacities:** underlying and ongoing health system weaknesses, such as gaps in staffing, supply chains, information systems, and community trust, limit shock response, but effective response also requires emergency capacities, some of which are shock-specific – for example provision of PPE and COVID-19 test kits, training in emergency management, or surveillance systems.
- **The role of health system hardware and software:** as well as hardware, such as sufficient staff and supplies, shock responsiveness is affected by software, such as coordination processes and the knowledge, attitudes, and relationships of people in the health system. For example, health workers' fear and motivation affects their availability for COVID-19 response activities, trust in early warning data affects its use to prepare for shocks, and community fear of stigma and isolation centres affects COVID-19 testing.
- **Close interactions between different health system building blocks, with gaps in one area affected by and contributing to gaps in other health system functions:** for example, supply chains for provision of PPE affect availability and motivation of health workers; effective use of information systems depends on sufficiently flexible funding to respond; and adequate information systems affect provision of emergency supplies.
- **The influence of wider factors beyond the health sector:** for example, unavailability or high costs of transport affect supply chains and access to health services; national government allocation of funding to counties affects the supply of medicines; and broader governance tensions affect coordination around emergencies, as well as public trust in health communication and activities.
- **The influence of international, national, and sub-national factors on health system shock responsiveness:** for example, the provision of adequate PPE to provide safe service delivery during COVID-19 was affected by disruption to international supply chains, and provision of medicines and nutrition products during droughts was affected by national procurement systems, county budgets, and storage facilities.

These interactions – between core health system and health security capacities, between health system software and hardware, between health system building blocks, and between

health and wider systems – are acknowledged in the health systems and resilience literature, and are emphasised in the Maintains framework for shock-responsive health systems. They underline the importance of an integrated and multisectoral approach to supporting health system shock responsiveness; this should be considered in relation to the intervention areas set out in Table 1 above.

This summary was based on a rapid review of Maintains research outputs. Further work could develop the analysis and make additional use of the data produced through Maintains, including examining how and why shock responsiveness varied between countries and contexts.

Several research gaps identified at the start of Maintains and in country research plans remain to be addressed, partly due to early closure of the programme. In particular, further work is needed to provide empirical assessments of specific interventions that can enhance shock responsiveness. The Maintains research has examined some interventions (particularly CMAM Surge), but also points to many other areas for potential intervention where specific strategies require further evidence (as indicated in relation to Table 1 above). Research in this area could include examining the effectiveness of interventions targeted directly at health security, but also the role of broader health system strengthening interventions in enhancing shock responsiveness. The latter would assist in identifying additional activities that could be integrated within health system strengthening programmes to maximise their value for building shock responsiveness.

Other areas for further research include the influence of health system software, such as leadership and relationships, and the political economy driving decisions for shock response and influencing why some institutions prepare and respond more effectively. Oxford Policy Management (OPM) aims to support research in these areas through partnership with the FCDO-funded Rebuild for Resilience research consortium and other programmes.

References

Ali, S.Z. (2020) 'COVID-19 response: rapid country study: Pakistan', unpublished internal report, OPM, Oxford.

Amara, P.S., M'Cormack-Hale, F.A., Kanu, M., Bash-Taqi, R., Kanu, A. (2021) 'The effectiveness of the Sierra Leone health sector response to health shocks: Evidence from the COVID-19 perception survey', OPM, Oxford.

Ekirapa, A. (2020) 'COVID-19 response: rapid country study: Kenya', unpublished internal report, OPM, Oxford.

Fortnam, M., Hailey, P., Balfour, N., Sheen, K., Lea, R. (2020a) 'Innovation history of the CMAM Surge approach: towards a shock-responsive health system in Kenya', OPM, Oxford.

Fortnam, M., Hailey, P., Mbelenga, E., Balfour, N., Odhiambo, S., Odundo, E. (2020b) 'Climate shock responsiveness of the Kenya health system', OPM, Oxford.

Gooding, K., Harb, J., Binci, M., Hagos, S., Alayu, M., Taye, G. (2020) 'Ethiopia research plan: 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', OPM, Oxford.

Grieco, K. (2020) 'Beyond the state: the role of traditional leaders in COVID-19', OPM, Oxford.

Grieco, K. and Yusuf, Y. (2020) 'Sierra Leone's response to COVID-19', OPM, Oxford.

Hillier, D., Newton-Lewis, T., Nair, R., Larsen, C. (2020) 'Initial COVID-19 responses in Bangladesh, Kenya, Pakistan, Sierra Leone, and Uganda', OPM, Oxford.

Najmi, R., Pradhan, N.A., Ahmed, Z., Qidwai, M., Hyat, S., Khursheed, S., Fatmi, Z. (2021) 'Response and preparedness for essential health and nutrition services during disasters in Pakistan', unpublished internal report, OPM, Oxford.

Newton-Lewis, T., Witter, S., Gooding, K., Fortnam, M., Seal, A., Hailey, P., Hillier, D., Nair, R. (2021) What is a Shock-Responsive Health System? A Framework to Inform Maintains Research, OPM, Oxford.

Annex A Maintains research studies included in this summary

The following Maintains research was drawn on for this summary. Some of these reports were internal or unfinished studies. We also drew on the initial plan for research in Ethiopia. For full details of authors and dates, please see the references list.

Country	Study
Kenya	COVID-19 response: rapid country study: Kenya
	Innovation history of the CMAM Surge approach: towards a shock-responsive health system in Kenya
	Climate shock responsiveness of the Kenya health system
Pakistan	COVID-19 response: rapid country study: Pakistan
	Response and preparedness for essential health and nutrition services during disasters in Pakistan
Sierra Leone	The effectiveness of the Sierra Leone health sector response to health shocks: evidence from the COVID-19 perception survey
	Beyond the state: the role of traditional leaders in COVID-19
	Sierra Leone's response to COVID-19
Cross-country	Initial COVID-19 responses in Bangladesh, Kenya, Pakistan, Sierra Leone, and Uganda