BMJ Global Health

The building blocks of community health systems: a systems framework for the design, implementation and evaluation of iCCM programs and community-based interventions

Aliya Karim ,[1,2] Don de Savigny,[1,2] Phyllis Awor,[3] Daniel Cobos Muñoz,[1,2] Daniel Mäusezahl,[1,2] Antoinette Kitoto Tshefu,[4] Jean Serge Ngaima,[4] Ugo Enebeli,[5] Chinwoke Isiguzo,[6,7] Humphreys Nsona,[8] Ikechi Ogbonnaya,[9] Pascal Ngoy,[10] Ayo Alegbeleye[11]

To cite: Karim A, de Savigny D, Awor P, *et al*. The building blocks of community health systems: a systems framework for the design, implementation and evaluation of iCCM programs and community-based interventions. *BMJ Global Health* 2022;**7**:e008493. doi:10.1136/bmjgh-2022-008493

Handling editor Stephanie M Topp

► Additional supplemental material is published online only. To view, please visit the journal online (http://dx.doi.org/10.1136/bmjgh-2022-008493).

Received 11 January 2022
Accepted 30 May 2022

For numbered affiliations see end of article.

Correspondence to
Aliya Karim;
aliya.karim@unibas.ch

ABSTRACT

Introduction Almost all sub-Saharan African countries have adopted some form of integrated community case management (iCCM) to reduce child mortality, a strategy targeting common childhood diseases in hard-to-reach communities. These programs are complex, maintain diverse implementation typologies and involve many components that can influence the potential success of a program or its ability to effectively perform at scale. While tools and methods exist to support the design and implementation of iCCM and measure its progress, these may not holistically consider some of its key components, which can include program structure, setting context and the interplay between community, human resources, program inputs and health system processes.

Methods We propose a Global South-driven, systems-based framework that aims to capture these different elements and expand on the fundamental domains of iCCM program implementation. We conducted a content analysis developing a code frame based on iCCM literature, a review of policy documents and discussions with key informants. The framework development was guided by a combination of health systems conceptual frameworks and iCCM indices.

Results The resulting framework yielded 10 thematic domains comprising 106 categories. These are complemented by a catalogue of critical questions that program designers, implementers and evaluators can ask at various stages of program development to stimulate meaningful discussion and explore the potential implications of implementation in decentralised settings.

Conclusion The iCCM Systems Framework proposed here aims to complement existing intervention benchmarks and indicators by expanding the scope and depth of the thematic components that comprise it. Its elements can also be adapted for other complex community interventions. While not exhaustive, the framework is intended to highlight the many forces involved in iCCM to help managers better harmonise the organisation and evaluation of their programs and examine their interactions within the larger health system.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Community health interventions, such as integrated community case management (iCCM), are considered highly effective programs with the potential to reduce mortality in underserved areas.
⇒ Such interventions are influenced by elements beyond the normal indices designed to plan, guide and measure them, which generally do not consider interactions and effects at lower levels of implementation.
⇒ Failure to account for these factors can produce suboptimal outcomes and compromise overall program effectiveness.

WHAT THIS STUDY ADDS

⇒ We developed a practical systems framework that can be used in the design, implementation and evaluation phases of community-based programs, applied here to iCCM.
⇒ It accounts for context and stakeholder dynamics, and considers their interactions with program architecture, local policy, supply chain and health information processes, and community mobilisation among other areas, and supports these with a menu of critical questions.

BACKGROUND

Integrated community case management (iCCM) is a strategy designed to provide children in remote areas of low- and middle-income countries (LMICs) with access to life-saving care directly in their communities.[1] The program integrates traditionally vertical

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE AND/OR POLICY

⇒ This framework aids planners and program managers of integrated community-based programs to account for more than broad-based measurement criteria when developing and rolling out their interventions.

⇒ Greater coordination and communication between high-level program stakeholders and local actors are needed to avoid fragmentation, ensure contextualised implementation, promote sustainability and engender local ownership.

interventions for childhood illnesses such as pneumonia, malaria and diarrhoea into one care package in which a trained community health worker (CHW) provides diagnostic and treatment services in designated catchment areas.[2] It is touted as both an economical and sustainable strategy towards the attainment of the Sustainable Development Goal (SDG) to reduce child mortality, and is globally promoted by policy-makers and health and development organisations.[3 4] Currently, almost all sub-Saharan African countries are implementing iCCM in some form.[5]

For iCCM to optimise its programmatic potential, it is generally recognised that many systems influences must coalesce to ensure scaleable implementation and equitable coverage.[6 7] Quality and consistent supervision of CHWs, an enabling policy environment, a comprehensive community mobilisation campaign, continuously available commodities, among a host of other conditions are considered necessary to position iCCM as an effective strategy.[8–14] Efforts to categorise these dimensions have led to the creation of indices and benchmarks to assist program planners and managers in measuring success at different phases of implementation.[15–17]

While these indices provide an essential basis for harmonising design and establishing common implementation standards, the benchmark categories prescribed may not necessarily reflect all the thematic areas significant to the iCCM intervention. They are also proposed as a measurable checklist for the core components of iCCM program development and therefore may not comprehensively cover key programmatic interactions or their consideration in design or evaluation. Additionally, because the target audiences for these benchmarks are often high-level stakeholders, they may not account for some of the challenges or nuances of implementation at the decentralised level. Inadequate consideration for this complexity and the range of elements that influence intervention dynamics can lead to suboptimal outcomes or negative unintended consequences.[6 9]

We propose an iCCM Systems Framework that aims to address these elements. The purpose of the iCCM Systems Framework is to elevate the discussion of iCCM from specific measurement criteria to a broader discourse on the interactions that can occur within community health systems, particularly those that underlie an activity and what these might mean for the success of that program component. Rather than suggesting indicators or accompanying metrics, this framework aims to collate the major systems thematic areas relevant to iCCM with corresponding critical questions that program managers should ask during the planning, implementation and evaluation phases. This allows the planner to move from generic to specific foci, revealing meaningful questions that may be overlooked when focusing on defined indicators.

The utility of the framework lies both in its comprehensiveness and its equal treatment of system components, including the dynamic forces that are challenging to measure yet potentially critical to program success. While the archetypal Building Blocks of Health Systems prescribes the foundational integrants essential to the production of health, this framework better supports the positioning of community health and its determinants effectively within the scope of health systems strengthening.[18] A defining difference of this framework is that it proposes three additional thematic areas, program architecture, context and software, described below. While the framework is not designed to be exhaustive, it does attempt to draw attention to the 'how' and the 'why' of iCCM and its components. It is intended to complement current iCCM and community-based frameworks with new health systems domains vital to the design and success of the intervention, and to expand existing domains with a broader scope. Finally, the framework is unique in that its contents are guided primarily by contributors of the Global South who are heavily involved with on-the-ground iCCM implementation.

METHODS

This framework is the product of the domain charting process of a scoping review for the design, implementation and evaluation of iCCM, and is informed by working groups and structured interviews with stakeholders from the iCCM program and policy community. A scoping review approach was used due to its ability to capture the full breadth of the current iCCM literature landscape. This was supplemented by a document review of selected country iCCM policy and publicly available program documents. The methods and criteria for this scoping review can be found elsewhere.[19] As the domain charting process was part of the methodological approach to the development of the framework, results of the literature search are presented in this section.

Patient and public involvement

No patient or health data were collected as a part of the development of this framework, nor were patients or the public involved during the research process.

Literature review

Search strategy

The primary objective of the review was to assess the key thematic areas of emphasis according to the current body of available literature on iCCM. We conducted a literature search in October 2020 in selected electronic databases

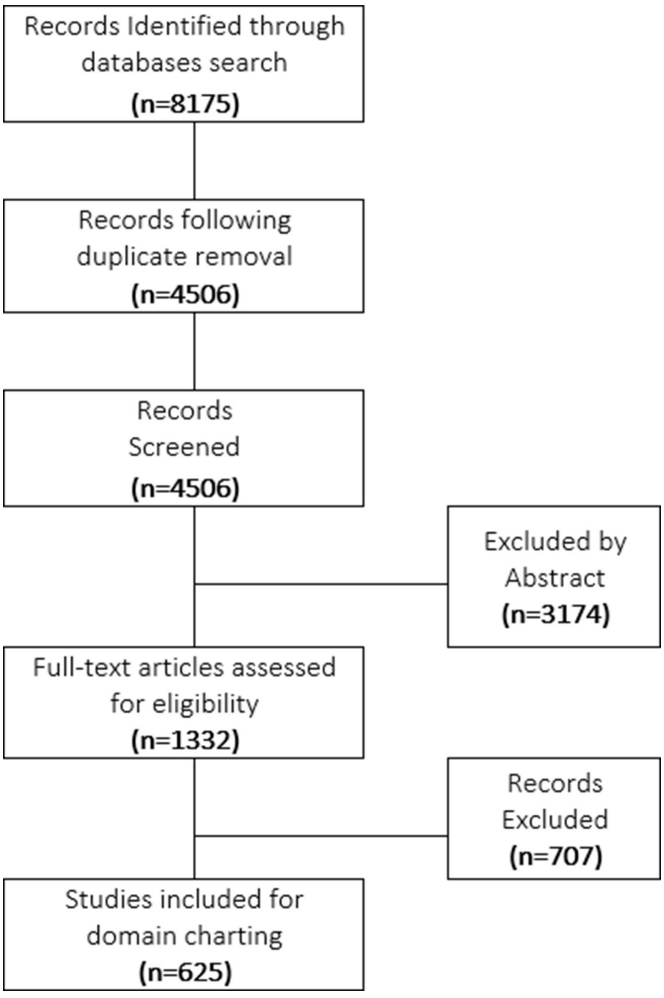

Figure 1 PRISMA document review flowchart.

ISI Web of Science, PubMed, including its archive of full-text articles in PMC, *Ethiopian Medical Journal* and CCM Central using the keywords and Boolean operators "iCCM" OR "integrated community case management" OR "community case management" as prescribed in the scoping review protocol. Testing search terms revealed that the inclusion of "community(-)integrated management of childhood illness", "community(-)IMCI", "community(-)based IMCI", and "CIMCI" in the search strategy was necessary as these antecedent terms served as precursors to the modern definition of iCCM. This search was repeated in October 2021 to include more recently published material. We also manually retrieved relevant peer-reviewed publications from the reference lists of selected articles that were unindexed or did not appear in our original search.

Screening and eligibility

We assessed publications against prescribed inclusion criteria in two stages.[19] In the first stage, we screened titles and abstracts; remaining articles were read in their entirety in the second stage. The search and subsequent application of inclusion criteria were conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) method for scoping reviews. Figure 1 illustrates the flowchart for the collection of review documents according to PRISMA guidelines.

Inclusion and exclusion criteria

The search included only peer-reviewed publications in English that addressed any aspect of iCCM with reference to iCCM, published from 2002. These were not limited to interventional or observational studies, but also included reflections and critical analyses. Studies focusing on neonates or children over 5 years were excluded unless the study in some way assessed the impact of assimilating these age groups into existing iCCM programs and their influence on the intervention. Studies of single CCM interventions such as severe acute malnutrition, intermittent preventive treatment during pregnancy or antenatal care were excluded unless they were integrated into an existing iCCM program where the impact of this expansion on iCCM was assessed in some capacity. If the iCCM structure was simply the delivery mechanism for another intervention (eg, mass drug administration) with no implications for iCCM, the study was excluded. Research assessing general household understanding and behaviours related to childhood pneumonia, malaria or diarrhoea without explicit reference to inform a CCM program was excluded.

Data extraction and analysis

The search yielded a total of 8175 hits, of which 625 were included for the coding development of the framework. A complete list of these sources is provided in online supplemental appendix 1. Data from the final set of articles were extracted and analysed using MaxQDA and MS Excel software. We performed a content analysis of the selected literature according to the Standard Framework Approach, categorising key areas and their elements according to emergent areas of emphasis.[20] In the event of discrepancies, the investigators discussed until a consensus was reached. To verify the validity of the resulting code list and categories, we compared them to the existing iCCM Interagency Framework and the WHO Systems Building Blocks on which it is based.[15 18] Although all domains in our framework emerged organically from the literature, certain domains autonomously mirrored those found in these previous frameworks.

Stakeholder consultations and policy document review

We held stakeholder consultations with iCCM experts to supplement and validate this information. These included technical advisors, country program managers and researchers in the field of iCCM and child health. We also reviewed publicly available global and country-specific iCCM program and policy documents.

Following final development of the framework, a set of critical questions were formulated using a modified Delphi approach.[21] These questions correspond to each thematic domain category and are designed to be posed to actors at different levels of the programmatic

Figure 2 iCCM Systems Framework domains and categories. CHW, community health worker; iCCM, integrated community case management; HF, health facility; HMIS, health management information systems; M&E, monitoring and evaluation; SOPs, Standard Operating Procedures.

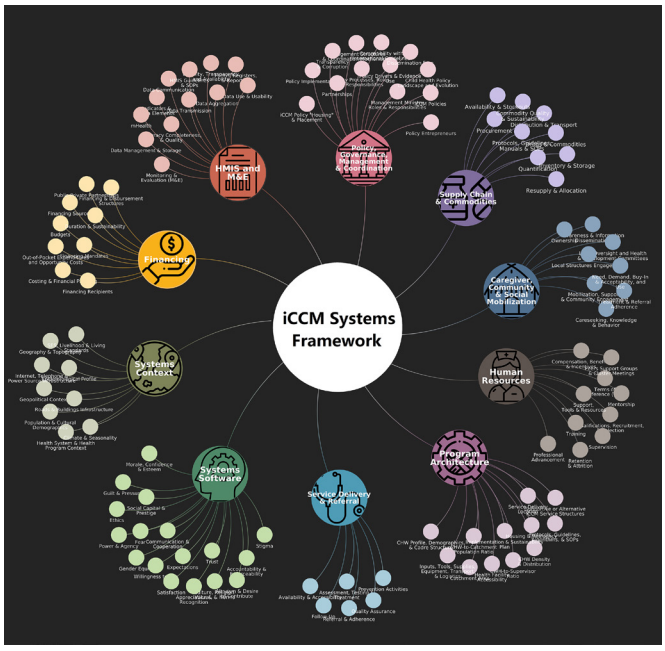

Figure 3 Interactive iCCM Systems Framework. Available at: https://kumu.io/iccm/iccm-systems-framework.

and administrative hierarchy. The critical questions listed are intended to be non-exhaustive, but are considered important enough to warrant discussion by those planning and implementing iCCM. This list was iteratively circulated among iCCM experts resulting in a final compendium of domains, categories and questions. The resulting framework was developed into an interactive, publicly accessible dashboard.

RESULTS

iCCM systems framework

The iCCM Systems Framework comprises 10 domains, 106 categories and corresponding critical questions relevant to each category (figure 2). Tables for each domain, including category definitions and critical questions, can be found in online supplemental table S2. Online supplemental figure S1 illustrates a mind map of the 10 domains and their categories. An interactive version of the framework is available at https://kumu.io/iccm/iccm-systems-framework (figure 3).

Each of the following sections describes the thematic domain and its categories as they are relevant to the iCCM intervention and includes a list of key questions. The critical questions posed in this framework operate in a variety of ways. They can be asked at different stages of the planning, implementation and evaluation phases of iCCM and can be used to prompt discussion about the potential consequences of an activity, input, design decision or the influence of embedded context or structures.

The framework posits that a program's context, its architecture and intangible elements such as power and agency, personal motivations and social norms may govern the outcomes of iCCM to the same or similar extent as other systems factors, such as the presence of a supportive policy environment or the availability of medicines. Just as these elements may influence each other, so might they overlap. For example, the availability of general guidelines for iCCM implementation is relevant to its structure (program architecture), where more targeted operational guidelines are relevant to their associated domains (ie, guidelines specific to community mobilisation or data transmission). Similarly, the way CHW cadres are structured is relevant to both the programmatic setup—or architecture—of iCCM and its human resources (HR). Outside of these 106 categories, some domains include an additional category entitled 'Systems Considerations' which explores synergies between domains.

Domain 1: systems context

The systems context domain comprises the natural and preexisting conditions inherent to the situation and setting of a system. The context of a system sets the stage for an intervention and can determine many of the interactions among its parts.[22] For iCCM, this can mean assessing how the geographical layout, climate and infrastructural makeup of target areas may affect the types and timing of inputs, medicines, transportation and equipment needed for service delivery. The demographic composition of the population and the geopolitical situation may affect where and how activities can take place and who the intervention can (or cannot) target.[23 24] Optimising CHW density and distribution is

essential to effective coverage and requires mapping exercises that incorporate contextual factors beyond spatial distances.[25–27] Healthcare infrastructure, disease burden and epidemiologic profiles may vary across administrative and ecological areas, necessitating a potentially stratified approach to implementation.[28] Whether and what type of mobile networks are available in areas of service delivery can affect coordination among downstream program actors or mobile Health (mHealth) applications that depend on them, and electrical infrastructure can affect a CHW's ability to provide services at night or transmit data.[29–31] The healthcare, socioeconomic and geophysical context can also determine whether iCCM is even a suitable response at all to address child mortality in a target area or population.

Domain 2: program architecture

The core elements that form the backbone of the iCCM intervention are grouped in the program architecture domain. These are not specific to programmatic processes such as data transmission or supply chain, but rather form the overarching setup and typology of iCCM implemented. Factors such as how the program chooses to allocate and geographically arrange its CHWs can set the foundation for coverage, workload and intervention requirements.[32] Accounting for how populations fluctuate across target areas is important to tempering expectations and monitoring capacity for service delivery, as is safeguarding a reasonable CHW-to-supervisor ratio to optimise adequate and timely supervision.[33 34] A judicious approach to defining catchment areas in terms of their breadth and accessibility to the health facility dually ensures better coverage by CHWs and that communities where there is a real need are those targeted for iCCM.[35]

The program architecture domain also addresses a myriad of other key facets of intervention design and its organisational arrangement. Major context issues can only be overcome with the provision of certain tools and materials, and it is up to programs to either offer these or relay this responsibility to CHWs, supervisors or district managers. Developing ministry-sanctioned and technically vetted protocols and guidelines for CHWs, supervisors and district actors to perform their various functions is indispensable to quality assurance and helps programs align with international standards while measuring achievements. Deciding how CHWs are housed, where they deliver health services, and who, if anyone, should provide these buildings can be a critical determinant of health service utilisation, quality of care and retention of CHWs.[36–38] In addition, the model of volunteer or remunerated CHWs can have significant implications for program longevity and far-reaching systems impacts such as the type of primary healthcare models promoted within the country.[39–42] Finally, the development of a timely, well-reasoned and practical handover plan for ministry ownership is imperative to ensure fluid transition and sustainability of program gains.[43]

Domain 3: policy, governance, management and coordination

The extent to which iCCM can be considered a tenable strategy depends on whether and how its basic tenets are enshrined in local policies; how these are advocated by influential political champions; and how the ecosystem of governing structures and management partners organise responsibilities among themselves and other key stakeholders.[9 44–47] This is the focus of the policy, governance, management and coordination domain, which describes the coordination among program actors and the policy landscape underpinning the iCCM intervention. Policy players, managing partners and the technical working groups that oversee and steer iCCM implementation can have a palpable impact on intervention success by shaping or enacting legislation that is both thorough and realistic. This facilitates program design that is appropriately aligned with and integrated into country health systems, while promoting its sustained priority as a regular part of the expected health service delivery package.

However, how successful these actors are depends not only on the development of an enabling policy environment, but also on the arrangement of primary healthcare and how it has evolved within the country's health system.[47] The scope of iCCM policy can be shaped by factors such as the ministry jurisdiction under which it is placed, existing policies for CHW cadres that preceded iCCM, and the influence of powerful policy entrepreneurs outside of common dialoguers.[47] In addition to policy, management and coordination mechanisms among ministries, non-governmental organisations (NGOs), multilateral organisations and other multisectoral partners can be decisive in determining the impact and continuity of iCCM. How these groups liaise with each other and clearly define their roles and responsibilities at the national, state and local levels lays the groundwork for the capacity building necessary to promote successful program handover.[46] Moreover, mechanisms for such intersectoral partnerships are necessary to act on local social determinants of health for change.[48] Finally, transparency among political entities, and the presence and influence of corruption in health systems, are important forces influencing health systems behaviour and merit examination in the context of iCCM.[49]

Domain 4: financing and costing

Uninterrupted, sufficient and well-allocated funding is considered the cornerstone of robust and sustainable health programs.[50] The iCCM intervention often, if not exclusively, relies on external funding partners that usually operate in parallel with an assembly of financial structures. Different components of the intervention may be funded by multiple entities, resulting in duplicative resources for some areas of iCCM or insufficient allocations for others.[51] If these mechanisms are not coordinated, they risk creating financial misalignment and fragmenting implementation efforts. The way in which ministries earmark funds for iCCM as part of their health expenditure is not only a question of how much and to

which activities funds are allocated, but also the administrative division to which these funds are directed. If resources are allotted to specific iCCM activities (eg, revitalising an existing cadre of CHWs) in selected administrative areas, scale-up efforts would be remiss not to ensure continuity in the areas of initial implementation before expanding resources to other regions.[52] The kind of financial disbursement mechanisms at lower levels of government and the presence of public–private partnerships may affect which administrative areas and what aspects of the program are prioritised.[52 53] Planners should anticipate the likely duration of funding streams for inputs and activities and project how the termination of these funds might not only affect gains achieved through the program, but also lead to unwanted effects resulting from local reliance on and abrupt disruption of services. Finally, managers should define the financial and opportunity costs that providers and recipients will incur for the operationalisation of iCCM.[54]

Domain 5: health management information systems and M&E

Health management information systems (HMIS) encompass the processes of data collection, transmission and use within the iCCM intervention, while monitoring and evaluation (M&E) provides a blueprint to ensure the program is operating as intended. In addition to monitoring, the data form the evidential basis for iCCM and are critical to evaluating its deficiencies and impact. This goes beyond data accuracy or how information is transferred between levels of hierarchy. This means ensuring that granular data are not only accessible, but also aggregated in a format that is both useable and useful for effective monitoring and readily available to decision-makers at different levels.[55 56] How, in what format, and where data are reported and stored can have implications for completeness, transparency, use and even reporting frequency, while influencing how data are linked with the national health system.[57 58] Critical to overcoming commonplace bottlenecks of evaluation is ensuring that the data elements actually exist to calculate the indicators needed for decision-making and that they are organised in a format conducive to extracting information.[59 60] The surge of mHealth used in iCCM and other programs in which CHWs frequently participate can impact the data collection burden on CHWs, as well as dependency on hardware that may not always operate effectively.[61 62] Visibility and visualisation of data, especially at lower levels, have the potential to change the way stakeholders use information to make decisions and influence community understanding of program impacts.[63 64] A comprehensive M&E plan is necessary to track and measure overall program performance. Finally, it is important to ensure that CHWs, supervisors and ministry stakeholders have the appropriate training and guidelines to inform their data collection and reporting procedures to standardise these activities while maximising data quality and use.[65 66]

Domain 6: commodities and supply chain

Experts in iCCM globally endorse the mantra ‘There is no program without a product’ (15). Domain 4 of the framework is not solely focused on the ready availability of sufficient quantities of quality medicines at the community level. It also underscores that their procurement and quantification processes, and the formulas that underpin them, can contain overlooked causes of supply chain deficiencies beyond common transport and infrastructural challenges ubiquitous in LMICs.[67 68] Sufficient resupply and product allocation require accurate projections of actual community demand, which depends on factors that may not be captured simply by measuring aggregate product consumed.[69] The way district authorities and supervisors choose to allocate supply among CHWs can also determine the potential for stockouts to occur, especially in the absence of standardised procedures.[67 70] The domain also emphasises its interdependence on other areas, such as how treatment and drug consumption data are recorded and aggregated, whether and how district pharmacists are trained in quantification and allocation processes, and the existence and enforcement of regulatory drug procurement and distribution policies. Systems considerations, such as whether an implementing partner uses existing country supply chain mechanisms or develops one in parallel, can affect the ability of local systems to appropriately support product supply and distribution after program handover.[71]

Domain 7: service delivery and referral

Service delivery in iCCM encompasses the series of activities performed by the CHW to ensure an illness case achieves an optimal health outcome. This begins when a case successfully attains contact with the CHW; receives a diagnostic test (in the case of fever or cough and fast breathing); is appropriately treated and/or referred; until finally exiting the care pathway through adhered referral and/or follow-up by the CHW.[7] While these activities require guidelines for diagnosis and case management to ensure quality and consistency, it is insufficient to simply assure the existence of nondescript plans or algorithms. These must address the specificities of diverse treatment options and diagnostic instruments, suit the organisational context and align with country policy.[9 44 72–75] How service delivery standards are defined and organised can affect who receives services, when, and how, impacting the workload for CHWs, their capacity to carry out activities, and the quality of services rendered.[76–80] Defining the expected and feasible schedule for iCCM service delivery, and setting standards for the physical structures of service provision, are arguably important to achieving better health outcomes by optimising CHW availability.[38 54] Diagnostic ambiguities persist, particularly in the confirmation of pneumonia at the community level, and thus addressing these with clear and practical guidelines and tools is a pressing need of iCCM.[81] Follow-up procedures in practice can be challenging, as can ensuring a clear counter-referral system

that both caregivers and supervisors can easily adhere to and verify.[82–84] This affects accurate reporting of successful case management and evaluators' subsequent ability to adequately measure outcomes.

Domain 8: human resources

There are many actors within the iCCM intervention, and few are as important as the CHWs who provide services and the supervisors who support and oversee them. The HR domain comprises the recruitment, selection and training of CHWs, their terms of reference, and performance quality control provided by supervisors. Who has a say in the selection of CHWs, what expectations are placed on the CHW, or which training modules CHWs and supervisors have or have not completed can significantly affect how services are delivered and how stakeholders relate to and manage their responsibilities.[85–88] We expand this domain to include CHW retention and attrition, CHW mentorship and their meeting forums and peer groups, the last of these having especially demonstrated support for CHW activities and service delivery quality.[89 90] The domain also includes categories that examine what support channels are available to iCCM service providers, as well as their potential incentives, benefits and career path. Because these aspects of HR can vary widely in different iCCM programs, designers and managers must weigh which components are most applicable to their respective interventions, while also considering how other HR models might better align with their health system environment and intervention goals.

Domain 9: caregivers, community and social mobilisation

The central role that caregivers, the community and local decision-makers play in the success of community programs is increasingly recognised, especially in the case of iCCM.[91 92] Social mobilisation is the activity that aims to inform these stakeholders and trigger local buy-in and support for the intervention. More than rallying grassroots patronage from local leaders or sensitising communities to the availability and benefits of iCCM, mobilisation sets the tone for how communities and caregivers relate to, support and engage with the CHW and the intervention as a public service.[92–94] This support, whether moral or material, can arguably serve as an impetus to sustain intervention longevity by both intrinsically motivating CHWs and providing a source of funds that enables them to perform services.[91 95 96] Establishing or supporting existing local health and development committees as part of the mobilisation strategy has the potential to safeguard this support in the long term and ensure that it is congruous with program needs.[97]

This domain also encompasses community and caregiver knowledge, attitudes and behaviour, which influence the key intervention steps of timely careseeking, treatment compliance and referral adherence, among others.[98–100] The content of the information, education and communication component of mobilisation can influence whether caregivers are only aware of disease symptoms and the offer of iCCM services, or if they also understand the voluntary status of the CHW and the necessity of community ownership for its continuity. Who delivers these messages, such as external mobilisers or participating CHWs themselves; and to whom, whether these target female caregivers or the village at large; can affect what information is conveyed and how it is received, and subsequently impact the opportunities for successful integration.[101 102]

Domain 10: systems software

There can be no system without the dynamic interactions of the actors within it. The systems software domain is concerned with the intangible forces at play within community interventions, where the term 'software' refers to its derivation from its namesake framework presented by Sheikh *et al*.[103] These expressions emanate primarily from key stakeholders and can exert profound influence in shaping program outcomes. They include the feelings, motivations, norms and expectations of caregivers, communities, CHWs and their supervisors. These actors can be largely responsible for holding each other accountable through social contracts, especially in the absence of other extrinsic motivational or accountability mechanisms.[104] Factors such as the sense of esteem, recognition, appreciation or support that a CHW enjoys in the community can not only affect morale and motivation, which in turn influence attrition, but also set the precedent for community expectations and standards in their relationship with the intervention.[92 102 103] Increased social capital and prestige of the CHW position within the community may encourage more frequent careseeking, higher referral adherence rates and possibly increased chances of financial contributions from communities to support activities.[79 92 105–107] Other factors, such as culture and values, can influence caregiver–CHW relationships and gestures of support, and may also affect the gender composition of CHW cadres.[107–110] The agency and power dynamics among CHWs, supervisors and district support mechanisms can influence how these actors approach problem solving, or how beholden they feel to each other to complete activities as expected.[111 112] Feelings of pressure, guilt or fear by the CHW can be greater drivers of service delivery than previously recognised.[36 85 113 114] Finally, ethical considerations should be given to the overall concept and policy of iCCM, where its relationship to labour, intrinsic motivation, human rights and other SDGs merit reflection.[115] How systems software is addressed within iCCM is case-specific and should not be generalised, but exploring these interactions is critical to unpacking unexpected outcomes and mitigating unintended consequences.

DISCUSSION

In this paper, we present a comprehensive systems framework to inform the design, implementation and evaluation

of community-based interventions, specifically adapted to the iCCM intervention. Robust and sustainable community health interventions are predicated on a host of systems factors. These include facets implicit to program design and systems context, and how these interface with both structural and intangible properties of the health system. We argue that it is not enough to examine these elements as isolated aspects of the intervention, but rather that it is valuable to pose meaningful questions about their interactions with each other and the system at large. Doing so can also assist designers and implementers to view interventions such as iCCM as a means to an end, rather than the end itself. This is in line with the recent WHO global review on the integrated management of childhood illnesses (IMCI), which discourages standalone approaches to iCCM and subsequent fragmentation of child health services in favour of those which include iCCM as part of a system-wide strategy.[116] Our framework views the elements of community health systems through a wide-angle lens, defines their fundamental building blocks and offers a range of critical questions that the programmer, researcher, policy-maker and technical expert can use to navigate the minutiae of this complex intervention while simultaneously considering its macro interactions.

Current resources abound to support different aspects of iCCM planning, implementation and evaluation targeting a variety of audiences. These are commonly in the form of definitive technical guidance and training packages primarily developed by WHO/UNICEF[117]; toolkits produced by supporting agencies[14]; and country-specific IMCI/CCM taskforce manuals, protocols and policies. One of the most recognised CCM-based frameworks and guidance documents is the USAID Maternal and Child Health Integrated Program (MCHIP) iCCM interagency framework and its accompanying benchmark indicator guide, which streamlines core parameters and provides a necessary foundation for intervention M&E.[15 16] As a compendium of 48 indicators divided among 8 categories (coordination and policy setting; costing and financing; HR; supply chain management; service delivery and referral; communication and social mobilisation; supervision and performance quality assurance; M&E and HMISs), it focuses on the use of specific activity benchmarks and performance markers to plan and measure progress and certain program processes. Those listed form the backbone of what is most often used to measure coverage of iCCM, and are generally considered essential across different program stages. While this is critical to measuring performance, sole reliance on such metrics risks conflating coverage outputs with intervention success.

For example, the interagency framework indicator 'caseload by CHW' is defined as the 'proportion of CHWs… treating at least x cases per month (to be defined locally)'.[16] A high proportion could suggest a well-served population, quality data reporting, strong community awareness resulting in elevated demand or an efficient and skilled CHW. However, it could also indicate a poor CHW allocation strategy and subsequent saturated population density-to-CHW ratio, a volatile epidemiological profile, or an inundated and overburdened CHW. The appropriate caseload figure, as suggested by the interagency framework, is relative and context-dependent, and sits between meeting community needs and maintaining CHW service delivery skills. This calculus is necessary to support the basis of the decision-making processes; however, it is not designed to provide further information. Our framework builds on these metrics to assist managers in exploring their emergent dynamics and underlying factors, helping qualify their interpretation and meaning.

Indeed, there is growing recognition of the need to transcend current constructs for conceptualising and assessing complex health systems, with a clarion call to better capture the foundational determinants of the production of health.[118] Several efforts have coalesced specifically around the adaptation or inclusion of community health in systems frameworks.[17 119–123] Each maintain their advantages, as there can be no panacea that is well suited to every context or program. The proposed iCCM Systems Framework aims to complement its contemporaries, specifically the iCCM Interagency Framework, by offering some specific advantages. First, it provides three additional areas of consideration: the systems context, programmatic architecture and systems software domains. These often underrepresented, measurable areas of systems forces can provide necessary insights when determining the configuration and implementation of community interventions. Second, it supports a more profound exploration of existing components in the interagency framework. For example, the coordination and policy setting component of the interagency framework and indicators suggests partner mapping, the identification of existing of CCM policy, and measuring the degree to which policy supports CHW practice of the three illness. Our framework supplements this with the proposed examination of the composition and depth of those policies, how they evolved within the landscape of primary healthcare within the country, where governance and execution of iCCM policies are placed, the drivers of and evidence use in their development, and the processes and entrepreneurs that support or hinder them. Similarly, the interagency framework supply chain component details drug registration, availability, stockouts and commodity validity. Benchmarks validate whether quantifications for supplies have been completed, procurement plans developed and implemented, and a resupply logistics system in operation. Our systems framework probes further into the calculations underlying these quantification procedures, drug procurement processes, transport and distribution mechanisms at different administrative levels, commodity inventory and storage practices, and the various health systems factors affecting their resupply and allocation methods. It particularly expounds on the areas of community and social mobilisation, supporting the existing recognition of caregiver knowledge and communication, and elevating these to the inclusion of local oversight, ownership, demand, engagement of traditional structures and barriers to careseeking.

Third, this framework recognises that lower-level stakeholders may be better versed in understanding local

consequences of upstream decision-making and planning. It therefore encourages users to pose questions at a granular level, fostering a broader consideration of decentralised effects on implementation.[124] Finally, because this framework is not a finite checklist of tasks or indicators, but rather a guide designed to comprehensively address community health as a whole, it pairs intention with consequence, transcending a normative input-output-outcome formula in favour of a holistic translational approach.

The framework is versatile in its utility. It can be used alongside planning documentation to guide decision-makers in their design processes of new or restructured iCCM programs by cultivating a dialogue of the latent consequences of certain design decisions. Such forecasting helps support sustainability at the onset of program preparation. It can also be used to assess where barriers to scale of iCCM may exist, especially where and how structural arrangements may collide with contextual realities. It also provides a robust blueprint to outline evaluations of iCCM programs organised according to each dimension and its subcategory, where responses to critical questions can be assessed to either supplement or constitute the evaluation.

The framework poses some limitations. Further research is required to validate its usability and comprehensiveness. Furthermore, it is not intended to be exhaustive. However, it is expected to cover a variety of systems issues anticipated within the iCCM intervention across various stages of planning and operationalisation. While there is substantive need to streamline implementation efforts, there remains an exigency to recognise that every iCCM program is different.[90] Their varying requirements within diverse environments can yield starkly different outcomes, necessitating a context-driven approach to program architecture and implementation. The framework is intended to serve as an aide alongside planning and monitoring guides and tools to provoke discussion and an enriched examination of intervention dynamics.

CONCLUSIONS

Approaches to improving health in the world's most remote and underserved areas continue to evolve, and iCCM is no exception. True systems integration of these interventions surpasses simply combining various health service packages or focusing on outcomes; it requires a thoughtful examination of their intentions, effects and appropriateness across a spectrum of areas. Our systems framework ultimately aims to support context-driven solutions, reduce fragmentation in health systems, and better enable sustainable impact in community health.

Author affiliations
[1]University of Basel, Basel, Switzerland
[2]Department of Epidemiology and Public Health, Swiss Tropical and Public Health Institute, Basel, Switzerland
[3]Department of Community Health and Behavioural Sciences, Makerere University College of Health Sciences, Kampala, Uganda
[4]School of Public Health, University of Kinshasa, Kinshasa, Democratic Republic of the Congo
[5]Department of Community Medicine, University of Port Harcourt, Choba, Rivers State, Nigeria
[6]School of Public Health, University of Pittsburgh, Pittsburgh, Pennsylvania, USA
[7]Society for Family Health Nigeria, Abuja, Nigeria
[8]IMCI, Malawi Ministry of Health, Lilongwe, Central Region, Malawi
[9]Department of Health, Planning, Research & Statistics, Federal Ministry of Health, Abuja, Federal Capital Territory, Nigeria
[10]PROSANI, USAID, Washington, District of Columbia, USA
[11]Malaria Consortium, Niger State, Nigeria

Twitter Daniel Cobos Muñoz @Daniel_Cobos_PH

Acknowledgements The authors wish to thank Fabienne Fischer for her assistance in developing figure 2.

Contributors AK led research project and developed framework concept in collaboration with DdS, AKT, JSN, PA, CI, UE, HN, IO, PN, JJ and AA. AK developed protocol and methods with contributions from DCM, DdS and DM, and acts as guarantor. All listed authors reviewed and approved the final manuscript.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Ethics approval Ethical approval for this study was granted by the Ethikkommission Nordwest- und Zentralschweiz (EKNZ)(No.REQ-2016-00478); DRC Comite d'ethique de la recherché (No. ESP/CE/046/2016); the National Health Science Research Committee of Malawi (NHSRC) (No. 16.6.1610); and the National Health Research Ethics Committee of Nigeria (NHREC) (Ref No. NHREC 01012007-15122016).

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement All data relevant to the study are included in the article or uploaded as supplementary information.

ORCID iD
Aliya Karim http://orcid.org/0000-0002-3665-217X

REFERENCES

1 Marsh DR, Hamer DH, Pagnoni F, *et al*. Introduction to a special supplement: evidence for the implementation, effects, and impact of the integrated community case management strategy to treat childhood infection. *Am J Trop Med Hyg* 2012;87:2–5.
2 World Health Organization,, United Nations Children's Fund. *WHO/UNICEF joint statement: integrated community case management (iCCM). An equity–focused strategy to improve access to essential treatment services for children*. New York: UNICEF, 2012.
3 Young M, Sharkey A, Aboubaker S, *et al*. The way forward for integrated community case management programmes: a summary of lessons learned to date and future priorities. *J Glob Health* 2014;4:020303.
4 Liu L, Johnson HL, Cousens S, *et al*. Global, regional, and national causes of child mortality: an updated systematic analysis for 2010 with time trends since 2000. *Lancet* 2012;379:2151–61.

5 Rasanathan K, Muñiz M, Bakshi S, *et al*. Community case management of childhood illness in sub-Saharan Africa - findings from a cross-sectional survey on policy and implementation. *J Glob Health* 2014a;4:020401.
6 Oliver K*et al*. *Review of systematic challenges to the scale-up of integrated community case management: Emerging lessons & recommendations from the catalytic initiative (CI/IHSS*. New York: United Nations Children's Fund (UNICEF), 2012.
7 Karim A, Cobos Munoz D, Mäusezahl D, *et al*. A systems approach to assessing complexity in health interventions: an effectiveness decay model for integrated community case management. *Glob Health Action* 2020;13:1794106.
8 Bosch-Capblanch X, Marceau C. Training, supervision and quality of care in selected integrated community case management (iCCM) programmes: a scoping review of programmatic evidence. *J Glob Health* 2014;4:020403.
9 Rasanathan K. Policy analysis--important for improving iCCM implementation; essential for success of global health efforts. *Health Policy Plan* 2015;30 Suppl 2:ii1–2.
10 Sharkey AB, Martin S, Cerveau T, *et al*. Demand generation and social mobilisation for integrated community case management (iCCM) and child health: lessons learned from successful programmes in niger and Mozambique. *J Glob Health* 2014;4:020410.
11 Chandani Y, Duffy M, Lamphere B, *et al*. Quality improvement practices to institutionalize supply chain best practices for iCCM: evidence from Rwanda and Malawi. *Res Social Adm Pharm* 2017;13:1095–109.
12 Nanyonjo A, Counihan H, Siduda SG, *et al*. Institutionalization of integrated community case management into National health systems in low- and middle-income countries: a scoping review of the literature. *Glob Health Action* 2019;12:1678283.
13 Diaz T, Aboubaker S, Young M. Current scientific evidence for integrated community case management (iCCM) in Africa: findings from the iCCM evidence symposium. *J Glob Health* 2014;4:020101.
14 CORE Group. Save the Children, Basics, MCHIP. In: *Community case management essentials: treating common childhood illnesses in the community. A guide for program managers*, 2010: 1–124.
15 McGorman L, Marsh DR, Guenther T, *et al*. A health systems approach to integrated community case management of childhood illness: methods and tools. *Am J Trop Med Hyg* 2012;87:69–76.
16 MCHIP. *Indicator guide for monitoring and evaluating integrated community case management*, 2013: 1–80. http://www.mchip.net/node/2179
17 Winch PJ, Leban K, Casazza L, *et al*. An implementation framework for household and community integrated management of childhood illness. *Health Policy Plan* 2002;17:345–53.
18 World Health Organization (WHO). *Everybody's business - strengthening health systems to improve health outcomes: WHO's framework for action*. Geneva: WHO, 2007. http://www.who.int/healthsystems/strategy/everybodys_business.pdf
19 Karim A, Cobos Muñoz D, Mäusezahl D, *et al*. Thematic areas and complexity of integrated community case management (iCCM) design, implementation, and evaluation: protocol for a scoping review. *Syst Rev* 2020;9:205.
20 Gale NK, Heath G, Cameron E, *et al*. Using the framework method for the analysis of qualitative data in multi-disciplinary health research. *BMC Med Res Methodol* 2013;13:117–24.
21 Dalkey N, Helmer O. An experimental application of the Delphi method to the use of experts. *Manage Sci* 1963;9:458–67.
22 Rogers L, De Brún A, McAuliffe E. Defining and assessing context in healthcare implementation studies: a systematic review. *BMC Health Serv Res* 2020;20:591.
23 Craig P, Di Ruggiero E, Frohlich KL, on behalf of the Canadian Institutes of Health Research (CIHR)–National Institute for Health Research (NIHR) Context Guidance Authors Group (listed alphabetically). Chapter 3, Taking account of context in the population health intervention research process. In: *Taking account of context in population health intervention research: guidance for producers, users and funders of research*. Southampton (UK: NIHR Journals Library, 2018.
24 O'Neill J, Tabish H, Welch V, *et al*. Applying an equity lens to interventions: using progress ensures consideration of socially stratifying factors to illuminate inequities in health. *J Clin Epidemiol* 2014;67:56–64.
25 Speybroeck N, Kinfu Y, Dal Poz M. Reassessing the Relationship Between Human Resources for Health. In: *Intervention coverage and health outcomes*. Geneva, 2006.
26 Byrne A, Hodge A, Jimenez-Soto E, *et al*. What works? strategies to increase reproductive, maternal and child health in difficult to access mountainous locations: a systematic literature review. *PLoS One* 2014;9:e87683.
27 Amare Y, Scheelbeek P, Schellenberg J, *et al*. Early postnatal home visits: a qualitative study of barriers and facilitators to achieving high coverage. *BMC Public Health* 2018;18:1074.
28 Cohen JM, Le Menach A, Pothin E, *et al*. Mapping multiple components of malaria risk for improved targeting of elimination interventions. *Malar J* 2017;16:459.
29 Siedner MJ, Lankowski A, Musinga D, *et al*. Optimizing network connectivity for mobile health technologies in sub-Saharan Africa. *PLoS One* 2012;7:e45643.
30 Oliver M, Geniets A, Winters N, *et al*. What do community health workers have to say about their work, and how can this inform improved programme design? A case study with CHWs within Kenya. *Glob Health Action* 2015;8:27168.
31 Ilozumba O, Dieleman M, Kraamwinkel N, *et al*. "I am not telling. The mobile is telling": Factors influencing the outcomes of a community health worker mHealth intervention in India. *PLoS One* 2018;13:e0194927.
32 Najafizada M, Potter B, Bourgeault IL, *et al*. Maternal and child health performance of a national community health workers' program using large administrative databases: a quantitative case study of Afghanistan. *J Glob Health Rep* 2019;3:e2019061.
33 Sheik-Mohamed A, Velema JP. Where health care has no access: the nomadic populations of sub-Saharan Africa. *Trop Med Int Health* 1999;4:695–707.
34 Whidden C, Kayentao K, Liu JX, *et al*. Improving community health worker performance by using a personalised feedback dashboard for supervision: a randomised controlled trial. *J Glob Health* 2018;8:020418.
35 Jaskiewicz W, Tulenko K. Increasing community health worker productivity and effectiveness: a review of the influence of the work environment. *Hum Resour Health* 2012;10:38.
36 Muthuri RNDK, Senkubuge F, Hongoro C. Determinants of motivation among healthcare workers in the East African community between 2009-2019: a systematic review. *Healthcare* 2020;8:164.
37 Lehman U, Sanders D. *Community health workers: What do we know about them? The state of the evidence on programmes, activities, costs and impact on health outcomes of using community health workers. World Health Organization: Evidence and Information for Policy*. Geneva: Department of Human Health, 2007.
38 Government of Malawi National Community Health Strategy 2017–2022. *Integrating health services and engaging communities for the next generation*. Lilongwe-Malawi: Ministry of Health, 2017.
39 Singh D, Negin J, Otim M, *et al*. The effect of payment and incentives on motivation and focus of community health workers: five case studies from low- and middle-income countries. *Hum Resour Health* 2015;13:58.
40 Cherrington A, Ayala GX, Elder JP, *et al*. Recognizing the diverse roles of community health workers in the elimination of health disparities: from paid staff to volunteers. *Ethn Dis* 2010;20:189–94.
41 Ormel H, Kok M, Kane S, *et al*. Salaried and voluntary community health workers: exploring how incentives and expectation gaps influence motivation. *Hum Resour Health* 2019;17:59.
42 Tomlinson M, Sherr L, Macedo A, *et al*. Paid staff or volunteers - does it make a difference? The impact of staffing on child outcomes for children attending community-based programmes in South Africa and Malawi. *Glob Health Action* 2017;10:1381462.
43 Chaudhry RG, de Boer M, Perkins S. *Five steps towards implementing a deliberate health sector element Phase-out. United States agency for international development (USAID*, 2012.
44 Bennett S, George A, Rodriguez D, *et al*. Policy challenges facing integrated community case management in sub-Saharan Africa. *Trop Med Int Health* 2014;19:872–82.
45 Dalglish SL, George A, Shearer JC, *et al*. Epistemic communities in global health and the development of child survival policy: a case study of iCCM. *Health Policy Plan* 2015;30 Suppl 2:ii12–25.
46 Bennett S, Dalglish SL, Juma PA, *et al*. Altogether now. understanding the role of international organizations in iCCM policy transfer. *Health Policy Plan* 2015;30 Suppl 2:ii26–35.
47 George A, Rodríguez DC, Rasanathan K, *et al*. iCCM policy analysis: strategic contributions to understanding its character, design and scale up in sub-Saharan Africa. *Health Policy Plan* 2015;30 Suppl 2:ii3–11.
48 Schneider H. The governance of national community health worker programmes in low- and middle-income countries: an empirically based framework of governance principles, purposes and tasks. *Int J Health Policy Manag* 2018;8:18–27.

49 Vian T. Anti-corruption, transparency and accountability in health: concepts, frameworks, and approaches. *Glob Health Action* 2020;13:1694744.
50 WHO. *Toolkit on monitoring health systems strengthening: health systems financing. draft*. Geneva: World Health Organization, June 2008; Health Metrics Network (HMN), WHO, 2008.
51 Rasanathan K, Bakshi S, Rodriguez DC, *et al*. Where to from here? Policy and financing of integrated community case management (iCCM) of childhood illness in sub-Saharan Africa. *J Glob Health* 2014;4:020304.
52 World Health Organization. *Fragmentation in pooling arrangements. technical brief series No. 5*. Geneva: World Health Organization, 2010. https://www.who.int/healthsystems/topics/financing/healthreport/FragmentationTBNo5.pdf?ua=1
53 Mathauer I, Vinyals Torres L, Kutzin J, *et al*. Pooling financial resources for universal health coverage: options for reform. *Bull World Health Organ* 2020;98:132–9.
54 Collins D, Jarrah Z, Gilmartin C, *et al*. The costs of integrated community case management (iCCM) programs: a multi-country analysis. *J Glob Health* 2014;4:020407.
55 Admon AJ, Bazile J, Makungwa H, *et al*. Assessing and improving data quality from community health workers: a successful intervention in Neno, Malawi. *Public Health Action* 2013;3:56–9.
56 Rowe SY, Peters DH, Holloway KA, *et al*. A systematic review of the effectiveness of strategies to improve health care provider performance in low- and middle-income countries: methods and descriptive results. *PLoS One* 2019;14:e0217617.
57 AbouZahr C, Boerma T. Health information systems: the foundations of public health. *Bull World Health Organ* 2005;83:578–83.
58 Kagoya HR, Kibuule D. Quality assurance of health management information system in Kayunga district, Uganda. *African Evaluation Journal* 2018;6:1.
59 Roberton T, Kasungami D, Guenther T, *et al*. Monitoring iCCM: a feasibility study of the indicator guide for monitoring and evaluating integrated community case management. *Health Policy Plan* 2016;31:759–66.
60 Mayston R, Ebhohimen K, Jacob K. Measuring what matters - information systems for management of chronic disease in primary healthcare settings in low and middle-income countries: challenges and opportunities. *Epidemiol Psychiatr Sci* 2020;29:e127.
61 Ide N, Hardy V, Chirambo G, *et al*. People Welcomed this innovation with two hands: a qualitative report of an mHealth intervention for community case management in Malawi. *Ann Glob Health* 2019;85:61.
62 Brinkel J, Krämer A, Krumkamp R, *et al*. Mobile phone-based mHealth approaches for public health surveillance in sub-Saharan Africa: a systematic review. *Int J Environ Res Public Health* 2014;11:11559–82.
63 Hazel E, Chimbalanga E, Chimuna T, *et al*. Using data to improve programs: assessment of a data quality and use intervention package for integrated community case management in Malawi. *Glob Health Sci Pract* 2017;5:355–66.
64 Edwards J, Kane A. Using data visualization to create new tools for interactive CHW supervision in the last mile. *Ann Glob Health* 2017;83:47–8.
65 Akhlaq A, McKinstry B, Muhammad KB, *et al*. Barriers and facilitators to health information exchange in low- and middle-income country settings: a systematic review. *Health Policy Plan* 2016;31:1310–25.
66 Nyamtema AS. Bridging the gaps in the health management information system in the context of a changing health sector. *BMC Med Inform Decis Mak* 2010;10:36.
67 Yadav P. Health product supply chains in developing countries: diagnosis of the root causes of Underperformance and an agenda for reform. *Health Syst Reform* 2015;1:142–54.
68 Mukasa B, Ali M, Farron M, *et al*. Contraception supply chain challenges: a review of evidence from low- and middle-income countries. *Eur J Contracept Reprod Health Care* 2017;22:384–90.
69 USAID. *Deliver project, task order 1. quantification of health commodities: a guide to forecasting and supply planning for procurement. deliver project, task order 1*. Arlington, VA: USAID, 2008.
70 Davlantes E, Salomao C, Wate F, *et al*. Malaria case management commodity supply and use by community health workers in Mozambique, 2017. *Malar J* 2019;18:1.
71 Pisa M, McCurdy D. *Improving global health supply chains through traceability*. Center for Global Development, 2019Feb 28.
72 World Health Organization. *Who guideline on health policy and system support to optimize community health worker programmes*. World Health Organization, 2018.
73 Kelly JM, Osamba B, Garg RM, *et al*. Community health worker performance in the management of multiple childhood illnesses: Siaya district, Kenya, 1997-2001. *Am J Public Health* 2001;91:1617–24.
74 Mukanga D, Babirye R, Peterson S, *et al*. Can lay community health workers be trained to use diagnostics to distinguish and treat malaria and pneumonia in children? Lessons from rural Uganda. *Trop Med Int Health* 2011;16:1234–42.
75 World Health Organization. Community-Based healthcare, including outreach and campaigns, in the context of the COVID-19 pandemic, 2020. Available: https://www.who.int/publications-detail/community-based-health-care-including-outreach-and-campaigns-in-the-context-of-the-covid-19-pandemic
76 The Global Fund. *Integrated community case management (iCCM) in sub-Saharan Africa: successes and challenges with access, speed and quality, thematic review report*. Geneva, Switzerland: The Global Fund, 2018.
77 Perry H, Crigler L. *Developing and strengthening community health worker programs at scale. A reference guide and case studies for program managers and policymakers*. MCHIP, USAID. Jhpiego Corporation, 2013.
78 Folz R, Ali M. Task sharing in health workforce: an overview of community health worker programmes in Afghanistan, Egypt and Pakistan. *East Mediterr Health J* 2018;24:940–50.
79 Mohajer N, Singh D. Factors enabling community health workers and volunteers to overcome socio-cultural barriers to behaviour change: meta-synthesis using the concept of social capital. *Hum Resour Health* 2018;16:63.
80 Pandey J, Singh M. Donning the mask: effects of emotional labour strategies on burnout and job satisfaction in community healthcare. *Health Policy Plan* 2016;31:551–62.
81 Druetz T, Siekmans K, Goossens S, *et al*. The community case management of pneumonia in Africa: a review of the evidence. *Health Policy Plan* 2015;30:253–66.
82 Källander K, Alfvén T, Funk T, *et al*. Universal versus conditional day 3 follow-up for children with non-severe unclassified fever at the community level in Ethiopia: a cluster-randomised non-inferiority trial. *PLoS Med* 2018;15:e1002553.
83 Lal S, Ndyomugenyi R, Paintain L, *et al*. Caregivers' compliance with referral advice: evidence from two studies introducing mRDTs into community case management of malaria in Uganda. *BMC Health Serv Res* 2018;18:317.
84 English L, Miller JS, Mbusa R, *et al*. Monitoring iCCM referral systems: Bugoye integrated community case management initiative (BIMI) in Uganda. *Malar J* 2016;15:247.
85 Jaskiewic W, Deussom R, Perry H. *Recruitment of community health workers. developing and strengthening community health worker programs at scale: a reference guide and case studies for program managers and policymakers*. Washington, DC: MCHIP, 2014.
86 O'Brien MJ, Squires AP, Bixby RA, *et al*. Role development of community health workers: an examination of selection and training processes in the intervention literature. *Am J Prev Med* 2009;37:S262–9.
87 Abrahams-Gessel S, Denman CA, Montano CM, *et al*. Training and supervision of community health workers conducting population-based, noninvasive screening for CVD in LMIC: implications for scaling up. *Glob Heart* 2015;10:39–44.
88 The World Health Organization. Community health workers: what do we know about them? the state of the evidence on programmes, activities, costs and impact on health outcomes of using community health workers, 2007. Available: http://www.who.int/hrh/documents/ community_health_workers_brief.pdf
89 Horwood CM, Youngleson MS, Moses E, *et al*. Using adapted quality-improvement approaches to strengthen community-based health systems and improve care in high HIV-burden sub-Saharan African countries. *AIDS* 2015;29 Suppl 2:2.
90 Langston A, Weiss J, Landegger J, *et al*. Plausible role for CHW peer support groups in increasing care-seeking in an integrated community case management project in Rwanda: a mixed methods evaluation. *Glob Health Sci Pract* 2014;2:342–54.
91 World Health Organization. Community involvement in health care: basic terms. In: *Community involvement in tuberculosis care and prevention: towards partnerships for health: guiding principles and recommendations based on a who review*. Geneva, 2008: 1.
92 Alegbeleye A, Dada J, Oresanya O, *et al*. Community engagement and mobilisation of local resources to support integrated community case management of childhood illnesses in niger state, Nigeria. *J Glob Health* 2019;9:010804.
93 Sebert Kuhlmann AK, Altman L, Galavotti C. The importance of community mobilization in interventions to improve sexual,

reproductive, and maternal health outcomes: a review of the evidence. *Health Care Women Int* 2016;37:1028–66.
94 Walsh A, Matthews A, Manda-Taylor L, *et al*. The role of the traditional leader in implementing maternal, newborn and child health policy in Malawi. *Health Policy Plan* 2018;33:879–87.
95 Bhattacharyya K, Winch P, LeBan K. 2001 Community health worker incentives and disincentives: how they affect motivation, retention and sustainability. In: *Basic support for Institutionalizing child survival project (basics II*. Arlington,VA: United States Agency for International Development, 2005.
96 Mueller D, Kurowski C, Mills A. *Managing health workforce performance. Component–literature review: determinants and levers of health worker motivation and satisfaction. health economics financing program*. London: London School of Hygiene Tropical Medicine. International Health, 2005.
97 George A, Scott K, Garimella S, *et al*. Anchoring contextual analysis in health policy and systems research: a narrative review of contextual factors influencing health committees in low and middle income countries. *Soc Sci Med* 2015;133:159–67.
98 Noordam AC, Sharkey AB, Hinssen P, *et al*. Association between caregivers' knowledge and care seeking behaviour for children with symptoms of pneumonia in six sub-Saharan African countries. *BMC Health Serv Res* 2017;17:107.
99 Simba DO, Warsame M, Kimbute O, *et al*. Factors influencing adherence to referral advice following pre-referral treatment with artesunate suppositories in children in rural Tanzania. *Trop Med Int Health* 2009;14:775–83.
100 Simba DO, Kakoko DC, Warsame M, *et al*. Understanding caretakers' dilemma in deciding whether or not to adhere with referral advice after pre-referral treatment with rectal artesunate. *Malar J* 2010;9:123.
101 Obregón R, Waisbord S. The complexity of social mobilization in health communication: top-down and bottom-up experiences in polio eradication. *J Health Commun* 2010;15 Suppl 1:25–47.
102 Chimpololo A, Burrowes V. Use of social mobilization and community Mobilizers by Non-governmental health organizations in Malawi to support the eradication of polio, improve routine immunization coverage, and control measles and neonatal tetanus. *Am J Trop Med Hyg* 2019;101:85–90.
103 Sheikh K, Gilson L, Agyepong IA, *et al*. Building the field of health policy and systems research: framing the questions. *PLoS Med* 2011;8:e1001073.
104 Topp SM, Chipukuma JM, Hanefeld J. Understanding the dynamic interactions driving Zambian health centre performance: a case-based health systems analysis. *Health Policy Plan* 2015;30:485–99.
105 Strachan DL, Källander K, Ten Asbroek AHA, *et al*. Interventions to improve motivation and retention of community health workers delivering integrated community case management (iCCM): stakeholder perceptions and priorities. *Am J Trop Med Hyg* 2012;87:111–9.
106 Sanou AK, Jegede AS, Nsungwa-Sabiiti J, *et al*. Motivation of community health workers in diagnosing, treating, and referring sick young children in a multicountry study. *Clin Infect Dis* 2016;63:S270–5.
107 Brunie A, Wamala-Mucheri P, Otterness C, *et al*. Keeping community health workers in Uganda motivated: key challenges, facilitators, and preferred program inputs. *Glob Health Sci Pract* 2014;2:103–16.
108 Feldhaus I, Silverman M, LeFevre AE, *et al*. Equally able, but unequally accepted: gender differentials and experiences of community health volunteers promoting maternal, newborn, and child health in Morogoro region, Tanzania. *Int J Equity Health* 2015;14:70.
109 Najafizada SAM, Bourgeault IL, Labonté R. A gender analysis of a national community health workers program: a case study of Afghanistan. *Glob Public Health* 2019;14:23–36.
110 Steege R, Taegtmeyer M, McCollum R, *et al*. How do gender relations affect the working lives of close to community health service providers? empirical research, a review and conceptual framework. *Soc Sci Med* 2018;209:1–13.
111 Colvin CJ, Swartz A. Extension agents or agents of change? community health workers and the politics of care work in postapartheid South Africa. *Ann Anthropol Pract* 2015;39:29–4.
112 Schaaf M, Warthin C, Freedman L, *et al*. The community health worker as service extender, cultural broker and social change agent: a critical interpretive synthesis of roles, intent and accountability. *BMJ Glob Health* 2020;5:e002296.
113 Busza J, Dauya E, Makamba M, *et al*. "I will not stop visiting!" a qualitative study of community health workers' reluctance to withdraw household support following the end of a community-based intervention in Zimbabwe. *BMC Health Serv Res* 2018;18:718.
114 Rafiq MY, Wheatley H, Mushi HP, *et al*. Who are CHWs? an ethnographic study of the multiple identities of community health workers in three rural districts in Tanzania. *BMC Health Serv Res* 2019;19:712.
115 B-Lajoie M-R, Hulme J, Johnson K. Payday, ponchos, and promotions: a qualitative analysis of perspectives from non-governmental organization programme managers on community health worker motivation and incentives. *Hum Resour Health* 2014;12:66.
116 Costello AM and Dalglish SL on behalf of the Strategic Review Study Team. *Towards a grand convergence for child survival and health: a strategic review of options for the future building on lessons learnt from IMNCI*. Geneva: WHO, 2016.
117 World Health Organization and United National Children's Fund. *Caring for the sick child in the community*. World Health Organization, 2011.
118 Sacks E, Morrow M, Story WT, *et al*. Beyond the building blocks: integrating community roles into health systems frameworks to achieve health for all. *BMJ Glob Health* 2018;3:e001384.
119 The Global Fund. *Community systems strengthening framework*. Geneva, Switzerland: The Global Fund, 2014.
120 George AS, Scott K, Sarriot E, *et al*. Unlocking community capabilities across health systems in low- and middle-income countries: lessons learned from research and reflective practice. *BMC Health Serv Res* 2016;16:631.
121 Health Partners International. *Health systems strengthening*. London, UK, 2016.
122 Foundation for Professional Development. Technical assistance, foundation for professional development – South Africa, 2017. Available: https://www. foundation. co. za/ t-a
123 USAID. *Community health framework: version 1.0*. Washington, DC, 2015.
124 Wu B. Embedding research in local context: local knowledge, stakeholders' participation and fieldwork design. Field Research Method Lab at LSE (30 October 2014) 2014.

SUPPLEMENTARY APPENDIX 1

Table S1. Final Studies Selected for Coding Analysis

No.	Source
1	Abbey M, Bartholomew LK, Chinbuah MA, Gyapong M, Gyapong JO, van den Borne B. Development of a theory and evidence-based program to promote community treatment of fevers in children under five in a rural district in Southern Ghana: An intervention mapping approach. BMC Public Health. 2017;17:120. doi:10.1186/s12889-016-3957-1
2	Abbey M, Bartholomew LK, Pappoe M, van den Borne B. Treating fever in children under 5 years of age: caregiver perceptions of community health worker services in Dangme West district, Ghana. Int Health. 2015;7(6):455-463. doi:10.1093/inthealth/ihv027
3	Abbey M, Chinbuah MA, Gyapong M, Bartholomew LK, van den Borne B. Community perceptions and practices of treatment seeking for childhood pneumonia: a mixed methods study in a rural district, Ghana. BMC Public Health. 2016;16(1):848. doi:10.1186/s12889-016-3513-z
4	Abegunde D, Orobaton N, Bassi A, et al. The Impact of Integrated Community Case Management of Childhood Diseases Interventions to Prevent Malaria Fever in Children Less than Five Years Old in Bauchi State of Nigeria. PLoS One. 2016;11(2):e0148586. doi:10.1371/journal.pone.0148586
5	Abejirinde IOO, Ingabire CM, van Vugt M, Mutesa L, van den Borne B, Busari JO. Qualitative analysis of the health system effects of a community-based malaria elimination program in Rwanda. Res Rep Trop Med. 2018;9:63-75. doi:10.2147/RRTM.S158131
6	Adamo M, Rivera D, Shah R, et al. Time volunteered on community health activities by brigadistas in Nicaragua. Rev Panam Salud Publica. 2016;40(5):388-395.
7	Adesoro O, Oresanya O, Counihan H, et al. A feasibility study to assess non-clinical community health workers' capacity to use simplified protocols and tools to treat severe acute malnutrition in Niger state Nigeria. BMC Health Serv Res. 2021;21:1102. doi:10.1186/s12913-021-07118-4
8	Admasu K. Integrated community case management of sick children in Ethiopia. Foreword. Ethiop Med J. 2014;52 Suppl 3:1 p preceding 1.
9	Adom PVM, Ouendo EM, Salami L, Napo-Koura G, Makoutodé M. [Quality of the contribution of community volunteers in Benin community-based IMCI]. Sante Publique. 2014;26(2):241-248.
10	Aftab W, Piryani S, Rabbani F. Does supportive supervision intervention improve community health worker knowledge and practices for community management of childhood diarrhea and pneumonia? Lessons for scale-up from Nigraan and Nigraan Plus trials in Pakistan. Hum Resour Health. 2021;19:99. doi:10.1186/s12960-021-00641-9
11	Aftab W, Rabbani F, Sangrasi K, Perveen S, Zahidie A, Qazi SA. Improving community health worker performance through supportive supervision: a randomised controlled implementation trial in Pakistan. Acta Paediatr. 2018;107 Suppl 471:63-71. doi:10.1111/apa.14282
12	Aftab W, Shipton L, Rabbani F, et al. Exploring health care seeking knowledge, perceptions and practices for childhood diarrhea and pneumonia and their context in a rural Pakistani community. BMC Health Serv Res. 2018;18:44. doi:10.1186/s12913-018-2845-z
13	Agarwal S, Sripad P, Johnson C, et al. A conceptual framework for measuring community health workforce performance within primary health care systems. Hum Resour Health. 2019;17:86. doi:10.1186/s12960-019-0422-0
14	Agyei-Baffour P, Hansen KS, Browne ENL, Magnussen P. The amount and value of work time of community medicine distributors in community case management of malaria among children under five years in the Ejisu-Juaben District of Ghana. Malar J. 2012;11:277. doi:10.1186/1475-2875-11-277
15	Ajayi IO, Nsungwa-Sabiiti J, Siribié M, et al. Feasibility of Malaria Diagnosis and Management in Burkina Faso, Nigeria, and Uganda: A Community-Based Observational Study. Clin Infect Dis. 2016;63(Suppl 5):S245-S255. doi:10.1093/cid/ciw622
16	Ajibaye O, Balogun EO, Olukosi YA, et al. Impact of training of mothers, drug shop attendants and voluntary health workers on effective diagnosis and treatment of malaria in Lagos, Nigeria. Trop Parasitol. 2019;9(1):36-44. doi:10.4103/tp.TP_36_18
17	Akinyode AO, Ajayi IO, Ibrahim MS, Akinyemi JO, Ajumobi OO. Practice of antimalarial prescription to patients with negative rapid test results and associated factors among health workers in Oyo State, Nigeria. Pan Afr Med J. 2018;30:229. doi:10.11604/pamj.2018.30.229.13231

18	Akweongo P, Agyei-Baffour P, Sudhakar M, et al. Feasibility and acceptability of ACT for the community case management of malaria in urban settings in five African sites. Malar J. 2011;10:240. doi:10.1186/1475-2875-10-240
19	Alegbeleye A, Dada J, Oresanya O, et al. Community engagement and mobilisation of local resources to support integrated Community Case Management of childhood illnesses in Niger State, Nigeria. J Glob Health. 9(1):010804. doi:10.7189/jogh.09.010804
20	Aliyu A, Ogbureke N, Azike S, Obamina D, Kunle B. Integrated Community Case Management of Childhood Illness: A Contextual Examination of Community Healthcare Delivery in Benue State Nigeria. INTERNATIONAL JOURNAL OF INTEGRATED CARE. 2018;18. doi:10.5334/ijic.s2217
21	Aliyu S, Shea J, Masu A, Udoh A, Azike S. Management of malaria, pneumonia and diarrhoea: addressing the needs of under-fives via culturally appropriate community - level strategy in Benue state, Nigeria. INTERNATIONAL JOURNAL OF INTEGRATED CARE. 2019;19. doi:10.5334/ijic.s3500
22	Allen KC, Whitfield K, Rabinovich R, Sadruddin S. The role of governance in implementing sustainable global health interventions: review of health system integration for integrated community case management (iCCM) of childhood illnesses. BMJ Glob Health. 2021;6(3):e003257. doi:10.1136/bmjgh-2020-003257
23	Al-Mujtaba M, Shobo O, Oyebola BC, et al. Assessing the acceptability of village health workers' roles in improving maternal health care in Gombe State, Nigeria a qualitative exploration from women beneficiaries. PLoS One. 2020;15(10):e0240798. doi:10.1371/journal.pone.0240798
24	Altaras R, Montague M, Graham K, et al. Integrated community case management in a peri-urban setting: a qualitative evaluation in Wakiso District, Uganda. BMC Health Serv Res. 2017;17:785. doi:10.1186/s12913-017-2723-0
25	Altaras R, Nuwa A, Agaba B, et al. How Do Patients and Health Workers Interact around Malaria Rapid Diagnostic Testing, and How Are the Tests Experienced by Patients in Practice? A Qualitative Study in Western Uganda. PLoS One. 2016;11(8):e0159525. doi:10.1371/journal.pone.0159525
26	Alvarez Morán JL, Alé FGB, Rogers E, Guerrero S. Quality of care for treatment of uncomplicated severe acute malnutrition delivered by community health workers in a rural area of Mali. Matern Child Nutr. 2017;14(1):e12449. doi:10.1111/mcn.12449
27	Alvarez Morán JL, Alé GBF, Charle P, Sessions N, Doumbia S, Guerrero S. The effectiveness of treatment for Severe Acute Malnutrition (SAM) delivered by community health workers compared to a traditional facility based model. BMC Health Serv Res. 2018;18:207. doi:10.1186/s12913-018-2987-z
28	Ameh S, Welaga P, Kabiru CW, et al. Factors associated with appropriate home management of uncomplicated malaria in children in Kassena-Nankana district of Ghana and implications for community case management of childhood illness: a cross-sectional study. BMC Public Health. 2015;15:458. doi:10.1186/s12889-015-1777-3
29	Ameha A, Karim AM, Erbo A, et al. Effectiveness of supportive supervision on the consistency of integrated community cases management skills of the health extension workers in 113 districts of Ethiopia. Ethiop Med J. 2014;52 Suppl 3:65-71.
30	Amouzou A, Hazel E, Shaw B, et al. Effects of the integrated Community Case Management of Childhood Illness Strategy on Child Mortality in Ethiopia: A Cluster Randomized Trial. Am J Trop Med Hyg. 2016;94(3):596-604. doi:10.4269/ajtmh.15-0586
31	Amouzou A, Kanyuka M, Hazel E, et al. Independent Evaluation of the integrated Community Case Management of Childhood Illness Strategy in Malawi Using a National Evaluation Platform Design. Am J Trop Med Hyg. 2016;94(3):574-583. doi:10.4269/ajtmh.15-0584
32	Amouzou A, Kidanu A, Taddesse N, et al. Using Health Extension Workers for Monitoring Child Mortality in Real-Time: Validation against Household Survey Data in Rural Ethiopia. PLoS One. 2015;10(11):e0126909. doi:10.1371/journal.pone.0126909
33	Amouzou A, Morris S, Moulton LH, Mukanga D. Assessing the impact of integrated community case management (iCCM) programs on child mortality: Review of early results and lessons learned in sub–Saharan Africa. J Glob Health. 2014;4(2):020411. doi:10.7189/jogh.04.020411
34	Andrus A, Cohen R, Carvajal-Aguirre L, El Arifeen S, Weiss W. Strong community-based health systems and national governance predict improvement in coverage of oral rehydration solution (ORS): a multilevel longitudinal model. J Glob Health. 10(1):010503. doi:10.7189/jogh.10.010503
35	Angwa LM, Ouma C, Okoth P, et al. Acceptability, adherence, and clinical outcomes, of amoxicillin dispersible tablets versus oral suspension in treatment of children aged 2–59 Months with pneumonia, Kenya: A cluster randomized controlled trial. Heliyon. 2020;6(4):e03786. doi:10.1016/j.heliyon.2020.e03786
36	Angwenyi V, Aantjes C, Kondowe K, et al. Moving to a strong(er) community health system: analysing the role of community health volunteers in the new national community health strategy in Malawi. BMJ Glob Health. 2018;3(Suppl 3):e000996. doi:10.1136/bmjgh-2018-000996

37	Annobil I, Dakyaga F, Sillim ML. "From experts to locals hands" healthcare service planning in sub-Saharan Africa: an insight from the integrated community case management of Ghana. BMC Health Serv Res. 2021;21:403. doi:10.1186/s12913-021-06407-2
38	Ansermino JM, Wiens MO, Kissoon N. Evidence and Transparency are Needed to Develop a Frontline Health Worker mHealth Assessment Platform. Am J Trop Med Hyg. 2019;101(4):948. doi:10.4269/ajtmh.19-0411a
39	Aridi JO, Chapman SA, Wagah MA, Negin J. A comparative study of an NGO-sponsored CHW programme versus a ministry of health sponsored CHW programme in rural Kenya: a process evaluation. Hum Resour Health. 2014;12:64. doi:10.1186/1478-4491-12-64
40	Ashenafi A, Karim AM, Ameha A, Erbo A, Getachew N, Betemariam W. Effect of the health extension program and other accessibility factors on care-seeking behaviors for common childhood illnesses in rural Ethiopia. Ethiop Med J. 2014;52 Suppl 3:57-64.
41	Assebe LF, Belete WN, Alemayehu S, et al. Economic evaluation of Health Extension Program packages in Ethiopia. PLoS One. 2021;16(2):e0246207. doi:10.1371/journal.pone.0246207
42	Awasthi S, Kumar D, Mishra N, Agarwal M, Pandey CM. Effectiveness of various communication strategies for improving childhood pneumonia case management: a community based behavioral open labeled trial in rural Lucknow, Uttar Pradesh, India. BMC Public Health. 2019;19:1721. doi:10.1186/s12889-019-8050-0
43	Awasthi S, Nichter M, Verma T, et al. Revisiting community case management of childhood pneumonia: perceptions of caregivers and grass root health providers in Uttar Pradesh and Bihar, northern India. PLoS One. 2015;10(4):e0123135. doi:10.1371/journal.pone.0123135
44	Awasthi S, Verma T, Agarwal M, Pandey CM. To assess the effectiveness of various communication strategies for improving childhood pneumonia case management: study protocol of a community based behavioral open labeled trial in rural Lucknow, Uttar Pradesh, India. BMC Pediatr. 2018;18:279. doi:10.1186/s12887-018-1250-4
45	Awor P, Kalyango JN, Stålsby Lundborg C, Ssengooba F, Eriksen J, Rutebemberwa E. Policy Challenges Facing the Scale Up of Integrated Community Case Management (iCCM) in Uganda. Int J Health Policy Manag. Published online May 24, 2021. doi:10.34172/ijhpm.2021.39
46	Awor P, Wamani H, Bwire G, Jagoe G, Peterson S. Private Sector Drug Shops in Integrated Community Case Management of Malaria, Pneumonia, and Diarrhea in Children in Uganda. Am J Trop Med Hyg. 2012;87(5 Suppl):92-96. doi:10.4269/ajtmh.2012.11-0791
47	Awor P, Wamani H, Tylleskar T, Jagoe G, Peterson S. Increased Access to Care and Appropriateness of Treatment at Private Sector Drug Shops with Integrated Management of Malaria, Pneumonia and Diarrhoea: A Quasi-Experimental Study in Uganda. PLoS One. 2014;9(12):e115440. doi:10.1371/journal.pone.0115440
48	Awor P, Wamani H, Tylleskar T, Peterson S. Drug seller adherence to clinical protocols with integrated management of malaria, pneumonia and diarrhoea at drug shops in Uganda. Malar J. 2015;14:277. doi:10.1186/s12936-015-0798-9
49	Awor, P, Peterson, S, Gautham, M. Delivering child health interventions through the private sector in low and middle income countries: challenges, opportunities, and potential next steps. BMJ. 2018;362:k2950. doi:10.1136/bmj.k2950
50	Aysha Z, Kashif S, Saleem I, Shagufta P, Wafa A, Fauziah R. Strengthening Health System: Using Mobile Phones for Coordinated Community Case Management of Childhood Diarrhea and Pneumonia in District Badin, Pakistan. Health Systems and Policy Research. Published online 2016. Accessed November 4, 2021. https://www.semanticscholar.org/paper/Strengthening-Health-System%3A-Using-Mobile-Phones-of-Aysha-Kashif/2563e9125361180564ade1b640f22de8bb4ee2f0
51	Bagonza A, Kitutu FE, Peterson S, et al. Effectiveness of peer-supervision on pediatric fever illness treatment among registered private drug sellers in East-Central Uganda: An interrupted time series analysis. Health Sci Rep. 2021;4(2):e284. doi:10.1002/hsr2.284
52	Bagonza A, Wamani H, Peterson S, et al. Peer supervision experiences of drug sellers in a rural district in East-Central Uganda: a qualitative study. Malar J. 2020;19:270. doi:10.1186/s12936-020-03343-0
53	Bagonza J, Kibira SP, Rutebemberwa E. Performance of community health workers managing malaria, pneumonia and diarrhoea under the community case management programme in central Uganda: a cross sectional study. Malar J. 2014;13:367. doi:10.1186/1475-2875-13-367
54	Bagonza J, Rutebemberwa E, Eckmanns T, Ekirapa-Kiracho E. What influences availability of medicines for the community management of childhood illnesses in central Uganda? Implications for scaling up the integrated community case management programme. BMC Public Health. 2015;15:1180. doi:10.1186/s12889-015-2525-4

55	Baker K, Akasiima M, Wharton-Smith A, et al. Performance, Acceptability, and Usability of Respiratory Rate Timers and Pulse Oximeters When Used by Frontline Health Workers to Detect Symptoms of Pneumonia in Sub-Saharan Africa and Southeast Asia: Protocol for a Two-Phase, Multisite, Mixed-Methods Trial. JMIR Res Protoc. 2018;7(10):e10191. doi:10.2196/10191
56	Baker K, Alfvén T, Mucunguzi A, et al. Performance of Four Respiratory Rate Counters to Support Community Health Workers to Detect the Symptoms of Pneumonia in Children in Low Resource Settings: A Prospective, Multicentre, Hospital-Based, Single-Blinded, Comparative Trial. EClinicalMedicine. 2019;12:20-30. doi:10.1016/j.eclinm.2019.05.013
57	Baker K, Maurel A, Ward C, et al. Automated Respiratory Rate Counter to Assess Children for Symptoms of Pneumonia: Protocol for Cross-Sectional Usability and Acceptability Studies in Ethiopia and Nepal. JMIR Res Protoc. 2020;9(3):e14405. doi:10.2196/14405
58	Baker K, Petzold M, Mucunguzi A, et al. Performance of five pulse oximeters to detect hypoxaemia as an indicator of severe illness in children under five by frontline health workers in low resource settings – A prospective, multicentre, single-blinded, trial in Cambodia, Ethiopia, South Sudan, and Uganda. EClinicalMedicine. 2021;38:101040. doi:10.1016/j.eclinm.2021.101040
59	Baker K, Ward C, Maurel A, et al. Usability and acceptability of a multimodal respiratory rate and pulse oximeter device in case management of children with symptoms of pneumonia: A cross-sectional study in Ethiopia. Acta Paediatr. 2021;110(5):1620-1632. doi:10.1111/apa.15682
60	Banek K, Nankabirwa J, Maiteki-Sebuguzi C, et al. Community case management of malaria: exploring support, capacity and motivation of community medicine distributors in Uganda. Health Policy Plan. 2015;30(4):451-461. doi:10.1093/heapol/czu033
61	Bari A, Sadruddin S, Khan A, et al. Community case management of severe pneumonia with oral amoxicillin in children aged 2-59 months in Haripur district, Pakistan: a cluster randomised trial. Lancet. 2011;378(9805):1796-1803. doi:10.1016/S0140-6736(11)61140-9
62	Basaleem HO, Amin RM. Integrated management of childhood illness in Lahej, Yemen: a qualitative analysis from the perspective of health providers. East Mediterr Health J. 2011;17(2):101-108.
63	Basaleem HO, Amin RM. Qualitative study on the Community Perception of the Integrated Management of Childhood Illness (IMCI) Implementation in Lahej, Yemen. Sultan Qaboos Univ Med J. 2009;9(1):42-52.
64	Baynes C, Mboya D, Likasi S, et al. Quality of Sick Child-Care Delivered by Community Health Workers in Tanzania. Int J Health Policy Manag. 2018;7(12):1097-1109. doi:10.15171/ijhpm.2018.63
65	Bedford KJA, Sharkey AB. Local Barriers and Solutions to Improve Care-Seeking for Childhood Pneumonia, Diarrhoea and Malaria in Kenya, Nigeria and Niger: A Qualitative Study. PLoS One. 2014;9(6):e100038. doi:10.1371/journal.pone.0100038
66	Befekadu A, Yitayal M. Knowledge and practice of health extension workers on drug provision for childhood illness in west Gojjam, Amhara, Northwest Ethiopia. BMC Public Health. 2020;20:496. doi:10.1186/s12889-020-08602-y
67	Bekolo C, Williams T. ADDING PROACTIVE AND REACTIVE CASE DETECTION INTO THE INTEGRATED COMMUNITY CASE MANAGEMENT SYSTEM (ICCM plus) TO OPTIMISE DIAGNOSIS AND TREATMENT OF MALARIA IN A HIGH TRANSMISSION SETTING OF CAMEROON. TRANSACTIONS OF THE ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE. 2019;113:S9-S10.
68	Bekolo CE, Williams TD. Adding proactive and reactive case detection into the integrated community case management system to optimise diagnosis and treatment of malaria in a high transmission setting of Cameroon: an observational quality improvement study. BMJ Open. 2019;9(6):e026678. doi:10.1136/bmjopen-2018-026678
69	Bell D, Bwanika JB, Cunningham J, et al. Prototype Positive Control Wells for Malaria Rapid Diagnostic Tests: Prospective Evaluation of Implementation Among Health Workers in Lao People's Democratic Republic and Uganda. Am J Trop Med Hyg. 2017;96(2):319-329. doi:10.4269/ajtmh.16-0498
70	Bellete M, Boke MM, Yenit MK. Child Caregiver's healthcare seeking behavior and its determinants for common childhood illnesses in Addis Ababa, Ethiopia: a community-based study. Ital J Pediatr. 2021;47:99. doi:10.1186/s13052-021-01049-w
71	Bennett S, Dalglish SL, Juma PA, Rodríguez DC. Altogether now... understanding the role of international organizations in iCCM policy transfer. Health Policy Plan. 2015;30 Suppl 2:ii26-ii35. doi:10.1093/heapol/czv071
72	Bennett S, George A, Rodriguez D, et al. Policy challenges facing integrated community case management in Sub-Saharan Africa. Trop Med Int Health. 2014;19(7):872-882. doi:10.1111/tmi.12319
73	Berhanu A, Alemayehu M, Daka K, Binu W, Suleiman M. Utilization of Integrated Community Case Management of Childhood Illnesses at Health Posts in Southern Ethiopia. Pediatric Health Med Ther. 2020;11:459-467. doi:10.2147/PHMT.S282698
74	Berhanu D, Okwaraji YB, Belayneh AB, et al. Protocol for the evaluation of a complex intervention aiming at increased utilisation of primary child health services in Ethiopia: a before and after study in intervention and comparison areas. BMC Health Serv Res. 2020;20:339. doi:10.1186/s12913-020-05151-3

75	Berhanu D, Okwaraji YB, Defar A, et al. Does a complex intervention targeting communities, health facilities and district health managers increase the utilisation of community-based child health services? A before and after study in intervention and comparison areas of Ethiopia. BMJ Open. 2020;10(9):e040868. doi:10.1136/bmjopen-2020-040868
76	Berlan D. Pneumonia's second wind? A case study of the global health network for childhood pneumonia. Health Policy Plan. 2016;31(Suppl 1):i33-i47. doi:10.1093/heapol/czv070
77	Besada D, Kerber K, Leon N, et al. Niger's Child Survival Success, Contributing Factors and Challenges to Sustainability: A Retrospective Analysis. PLoS One. 2016;11(1):e0146945. doi:10.1371/journal.pone.0146945
78	Beyene H, Hailu D, Tadele H, Persson LÅ, Berhanu D. A mixed-methods study exploring adherence to the referral of severely sick children in primary health care in Southern Ethiopia. Arch Public Health. 2021;79:159. doi:10.1186/s13690-021-00681-6
79	Beyene H, Hailu D, Tadele H, Persson LÅ, Berhanu D. Insufficient referral practices of sick children in Ethiopia shown in a cross-sectional survey. Acta Paediatr. 2020;109(9):1867-1874. doi:10.1111/apa.15200
80	Beyene H, Kassa DH, Tadele H, Persson L, Defar A, Berhanu D. Factors associated with the referral of children with severe illnesses at primary care level in Ethiopia: a cross-sectional study. BMJ Open. 2021;11(6):e047640. doi:10.1136/bmjopen-2020-047640
81	Biemba G, Chiluba B, Yeboah-Antwi K, et al. A Mobile-Based Community Health Management Information System for Community Health Workers and Their Supervisors in 2 Districts of Zambia. Glob Health Sci Pract. 2017;5(3):486-494. doi:10.9745/GHSP-D-16-00275
82	Biemba G, Chiluba B, Yeboah-Antwi K, et al. Impact of mobile health-enhanced supportive supervision and supply chain management on appropriate integrated community case management of malaria, diarrhoea, and pneumonia in children 2-59 months: A cluster randomised trial in Eastern Province, Zambia. J Glob Health. 10(1):010425. doi:10.7189/jogh.10.010425
83	Biemba G, Mulenga A, Chiluba B, et al. Cost analysis of integrated community case management of childhood malaria, diarrhea and pneumonia enhanced by mobile health technology in rural Zambia. J Public Health Afr. 2020;10(2):1039. doi:10.4081/jphia.2019.1039
84	Billah SM, Hoque DE, Rahman M, et al. Feasibility of engaging "Village Doctors" in the Community-based Integrated Management of Childhood Illness (C-IMCI): experience from rural Bangladesh. J Glob Health. 2018;8(2):020413. doi:10.7189/jogh.08.020413
85	Blanas DA, Ndiaye Y, MacFarlane M, et al. Health worker perceptions of integrating mobile phones into community case management of malaria in Saraya, Senegal. Int Health. 2015;7(3):176-182. doi:10.1093/inthealth/ihu075
86	Blanas DA, Ndiaye Y, Nichols K, Jensen A, Siddiqui A, Hennig N. Barriers to community case management of malaria in Saraya, Senegal: training, and supply-chains. Malar J. 2013;12:95. doi:10.1186/1475-2875-12-95
87	Blum LS, Oria PA, Olson CK, Breiman RF, Ram PK. Examining the Use of Oral Rehydration Salts and Other Oral Rehydration Therapy for Childhood Diarrhea in Kenya. Am J Trop Med Hyg. 2011;85(6):1126-1133. doi:10.4269/ajtmh.2011.11-0171
88	Boakye MDS, Owek CJ, Oluoch E, Atakora SB, Wachira J, Afrane YA. Needs assessment of community health workers to enhance efficient delivery of their services for community case management of malaria in Kenya. Malar J. 2021;20:102. doi:10.1186/s12936-021-03640-2
89	Boakye MDS, Owek CJ, Oluoch E, Wachira J, Afrane YA. Challenges of achieving sustainable community health services for community case management of malaria. BMC Public Health. 2018;18(1):1150. doi:10.1186/s12889-018-6040-2
90	Boateng M, Angel S, Enemark U. Integrated Community Case Management of Malaria-Stakeholders' Assessment From a Health Literacy Perspective. INTERNATIONAL JOURNAL OF QUALITATIVE METHODS. 2019;18.
91	Boateng MA, Agyei-Baffour E, Angel S, Asare O, Prempeh B, Enemark U. Co-creation and prototyping of an intervention focusing on health literacy in management of malaria at community-level in Ghana. Res Involv Engagem. 2021;7:55. doi:10.1186/s40900-021-00302-0
92	Boateng MA, Agyei-Baffour P, Angel S, Enemark U. Translation, cultural adaptation and psychometric properties of the Ghanaian language (Akan; Asante Twi) version of the Health Literacy Questionnaire. BMC Health Serv Res. 2020;20:1064. doi:10.1186/s12913-020-05932-w
93	Boettiger DC, Treleaven E, Kayentao K, et al. Household factors and under-five mortality in Bankass, Mali: results from a cross-sectional survey. BMC Public Health. 2021;21:244. doi:10.1186/s12889-021-10242-9
94	Bosch–Capblanch X, Marceau C. Training, supervision and quality of care in selected integrated community case management (iCCM) programmes: A scoping review of programmatic evidence. J Glob Health. 2014;4(2):020403. doi:10.7189/jogh.04.020403

95	Boschi-Pinto C, Dilip TR, Costello A. Association between community management of pneumonia and diarrhoea in high-burden countries and the decline in under-five mortality rates: an ecological analysis. BMJ Open. 2017;7(2):e012639. doi:10.1136/bmjopen-2016-012639
96	Boschi-Pinto C, Labadie G, Dilip TR, et al. Global implementation survey of Integrated Management of Childhood Illness (IMCI): 20 years on. BMJ Open. 2018;8(7):e019079. doi:10.1136/bmjopen-2017-019079
97	Boyce MR, Menya D, Turner EL, Laktabai J, Prudhomme-O'Meara W. Evaluation of malaria rapid diagnostic test (RDT) use by community health workers: a longitudinal study in western Kenya. Malar J. 2018;17:206. doi:10.1186/s12936-018-2358-6
98	Boyce SP, Nyangara F, Kamunyori J. A mixed-methods quasi-experimental evaluation of a mobile health application and quality of care in the integrated community case management program in Malawi. J Glob Health. 9(1):010811. doi:10.7189/jogh.09.010811
99	Bradley SEK, Rosapep L, Shiras T. Where Do Caregivers Take Their Sick Children for Care? An Analysis of Care Seeking and Equity in 24 USAID Priority Countries. Glob Health Sci Pract. 2020;8(3):518-533. doi:10.9745/GHSP-D-20-00115
100	Brenner JL, Barigye C, Maling S, et al. Where there is no doctor: can volunteer community health workers in rural Uganda provide integrated community case management? Afr Health Sci. 2017;17(1):237-246. doi:10.4314/ahs.v17i1.29
101	Briaux J, Martin-Prevel Y, Carles S, et al. Evaluation of an unconditional cash transfer program targeting children's first-1,000–days linear growth in rural Togo: A cluster-randomized controlled trial. PLoS Med. 2020;17(11):e1003388. doi:10.1371/journal.pmed.1003388
102	Briggs J, Embrey M, Maliqi B, Hedman L, Requejo J. How to assure access of essential RMNCH medicines by looking at policy and systems factors: an analysis of countdown to 2015 countries. BMC Health Serv Res. 2018;18:952. doi:10.1186/s12913-018-3766-6
103	Brunie A, Mercer S, Chen M, Andrianantoandro T. Expanding Understanding of Community Health Worker Programs: A Cross-Sectional Survey on the Work, Satisfaction, and Livelihoods of CHWs in Madagascar. Inquiry. 2018;55:0046958018798493. doi:10.1177/0046958018798493
104	Bruxvoort KJ, Leurent B, Chandler CIR, et al. The Impact of Introducing Malaria Rapid Diagnostic Tests on Fever Case Management: A Synthesis of Ten Studies from the ACT Consortium. Am J Trop Med Hyg. 2017;97(4):1170-1179. doi:10.4269/ajtmh.16-0955
105	Bryce J, Victora CG, Habicht JP, Black RE, Scherpbier RW, MCE-IMCI Technical Advisors. Programmatic pathways to child survival: results of a multi-country evaluation of Integrated Management of Childhood Illness. Health Policy Plan. 2005;20 Suppl 1:i5-i17. doi:10.1093/heapol/czi055
106	Buchner DL, Awor P. A protocol for engaging unlicensed private drug shops in Rural Eastern Uganda for Integrated Community Case Management (ICCM) of malaria, pneumonia and diarrhoea in children under 5 years of age. BMJ Open. 2015;5(10):e009133. doi:10.1136/bmjopen-2015-009133
107	Buchner DL, Brenner JL, Kabakyenga J, et al. Stakeholders' Perceptions of Integrated Community Case Management by Community Health Workers: A Post-Intervention Qualitative Study. PLoS One. 2014;9(6):e98610. doi:10.1371/journal.pone.0098610
108	Buchner DL, Kitutu FE, Cross DE, Nakamoga E, Awor P. A cross-sectional study to identify the distribution and characteristics of licensed and unlicensed private drug shops in rural Eastern Uganda to inform an iCCM intervention to improve health outcomes for children under five years. PLoS One. 2019;14(1):e0209641. doi:10.1371/journal.pone.0209641
109	Buregyeya E, Rutebemberwa E, LaRussa P, et al. Comparison of the capacity between public and private health facilities to manage under-five children with febrile illnesses in Uganda. Malar J. 2017;16:183. doi:10.1186/s12936-017-1842-8
110	Buregyeya E, Rutebemberwa E, LaRussa P, Mbonye A. Strengthening referral of sick children from the private health sector and its impact on referral uptake in Uganda: a cluster randomized controlled trial protocol. BMC Health Serv Res. 2016;16:646. doi:10.1186/s12913-016-1885-5
111	Callaghan-Koru JA, Gilroy K, Hyder AA, et al. Health systems supports for community case management of childhood illness: lessons from an assessment of early implementation in Malawi. BMC Health Serv Res. 2013;13:55. doi:10.1186/1472-6963-13-55
112	Callaghan-Koru JA, Hyder AA, George A, et al. Health Workers' and Managers' Perceptions of the Integrated Community Case Management Program for Childhood Illness in Malawi: The Importance of Expanding Access to Child Health Services. Am J Trop Med Hyg. 2012;87(5 Suppl):61-68. doi:10.4269/ajtmh.2012.11-0665
113	Camara A, Guilavogui T, Keita K, et al. Rapid Epidemiological and Entomological Survey for Validation of Reported Indicators and Characterization of Local Malaria Transmission in Guinea, 2017. Am J Trop Med Hyg. 2018;99(5):1134-1144. doi:10.4269/ajtmh.18-0479

114	Canavati SE, Lawpoolsri S, Quintero CE, et al. Village malaria worker performance key to the elimination of artemisinin-resistant malaria: a Western Cambodia health system assessment. Malar J. 2016;15:282. doi:10.1186/s12936-016-1322-6
115	Cardemil CV, Gilroy KE, Callaghan-Koru JA, Nsona H, Bryce J. Comparison of Methods for Assessing Quality of Care for Community Case Management of Sick Children: An Application with Community Health Workers in Malawi. Am J Trop Med Hyg. 2012;87(5 Suppl):127-136. doi:10.4269/ajtmh.2012.12-0389
116	Carvajal-Vélez L, Amouzou A, Perin J, et al. Diarrhea management in children under five in sub-Saharan Africa: does the source of care matter? A Countdown analysis. BMC Public Health. 2016;16:830. doi:10.1186/s12889-016-3475-1
117	Castellani J, Mihaylova B, Ajayi IO, et al. Quantifying and Valuing Community Health Worker Time in Improving Access to Malaria Diagnosis and Treatment. Clin Infect Dis. 2016;63(Suppl 5):S298-S305. doi:10.1093/cid/ciw629
118	Castellani J, Mihaylova B, Siribié M, et al. Household costs and time to treatment for children with severe febrile illness in rural Burkina Faso: the role of rectal artesunate. Malar J. 2018;17:380. doi:10.1186/s12936-018-2526-8
119	Chanda P, Hamainza B, Moonga HB, Chalwe V, Pagnoni F. Community case management of malaria using ACT and RDT in two districts in Zambia: achieving high adherence to test results using community health workers. Malar J. 2011;10:158. doi:10.1186/1475-2875-10-158
120	Chandani Y, Andersson S, Heaton A, et al. Making products available among community health workers: Evidence for improving community health supply chains from Ethiopia, Malawi, and Rwanda. J Glob Health. 2014;4(2):020405. doi:10.7189/jogh.04.020405
121	Chandani Y, Duffy M, Lamphere B, Noel M, Heaton A, Andersson S. Quality improvement practices to institutionalize supply chain best practices for iCCM: Evidence from Rwanda and Malawi. Res Social Adm Pharm. 2017;13(6):1095-1109. doi:10.1016/j.sapharm.2016.07.003
122	Chandani Y, Noel M, Pomeroy A, Andersson S, Pahl MK, Williams T. Factors affecting availability of essential medicines among community health workers in Ethiopia, Malawi, and Rwanda: solving the last mile puzzle. Am J Trop Med Hyg. 2012;87(5 Suppl):120-126. doi:10.4269/ajtmh.2012.11-0781
123	Chandna A, Shwe Nwe Htun N, Peto TJ, et al. Defining the burden of febrile illness in rural South and Southeast Asia: an open letter to announce the launch of the Rural Febrile Illness project. Wellcome Open Res. 2021;6:64. doi:10.12688/wellcomeopenres.16393.1
124	Charle-Cuéllar P, López-Ejeda N, Traore M, et al. Impact of Different Levels of Supervision on the Recovery of Severely Malnourished Children Treated by Community Health Workers in Mali. Nutrients. 2021;13(2):367. doi:10.3390/nu13020367
125	Chen X, Mohan D, Maïga A, et al. Validity of using mobile phone surveys to evaluate community health worker program in Mali. BMC Med Res Methodol. 2021;21:115. doi:10.1186/s12874-021-01317-7
126	Chikaphupha KR, Kok MC, Nyirenda L, Namakhoma I, Theobald S. Motivation of health surveillance assistants in Malawi: A qualitative study. Malawi Med J. 2016;28(2):37-42.
127	Chilundo BG, Cliff JL, Mariano AR, Rodríguez DC, George A. Relaunch of the official community health worker programme in Mozambique: is there a sustainable basis for iCCM policy? Health Policy Plan. 2015;30(Suppl 2):ii54-ii64. doi:10.1093/heapol/czv036
128	Chinbuah MA, Kager PA, Abbey M, et al. Impact of Community Management of Fever (Using Antimalarials With or Without Antibiotics) on Childhood Mortality: A Cluster-Randomized Controlled Trial in Ghana. Am J Trop Med Hyg. 2012;87(5 Suppl):11-20. doi:10.4269/ajtmh.2012.12-0078
129	Chipukuma HM, Halwiindi H, Zulu JM, Azizi SC, Jacobs C. Evaluating fidelity of community health worker roles in malaria prevention and control programs in Livingstone District, Zambia-A bottleneck analysis. BMC Health Serv Res. 2020;20:612. doi:10.1186/s12913-020-05458-1
130	Chirambo GB, Hardy VE, Heavin C, et al. Perceptions of a mobile health intervention for Community Case Management in Malawi: Opportunities and challenges for Health Surveillance Assistants in a community setting. Malawi Med J. 2018;30(1):6-12. doi:10.4314/mmj.v30i1.2
131	Chirambo GB, Muula AS, Thompson M, et al. End-user perspectives of two mHealth decision support tools: Electronic Community Case Management in Northern Malawi. Int J Med Inform. 2021;145:104323. doi:10.1016/j.ijmedinf.2020.104323
132	Chirambo GB, Thompson M, Hardy V, et al. Effectiveness of Smartphone-Based Community Case Management on the Urgent Referral, Reconsultation, and Hospitalization of Children Aged Under 5 Years in Malawi: Cluster-Randomized, Stepped-Wedge Trial. J Med Internet Res. 2021;23(10):e25777. doi:10.2196/25777
133	Choudhary TS, Sinha B, Khera A, et al. Factors associated with the decline in under-five diarrhea mortality in India: a LiST analysis. J Glob Health. 9(2):020804. doi:10.7189/jogh.09.020804

134	Colbourn T, King C, Beard J, et al. Predictive value of pulse oximetry for mortality in infants and children presenting to primary care with clinical pneumonia in rural Malawi: A data linkage study. PLoS Med. 2020;17(10):e1003300. doi:10.1371/journal.pmed.1003300
135	Collins D, Jarrah Z, Gilmartin C, Saya U. The costs of integrated community case management (iCCM) programs: A multi–country analysis. J Glob Health. 2014;4(2):020407. doi:10.7189/jogh.04.020407
136	Collins KA, Ouedraogo A, Guelbeogo WM, et al. Investigating the impact of enhanced community case management and monthly screening and treatment on the transmissibility of malaria infections in Burkina Faso: study protocol for a cluster-randomised trial. BMJ Open. 2019;9(9):e030598. doi:10.1136/bmjopen-2019-030598
137	Costello A, Peterson S, Rasanathan K, Daelmans B, Bahl R. Where's the leadership? Future commitments of Unicef and WHO for global child health. BMJ. 2018;362:k3219. doi:10.1136/bmj.k3219
138	Counihan H, Baba E, Oresanya O, et al. One-arm safety intervention study on community case management of chest indrawing pneumonia in children in Nigeria – a study protocol. Glob Health Action. 13(1):1775368. doi:10.1080/16549716.2020.1775368
139	Counihan H, Harvey SA, Sekeseke-Chinyama M, et al. Community Health Workers Use Malaria Rapid Diagnostic Tests (RDTs) Safely and Accurately: Results of a Longitudinal Study in Zambia. Am J Trop Med Hyg. 2012;87(1):57-63. doi:10.4269/ajtmh.2012.11-0800
140	Daelmans B, Seck A, Nsona H, Wilson S, Young M. Integrated Community Case Management of Childhood Illness: What have We Learned? Am J Trop Med Hyg. 2016;94(3):571-573. doi:10.4269/ajtmh.94-3intro2
141	Daka DW, Wordofa MA, Woldie M, Persson LÅ, Berhanu D. Quality of clinical assessment and management of sick children by Health Extension Workers in four regions of Ethiopia: A cross-sectional survey. PLoS One. 2020;15(9):e0239361. doi:10.1371/journal.pone.0239361
142	Dalglish SL, George A, Shearer JC, Bennett S. Epistemic communities in global health and the development of child survival policy: a case study of iCCM. Health Policy Plan. 2015;30 Suppl 2:ii12-ii25. doi:10.1093/heapol/czv043
143	Dalglish SL, Rodríguez DC, Harouna A, Surkan PJ. Knowledge and power in policy-making for child survival in Niger. Soc Sci Med. 2017;177:150-157. doi:10.1016/j.socscimed.2017.01.056
144	Dalglish SL, Straubinger S, Kavle JA, et al. Who are the real community health workers in Tshopo Province, Democratic Republic of the Congo? BMJ Glob Health. 2019;4(4):e001529. doi:10.1136/bmjgh-2019-001529
145	Dalglish SL, Surkan PJ, Diarra A, Harouna A, Bennett S. Power and pro-poor policies: the case of iCCM in Niger. Health Policy Plan. 2015;30 Suppl 2:ii84-ii94. doi:10.1093/heapol/czv064
146	Dalglish SL, Vogel JJ, Begkoyian G, et al. Future directions for reducing inequity and maximising impact of child health strategies. BMJ. 2018;362:k2684. doi:10.1136/bmj.k2684
147	Dalglish SL. Methods for the strategic review of programmes for integrated management of childhood illness and community cases. BMJ. 2018;362:k2989. doi:10.1136/bmj.k2989
148	Damien BG, Aguemon B, Abdoulaye Alfa D, et al. Low use of artemisinin-based combination therapy for febrile children under five and barriers to correct fever management in Benin: a decade after WHO recommendation. BMC Public Health. 2018;18:168. doi:10.1186/s12889-018-5077-6
149	Daniels K, Sanders D, Daviaud E, Doherty T. Valuing and Sustaining (or Not) the Ability of Volunteer Community Health Workers to Deliver Integrated Community Case Management in Northern Ghana: A Qualitative Study. PLoS One. 2015;10(6):e0126322. doi:10.1371/journal.pone.0126322
150	Das A, Friedman J, Kandpal E, et al. Strengthening malaria service delivery through supportive supervision and community mobilization in an endemic Indian setting: an evaluation of nested delivery models. Malar J. 2014;13:482. doi:10.1186/1475-2875-13-482
151	Das JK, Lassi ZS, Salam RA, Bhutta ZA. Effect of community based interventions on childhood diarrhea and pneumonia: uptake of treatment modalities and impact on mortality. BMC Public Health. 2013;13(Suppl 3):S29. doi:10.1186/1471-2458-13-S3-S29
152	Daviaud E, Besada D, Leon N, et al. Costs of implementing integrated community case management (iCCM) in six African countries: implications for sustainability. J Glob Health. 7(1):010403. doi:10.7189/jogh.07.010403
153	Davis LM, Zalisk K, Herrera S, Prosnitz D, Coelho H, Yourkavitch J. iCCM data quality: an approach to assessing iCCM reporting systems and data quality in 5 African countries. J Glob Health. 9(1):010805. doi:10.7189/jogh.09.010805
154	Davlantes E, Salomao C, Wate F, et al. Malaria case management commodity supply and use by community health workers in Mozambique, 2017. Malar J. 2019;18:47. doi:10.1186/s12936-019-2682-5

155	Dawson P, Pradhan Y, Houston R, Karki S, Poudel D, Hodgins S. From research to national expansion: 20 years' experience of community-based management of childhood pneumonia in Nepal. Bull World Health Organ. 2008;86(5):339-343. doi:10.2471/BLT.07.047688
156	de Sousa A, Tiedje KE, Recht J, Bjelic I, Hamer DH. Community case management of childhood illnesses: policy and implementation in Countdown to 2015 countries. Bull World Health Organ. 2012;90(3):183-190. doi:10.2471/BLT.11.093989
157	Debnath F, Bhatnagar T, Sundaramoorthy L, Ponnaiah M. Competency of peripheral health workers in detection & management of common syndromic conditions under surveillance, North 24 Parganas, West Bengal, India, 2016: a cross-sectional study. Glob Health Epidemiol Genom. 2017;2:e15. doi:10.1017/gheg.2017.13
158	Defar A, Alemu K, Tigabu Z, Persson LÅ, Okwaraji YB. Caregivers' and Health Extension Workers' Perceptions and Experiences of Outreach Management of Childhood Illnesses in Ethiopia: A Qualitative Study. Int J Environ Res Public Health. 2021;18(7):3816. doi:10.3390/ijerph18073816
159	Degefie Hailegebriel T, Mulligan B, Cousens S, et al. Effect on Neonatal Mortality of Newborn Infection Management at Health Posts When Referral Is Not Possible: A Cluster-Randomized Trial in Rural Ethiopia. Glob Health Sci Pract. 2017;5(2):202-216. doi:10.9745/GHSP-D-16-00312
160	Degefie T, Marsh D, Gebremariam A, Tefera W, Osborn G, Waltensperger K. Community case management improves use of treatment for childhood diarrhea, malaria and pneumonia in a remote district of Ethiopia. ETHIOPIAN JOURNAL OF HEALTH DEVELOPMENT. 2009;23(2):120-126.
161	Desta FA, Shifa GT, Dagoye DW, et al. Identifying gaps in the practices of rural health extension workers in Ethiopia: a task analysis study. BMC Health Serv Res. 2017;17:839. doi:10.1186/s12913-017-2804-0
162	Deutsch-Feldman M, Hamapumbu H, Lubinda J, et al. Efficiency of a Malaria Reactive Test-and-Treat Program in Southern Zambia: A Prospective, Observational Study. Am J Trop Med Hyg. 2018;98(5):1382-1388. doi:10.4269/ajtmh.17-0865
163	Dharmayat KI, Tran T, Hardy V, et al. Sustainability of 'mHealth' interventions in sub- Saharan Africa: a stakeholder analysis of an electronic community case management project in Malawi. Malawi Med J. 2019;31(3):177-183. doi:10.4314/mmj.v31i3.3
164	Diaz T, Aboubaker S, Young M. Current scientific evidence for integrated community case management (iCCM) in Africa: Findings from the iCCM Evidence Symposium. J Glob Health. 2014;4(2):020101. doi:10.7189/jogh.04.020101
165	Diaz T, George AS, Rao SR, et al. Healthcare seeking for diarrhoea, malaria and pneumonia among children in four poor rural districts in Sierra Leone in the context of free health care: results of a cross-sectional survey. BMC Public Health. 2013;13:157. doi:10.1186/1471-2458-13-157
166	Diaz T, Guenther T, Oliphant NP, Muñiz M. A proposed model to conduct process and outcome evaluations and implementation research of child health programs in Africa using integrated community case management as an example. J Glob Health. 2014;4(2):020409. doi:10.7189/jogh.04.020409
167	Diaz T, Rasanathan K, Meribole E, et al. Framework and strategy for integrated monitoring and evaluation of child health programmes for responsive programming, accountability, and impact. BMJ. 2018;362:k2785. doi:10.1136/bmj.k2785
168	Dick S, O'Connor Y, Thompson MJ, et al. Considerations for Improved Mobile Health Evaluation: Retrospective Qualitative Investigation. JMIR Mhealth Uhealth. 2020;8(1):e12424. doi:10.2196/12424
169	Diese M, Kalonji A, Izale B, et al. Community-based maternal, newborn, and child health surveillance: perceptions and attitudes of local stakeholders towards using mobile phone by village health volunteers in the Kenge Health Zone, Democratic Republic of Congo. BMC Public Health. 2018;18:316. doi:10.1186/s12889-018-5186-2
170	Ding W, Lu S, Xu Q, et al. Challenges of Sustaining Malaria Community Case Management in 81 Township Hospitals along the China-Myanmar Border Region - Yunnan Province, China, 2020. China CDC Wkly. 2021;3(17):355-359. doi:10.46234/ccdcw2021.097
171	Doherty T, Kerber K, Kinney M, Mason J. Approaches to Evaluate the Impact of Community-Based Delivery Strategies. Am J Trop Med Hyg. 2016;94(6):1433. doi:10.4269/ajtmh.16-0110a
172	Doherty T, Tran N, Sanders D, et al. Role of district health management teams in child health strategies. BMJ. 2018;362:k2823. doi:10.1136/bmj.k2823
173	Doherty T, Zembe W, Ngandu N, et al. Assessment of Malawi's success in child mortality reduction through the lens of the Catalytic Initiative Integrated Health Systems Strengthening programme: Retrospective evaluation. J Glob Health. 5(2):020412. doi:10.7189/jogh.05.020412
174	Downey J, McKenna AH, Mendin SF, et al. Measuring Knowledge of Community Health Workers at the Last Mile in Liberia: Feasibility and Results of Clinical Vignette Assessments. Glob Health Sci Pract. 2021;9(Suppl 1):S111-S121. doi:10.9745/GHSP-D-20-00380

175	Druetz T, Fregonese F, Bado A, et al. Abolishing Fees at Health Centers in the Context of Community Case Management of Malaria: What Effects on Treatment-Seeking Practices for Febrile Children in Rural Burkina Faso? PLoS One. 2015;10(10):e0141306. doi:10.1371/journal.pone.0141306
176	Druetz T, Kadio K, Haddad S, Kouanda S, Ridde V. Do community health workers perceive mechanisms associated with the success of community case management of malaria? A qualitative study from Burkina Faso. Soc Sci Med. 2015;124:232-240. doi:10.1016/j.socscimed.2014.11.053
177	Druetz T, Ridde V, Haddad S. The divergence between community case management of malaria and renewed calls for primary healthcare. CRITICAL PUBLIC HEALTH. 2015;25(2):165-177. doi:10.1080/09581596.2014.886761
178	Druetz T, Ridde V, Kouanda S, Ly A, Diabaté S, Haddad S. Utilization of community health workers for malaria treatment: results from a three-year panel study in the districts of Kaya and Zorgho, Burkina Faso. Malar J. 2015;14:71. doi:10.1186/s12936-015-0591-9
179	Druetz T. Integrated primary health care in low- and middle-income countries: a double challenge. BMC Med Ethics. 2018;19(Suppl 1):48. doi:10.1186/s12910-018-0288-z
180	Ebuehi OM, Adebajo S. Improving caregivers' home management of common childhood illnesses through community level interventions. J Child Health Care. 2010;14(3):225-238. doi:10.1177/1367493510364167
181	Ebuehi OM. Health care for under-fives in Ile-Ife, South-West Nigeria: Effect of the Integrated Management of Childhood Illnesses (IMCI) strategy on growth and development of under-fives. Afr J Prim Health Care Fam Med. 2009;1(1):029. doi:10.4102/phcfm.v1i1.29
182	Edward A, Ernst P, Taylor C, Becker S, Mazive E, Perry H. Examining the evidence of under-five mortality reduction in a community-based programme in Gaza, Mozambique. Trans R Soc Trop Med Hyg. 2007;101(8):814-822. doi:10.1016/j.trstmh.2007.02.025
183	English L, Miller JS, Mbusa R, et al. Erratum to: Monitoring iCCM referral systems: Bugoye Integrated Community Case Management Initiative (BIMI) in Uganda. Malar J. 2016;15:343. doi:10.1186/s12936-016-1375-6
184	English L, Miller JS, Mbusa R, et al. Monitoring iCCM referral systems: Bugoye Integrated Community Case Management Initiative (BIMI) in Uganda. Malar J. 2016;15:247. doi:10.1186/s12936-016-1300-z
185	Enhanced Management of Pneumonia in Community (EMPIC) Study Group. Community case management of chest indrawing pneumonia in children aged 2 to 59 months by community health workers: study protocol for a multi-country cluster randomized open label non-inferiority trial. Int J Clin Trials. 2020;7(2):131-141. doi:10.18203/2349-3259.ijct20201719
186	Escribano Ferrer B, Hansen KS, Gyapong M, et al. Cost-effectiveness analysis of the national implementation of integrated community case management and community-based health planning and services in Ghana for the treatment of malaria, diarrhoea and pneumonia. Malar J. 2017;16:277. doi:10.1186/s12936-017-1906-9
187	Escribano-Ferrer B, Gyapong M, Bruce J, et al. Effectiveness of two community-based strategies on disease knowledge and health behaviour regarding malaria, diarrhoea and pneumonia in Ghana. BMC Public Health. 2017;17:948. doi:10.1186/s12889-017-4964-6
188	Escribano-Ferrer B, Webster J, Gyapong M. Assessing the impact of health research on health policies: a study of the Dodowa Health Research Centre, Ghana. BMC Health Serv Res. 2017;17:435. doi:10.1186/s12913-017-2383-0
189	Fançony C, Soares Â, Lavinha J, Barros H, Brito M. Effectiveness of Nutrition and WASH/malaria educational community-based interventions in reducing anemia in children from Angola. Sci Rep. 2021;11:5603. doi:10.1038/s41598-021-85006-x
190	Feldman M, Lacey Krylova V, Farrow P, et al. Community health worker knowledge, attitudes and practices towards COVID-19: Learnings from an online cross-sectional survey using a digital health platform, UpSCALE, in Mozambique. PLoS One. 2021;16(2):e0244924. doi:10.1371/journal.pone.0244924
191	Feroz AS, Valliani K, Khwaja H, Karim S. Exploring digital health interventions to support community health workers in low-and-middle-income countries during the COVID-19 pandemic: a scoping review protocol. BMJ Open. 2021;11(9):e053871. doi:10.1136/bmjopen-2021-053871
192	Ferrer BE, Webster J, Bruce J, et al. Integrated community case management and community-based health planning and services: a cross sectional study on the effectiveness of the national implementation for the treatment of malaria, diarrhoea and pneumonia. Malar J. 2016;15:340. doi:10.1186/s12936-016-1380-9
193	Findley SE, Uwemedimo OT, Doctor HV, Green C, Adamu F, Afenyadu GY. Early results of an integrated maternal, newborn, and child health program, Northern Nigeria, 2009 to 2011. BMC Public Health. 2013;13:1034. doi:10.1186/1471-2458-13-1034
194	Ford N, Williams A, Renshaw M, Nkum J. Communication strategy for implementing community IMCI. J Health Commun. 2005;10(5):379-401. doi:10.1080/10810730591009817

195	Freeman PA, Schleiff M, Sacks E, Rassekh BM, Gupta S, Perry HB. Comprehensive review of the evidence regarding the effectiveness of community–based primary health care in improving maternal, neonatal and child health: 4. child health findings. J Glob Health. 7(1):010904. doi:10.7189/jogh.07.010904
196	Friberg IK, Walker N. Using the Lives Saved Tool as part of evaluations of community case management programs. J Glob Health. 2014;4(2):020412. doi:10.7189/jogh.04.020412
197	Funk T, Källander K, Abebe A, Alfvén T, Alvesson HM. 'I also take part in caring for the sick child': a qualitative study on fathers' roles and responsibilities in seeking care for children in Southwest Ethiopia. BMJ Open. 2020;10(8):e038932. doi:10.1136/bmjopen-2020-038932
198	Funk T, Källander K, Abebe A, Hailemariam A, Alvesson HM, Alfvén T. Management and Follow-up Practices of Children with Unclassified Fever in Rural Ethiopia: Experiences of Health Extension Workers and Caregivers. Am J Trop Med Hyg. 2018;99(5):1255-1261. doi:10.4269/ajtmh.17-0777
199	G/Selassie T, Fantahun M. In what ways can Community Integrated Management of Neonatal and Childhood Illnesses (C-IMNCI) improve child health? The Ethiopian Journal of Health Development. 2011;25(2). Accessed December 13, 2021. https://ejhd.org/index.php/ejhd/article/view/288
200	Gallalee S, Ward AV, Aye MM, et al. Factors associated with the decline of malaria in Myanmar's Ayeyarwady Region between 2013 and 2017. Sci Rep. 2021;11:20470. doi:10.1038/s41598-021-99737-4
201	Garde A, Zhou G, Raihana S, et al. Respiratory rate and pulse oximetry derived information as predictors of hospital admission in young children in Bangladesh: a prospective observational study. BMJ Open. 2016;6(8):e011094. doi:10.1136/bmjopen-2016-011094
202	Garg S, Gurung P, Dewangan M, Nanda P. Coverage of community case management for malaria through CHWs: a quantitative assessment using primary household surveys of high-burden areas in Chhattisgarh state of India. Malar J. 2020;19:213. doi:10.1186/s12936-020-03285-7
203	Gaye S, Kibler J, Ndiaye JL, et al. Proactive community case management in Senegal 2014–2016: a case study in maximizing the impact of community case management of malaria. Malar J. 2020;19:166. doi:10.1186/s12936-020-03238-0
204	Gebremedhin S, Astatkie A, Amin HM, Teshome A, Gebremariam A. Changes in care-seeking for common childhood illnesses in the context of Integrated Community Case Management (iCCM) program implementation in Benishangul Gumuz region of Ethiopia. PLoS One. 2020;15(11):e0242451. doi:10.1371/journal.pone.0242451
205	George A, Menotti EP, Rivera D, Marsh DR. Community case management in Nicaragua: lessons in fostering adoption and expanding implementation. Health Policy Plan. 2011;26(4):327-337. doi:10.1093/heapol/czq048
206	George A, Menotti EP, Rivera D, Montes I, Reyes CM, Marsh DR. Community case management of childhood illness in Nicaragua: transforming health systems in underserved rural areas. J Health Care Poor Underserved. 2009;20(4 Suppl):99-115. doi:10.1353/hpu.0.0205
207	George A, Rodríguez DC, Rasanathan K, Brandes N, Bennett S. iCCM policy analysis: strategic contributions to understanding its character, design and scale up in sub-Saharan Africa. Health Policy Plan. 2015;30 Suppl 2:ii3-ii11. doi:10.1093/heapol/czv096
208	George A, Young M, Nefdt R, et al. Community Health Workers Providing Government Community Case Management for Child Survival in Sub-Saharan Africa: Who Are They and What Are They Expected to Do? Am J Trop Med Hyg. 2012;87(5 Suppl):85-91. doi:10.4269/ajtmh.2012.11-0757
209	George AS, LeFevre AE, Schleiff M, Mancuso A, Sacks E, Sarriot E. Hubris, humility and humanity: expanding evidence approaches for improving and sustaining community health programmes. BMJ Glob Health. 2018;3(3):e000811. doi:10.1136/bmjgh-2018-000811
210	George CM, Vignola E, Ricca J, et al. Evaluation of the effectiveness of care groups in expanding population coverage of Key child survival interventions and reducing under-5 mortality: a comparative analysis using the lives saved tool (LiST). BMC Public Health. 2015;15:835. doi:10.1186/s12889-015-2187-2
211	Getachew T, Abebe SM, Yitayal M, Persson LÅ, Berhanu D. Association between a complex community intervention and quality of health extension workers' performance to correctly classify common childhood illnesses in four regions of Ethiopia. PLoS One. 2021;16(3):e0247474. doi:10.1371/journal.pone.0247474
212	Getachew T, Mekonnen S, Yitayal M, Persson LÅ, Berhanu D. Health Extension Workers' diagnostic accuracy for common childhood illnesses in four regions of Ethiopia: a cross-sectional study. Acta Paediatr. 2019;108(11):2100-2106. doi:10.1111/apa.14888
213	Ghimire M, Pradhan YV, Maskey MK. Community-based interventions for diarrhoeal diseases and acute respiratory infections in Nepal. Bull World Health Organ. 2010;88(3):216-221. doi:10.2471/BLT.09.065649

214	Gilroy KE, Callaghan-Koru JA, Cardemil CV, et al. Quality of sick child care delivered by Health Surveillance Assistants in Malawi. Health Policy Plan. 2013;28(6):573-585. doi:10.1093/heapol/czs095
215	Graham K, Sinyangwe C, Nicholas S, et al. Rational use of antibiotics by community health workers and caregivers for children with suspected pneumonia in Zambia: a cross-sectional mixed methods study. BMC Public Health. 2016;16(1):897. doi:10.1186/s12889-016-3541-8
216	Green C, Quigley P, Kureya T, et al. Use of rectal artesunate for severe malaria at the community level, Zambia. Bull World Health Organ. 2019;97(12):810-817. doi:10.2471/BLT.19.231506
217	Greenwood B, Bojang K, Tagbor H, Pagnoni F. Combining community case management and intermittent preventive treatment for malaria. Trends Parasitol. 2011;27(11):477-480. doi:10.1016/j.pt.2011.06.005
218	Guenther T, Laínez YB, Oliphant NP, et al. Routine monitoring systems for integrated community case management programs: Lessons from 18 countries in sub–Saharan Africa. J Glob Health. 2014;4(2):020301. doi:10.7189/jogh-04-020301
219	Guenther T, Sadruddin S, Chimuna T, et al. Beyond Distance: An Approach to Measure Effective Access to Case Management for Sick Children in Africa. Am J Trop Med Hyg. 2012;87(5 Suppl):77-84. doi:10.4269/ajtmh.2012.11-0747
220	Guenther T, Sadruddin S, Finnegan K, et al. Contribution of community health workers to improving access to timely and appropriate case management of childhood fever in Mozambique. J Glob Health. 7(1):010402. doi:10.7189/jogh.07.010402
221	Hailemariam S, Gebeyehu Y, Loha E, Johansson KA, Lindtjørn B. Inadequate management of pneumonia among children in South Ethiopia: findings from descriptive study. BMC Health Serv Res. 2019;19:426. doi:10.1186/s12913-019-4242-7
222	Hamainza B, Killeen GF, Kamuliwo M, Bennett A, Yukich JO. Comparison of a mobile phone-based malaria reporting system with source participant register data for capturing spatial and temporal trends in epidemiological indicators of malaria transmission collected by community health workers in rural Zambia. Malar J. 2014;13:489. doi:10.1186/1475-2875-13-489
223	Hamainza B, Moonga H, Sikaala CH, et al. Monitoring, characterization and control of chronic, symptomatic malaria infections in rural Zambia through monthly household visits by paid community health workers. Malar J. 2014;13:128. doi:10.1186/1475-2875-13-128
224	Hamer DH, Brooks ET, Semrau K, et al. Quality and safety of integrated community case management of malaria using rapid diagnostic tests and pneumonia by community health workers. Pathog Glob Health. 2012;106(1):32-39. doi:10.1179/1364859411Y.0000000042
225	Hamer DH, Marsh DR, Peterson S, Pagnoni F. Integrated Community Case Management: Next Steps in Addressing the Implementation Research Agenda. Am J Trop Med Hyg. 2012;87(5 Suppl):151-153. doi:10.4269/ajtmh.2012.12-0505
226	Hansen CL, McCormick BJJ, Azam SI, et al. Substantial and sustained reduction in under-5 mortality, diarrhea, and pneumonia in Oshikhandass, Pakistan: evidence from two longitudinal cohort studies 15 years apart. BMC Public Health. 2020;20:759. doi:10.1186/s12889-020-08847-7
227	Hardy V, Hsieh J, Chirambo B, et al. Assessing the feasibility of mobile phones for follow-up of acutely unwell children presenting to village clinics in rural northern Malawi. Malawi Med J. 2017;29(1):53-54.
228	Hardy V, O'Connor Y, Heavin C, et al. The added value of a mobile application of Community Case Management on referral, re-consultation and hospitalization rates of children aged under 5 years in two districts in Northern Malawi: study protocol for a pragmatic, stepped-wedge cluster-randomized controlled trial. Trials. 2017;18:475. doi:10.1186/s13063-017-2213-z
229	Hardy V, Thompson M, Muula AS. Evaluating mobile solutions of integrated Community Case Management (iCCM): Making the final connection. Malawi Med J. 2017;29(4):332-334. doi:10.4314/mmj.v29i4.11
230	Harkins T, Drasbek C, Arroyo J, McQuestion M. The health benefits of social mobilization: experiences with community-based Integrated Management of Childhood Illness in Chao, Peru and San Luis, Honduras. Promotion & Education. 2008;15(2):15-20. doi:10.1177/1025382308090340
231	Hasegawa A, Yasuoka J, Ly P, Nguon C, Jimba M. Integrating child health services into malaria control services of village malaria workers in remote Cambodia: service utilization and knowledge of malaria management of caregivers. Malar J. 2013;12:292. doi:10.1186/1475-2875-12-292
232	Hassen K, Aden BS, Belew D, Legesse H, Yetubie M, Pearson L. Integrated community case management of childhood illnesses: adaptations for the developing regions of Ethiopia. Ethiop Med J. 2014;52 Suppl 3:7.
233	Hazel E, Amouzou A, Park L, et al. Real-time assessments of the strength of program implementation for community case management of childhood illness: validation of a mobile phone-based method in Malawi. Am J Trop Med Hyg. 2015;92(3):660-665. doi:10.4269/ajtmh.14-0396
234	Hazel E, Bryce J. On Bathwater, Babies, and Designing Programs for Impact: Evaluations of the Integrated Community Case Management Strategy in Burkina Faso, Ethiopia, and Malawi. Am J Trop Med Hyg. 2016;94(3):568-570. doi:10.4269/ajtmh.94-3intro1

235	Hazel E, Chimbalanga E, Chimuna T, et al. Using Data to Improve Programs: Assessment of a Data Quality and Use Intervention Package for Integrated Community Case Management in Malawi. Glob Health Sci Pract. 2017;5(3):355-366. doi:10.9745/GHSP-D-17-00103
236	Hazel E, Requejo J, David J, Bryce J. Measuring coverage in MNCH: evaluation of community-based treatment of childhood illnesses through household surveys. PLoS Med. 2013;10(5):e1001384. doi:10.1371/journal.pmed.1001384
237	Healey J, Wiah SO, Horace JM, Majekodunmi DB, Duokie DS. Liberia's Community Health Assistant Program: Scale, Quality, and Resilience. Glob Health Sci Pract. 2021;9(Suppl 1):S18-S24. doi:10.9745/GHSP-D-20-00509
238	Heidkamp R, Hazel E, Nsona H, Mleme T, Jamali A, Bryce J. Measuring Implementation Strength for Integrated Community Case Management in Malawi: Results from a National Cell Phone Census. Am J Trop Med Hyg. 2015;93(4):861-868. doi:10.4269/ajtmh.14-0797
239	Heidkamp R. The National Evaluation Platform for Maternal, Newborn, and Child Health, and Nutrition: From idea to implementation. J Glob Health. 7(2):020305. doi:10.7189/jogh.07.020305
240	Helldén D, Källander K, Peterson S, Alfvén T. [Integrated Community Case Management - one piece of the puzzle to achieve the ambitious global goals for child health]. Lakartidningen. 2019;116:FHDT.
241	Higi AH, Debelew GT, Dadi LS. Perception and Experience of Health Extension Workers on Facilitators and Barriers to Maternal and Newborn Health Service Utilization in Ethiopia: A Qualitative Study. Int J Environ Res Public Health. 2021;18(19):10467. doi:10.3390/ijerph181910467
242	Hodgins S, Pullum T, Dougherty L. Understanding where parents take their sick children and why it matters: a multi-country analysis. Glob Health Sci Pract. 2013;1(3):328-356. doi:10.9745/GHSP-D-13-00023
243	Houston R, Acharya B, Poudel D, et al. Early initiation of community-based programmes in Nepal: a historic reflection. J Nepal Health Res Counc. 2012;10(21):82-87.
244	Huicho L, Dávila M, Campos M, Drasbek C, Bryce J, Victora CG. Scaling up integrated management of childhood illness to the national level: achievements and challenges in Peru. Health Policy Plan. 2005;20(1):14-24. doi:10.1093/heapol/czi002
245	Humphreys D, Kalyango JN, Alfvén T. The impact of equity factors on receipt of timely appropriate care for children with suspected malaria in eastern Uganda. BMC Public Health. 2021;21:1870. doi:10.1186/s12889-021-11908-0
246	Huque R, Ahmed F, King R, et al. Improving the quality of care of children in community clinics: an intervention and evaluation in Bangladesh. Public Health Action. 2016;6(2):77-82. doi:10.5588/pha.16.0004
247	Ide N, Hardy V, Chirambo G, et al. People Welcomed This Innovation with Two Hands: A Qualitative Report of an mHealth Intervention for Community Case Management in Malawi. Ann Glob Health. 85(1):61. doi:10.5334/aogh.919
248	Iloh GU, Ofoedu JN, Njoku PU, Amadi AN, Godswill-Uko EU. The Magnitude of Under-five Emergencies in a Resource-poor Environment of a Rural Hospital in Eastern Nigeria: Implication for Strengthening the House-hold and Community-integrated Management of Childhood Illnesses. N Am J Med Sci. 2012;4(8):344-349. doi:10.4103/1947-2714.99514
249	Jacobs M, Merson M. Introductory commentary: a strategic review of options for building on lessons learnt from IMCI and iCCM. BMJ. 2018;362:bmj.k3013. doi:10.1136/bmj.k3013
250	Jarolimova J, Baguma S, Patel P, et al. Completion of community health worker initiated patient referrals in integrated community case management in rural Uganda. Malar J. 2018;17:379. doi:10.1186/s12936-018-2525-9
251	Jegede AS, Oshiname FO, Sanou AK, et al. Assessing Acceptability of a Diagnostic and Malaria Treatment Package Delivered by Community Health Workers in Malaria-Endemic Settings of Burkina Faso, Nigeria, and Uganda. Clin Infect Dis. 2016;63(Suppl 5):S306-S311. doi:10.1093/cid/ciw630
252	Johnson AD, Thiero O, Whidden C, et al. Proactive community case management and child survival in periurban Mali. BMJ Glob Health. 2018;3(2):e000634. doi:10.1136/bmjgh-2017-000634
253	Juma PA, Owuor K, Bennett S. Integrated community case management for childhood illnesses: explaining policy resistance in Kenya. Health Policy Plan. 2015;30 Suppl 2:ii65-ii73. doi:10.1093/heapol/czv094
254	Kabakyenga J, Barigye C, Brenner J, et al. A demonstration of mobile phone deployment to support the treatment of acutely ill children under five in Bushenyi district, Uganda. Afr Health Sci. 2016;16(1):89-96. doi:10.4314/ahs.v16i1.12
255	Källander K, Alfvén T, Funk T, et al. Universal versus conditional day 3 follow-up for children with non-severe unclassified fever at the community level in Ethiopia: A cluster-randomised non-inferiority trial. PLoS Med. 2018;15(4):e1002553. doi:10.1371/journal.pmed.1002553
256	Källander K, Alfven T, Workineh AA, et al. Universal Versus Conditional Third Day Follow-Up Visit for Children With Nonsevere Unclassified Fever at the Community Level in Ethiopia: Protocol for a Cluster Randomized Noninferiority Trial. JMIR Res Protoc. 2018;7(4):e99. doi:10.2196/resprot.9780

257	Källander K, Counihan H, Cerveau T, Mbofana F. Barriers on the pathway to survival for children dying from treatable illnesses in Inhambane province, Mozambique. J Glob Health. 9(1):010809. doi:10.7189/jogh.09.010809
258	Källander K, Strachan D, Soremekun S, et al. Evaluating the effect of innovative motivation and supervision approaches on community health worker performance and retention in Uganda and Mozambique: study protocol for a randomised controlled trial. Trials. 2015;16:157. doi:10.1186/s13063-015-0657-6
259	Källander K, Tibenderana JK, Akpogheneta OJ, et al. Mobile Health (mHealth) Approaches and Lessons for Increased Performance and Retention of Community Health Workers in Low- and Middle-Income Countries: A Review. J Med Internet Res. 2013;15(1):e17. doi:10.2196/jmir.2130
260	Källander K, Ward C, Smith H, et al. Usability and acceptability of an automated respiratory rate counter to assess childhood pneumonia in Nepal. Acta Paediatr. 2020;109(6):1207-1220. doi:10.1111/apa.15108
261	Kalyango JN, Alfven T, Peterson S, Mugenyi K, Karamagi C, Rutebemberwa E. Integrated community case management of malaria and pneumonia increases prompt and appropriate treatment for pneumonia symptoms in children under five years in Eastern Uganda. Malar J. 2013;12:340. doi:10.1186/1475-2875-12-340
262	Kalyango JN, Lindstrand A, Rutebemberwa E, et al. Increased Use of Community Medicine Distributors and Rational Use of Drugs in Children Less than Five Years of Age in Uganda Caused by Integrated Community Case Management of Fever. Am J Trop Med Hyg. 2012;87(5 Suppl):36-45. doi:10.4269/ajtmh.2012.11-0733
263	Kalyango JN, Rutebemberwa E, Alfven T, Ssali S, Peterson S, Karamagi C. Performance of community health workers under integrated community case management of childhood illnesses in eastern Uganda. Malar J. 2012;11:282. doi:10.1186/1475-2875-11-282
264	Kalyango JN, Rutebemberwa E, Karamagi C, et al. High Adherence to Antimalarials and Antibiotics under Integrated Community Case Management of Illness in Children Less than Five Years in Eastern Uganda. PLoS One. 2013;8(3):e60481. doi:10.1371/journal.pone.0060481
265	Karim A, Cobos Munoz D, Mäusezahl D, de Savigny D. A systems approach to assessing complexity in health interventions: an effectiveness decay model for integrated community case management. Glob Health Action. 2020;13(1):1794106. doi:10.1080/16549716.2020.1794106
266	Karim AM, Tamire A, Medhanyie AA, Betemariam W. Changes in equity of maternal, newborn, and child health care practices in 115 districts of rural Ethiopia: implications for the health extension program. BMC Pregnancy Childbirth. 2015;15:238. doi:10.1186/s12884-015-0668-z
267	Karlyn A, Odindo S, Onyango R, et al. Testing mHealth solutions at the last mile: insights from a study of technology-assisted community health referrals in rural Kenya. Mhealth. 2020;6:43. doi:10.21037/mhealth-19-261
268	Kassam R, Collins JB, Liow E, Rasool N. Narrative review of current context of malaria and management strategies in Uganda (Part I). Acta Trop. 2015;152:252-268. doi:10.1016/j.actatropica.2015.07.028
269	Kasteng F, Settumba S, Källander K, Vassall A. Valuing the work of unpaid community health workers and exploring the incentives to volunteering in rural Africa. Health Policy Plan. 2016;31(2):205-216. doi:10.1093/heapol/czv042
270	Kavle J, Pacque M, Mbombeshayi E, et al. INTEGRATION OF PREVENTATIVE AND CURATIVE ASPECTS OF NUTRITION INTO INTEGRATED COMMUNITY CASE MANAGEMENT (ICCM) IN DEMOCRATIC REPUBLIC OF CONGO. ANNALS OF NUTRITION AND METABOLISM. 2017;71:1027-1028.
271	Kavle JA, Pacqué M, Dalglish S, et al. Strengthening nutrition services within integrated community case management (iCCM) of childhood illnesses in the Democratic Republic of Congo: Evidence to guide implementation. Matern Child Nutr. 2019;15(Suppl 1):e12725. doi:10.1111/mcn.12725
272	Kawakatsu Y, Tanaka J, Ogawa K, Ogendo K, Honda S. Community unit performance: factors associated with childhood diarrhea and appropriate treatment in Nyanza Province, Kenya. BMC Public Health. 2017;17:202. doi:10.1186/s12889-017-4107-0
273	Kayemba CN, Sengendo HN, Ssekitooleko J, et al. Introduction of Newborn Care within Integrated Community Case Management in Uganda. Am J Trop Med Hyg. 2012;87(5 Suppl):46-53. doi:10.4269/ajtmh.2012.12-0133
274	Kazembe LN, Muula AS, Appleton CC, Kleinschmidt I. Modelling the effect of malaria endemicity on spatial variations in childhood fever, diarrhoea and pneumonia in Malawi. Int J Health Geogr. 2007;6:33. doi:10.1186/1476-072X-6-33
275	Keats EC, Macharia W, Singh NS, et al. Accelerating Kenya's progress to 2030: understanding the determinants of under-five mortality from 1990 to 2015. BMJ Glob Health. 2018;3(3):e000655. doi:10.1136/bmjgh-2017-000655
276	Keitel K, D'Acremont V. Electronic clinical decision algorithms for the integrated primary care management of febrile children in low-resource settings: review of existing tools. Clin Microbiol Infect. 2018;24(8):845-855. doi:10.1016/j.cmi.2018.04.014

277 Keitel K, Kilowoko M, Kyungu E, Genton B, D'Acremont V. Performance of prediction rules and guidelines in detecting serious bacterial infections among Tanzanian febrile children. BMC Infect Dis. 2019;19:769. doi:10.1186/s12879-019-4371-y

278 Kelly JM, Osamba B, Garg RM, et al. Community Health Worker Performance in the Management of Multiple Childhood Illnesses: Siaya District, Kenya, 1997–2001. Am J Public Health. 2001;91(10):1617-1624.

279 Kema KM, Komwihangiro J, Kimaro S. Integrated community based child survival, reproductive health and water and sanitation program in Mkuranga district, Tanzania: a replicable model of good practices in community based health care. Pan Afr Med J. 2012;13(Suppl 1):11.

280 Kenny A, Gordon N, Downey J, et al. Design and implementation of a mobile health electronic data capture platform that functions in fully-disconnected settings: a pilot study in rural Liberia. BMC Med Inform Decis Mak. 2020;20:39. doi:10.1186/s12911-020-1059-6

281 Kimani-Murage EW, Pythagore H, Mwaniki E, et al. Integrated and simplified approaches to community management of acute malnutrition in rural Kenya: a cluster randomized trial protocol. BMC Public Health. 2019;19:1253. doi:10.1186/s12889-019-7497-3

282 King C, Banda M, Bar-Zeev N, et al. Care-seeking patterns amongst suspected paediatric pneumonia deaths in rural Malawi. Gates Open Res. 2021;4:178. doi:10.12688/gatesopenres.13208.2

283 King C, Boyd N, Walker I, et al. Opportunities and barriers in paediatric pulse oximetry for pneumonia in low-resource clinical settings: a qualitative evaluation from Malawi and Bangladesh. BMJ Open. 2018;8(1):e019177. doi:10.1136/bmjopen-2017-019177

284 King C, Colbourn T, Mankhambo L, et al. Non-treatment of children with community health worker-diagnosed fast-breathing pneumonia in rural Malawi: exploratory subanalysis of a prospective cohort study. BMJ Open. 2016;6(11):e011636. doi:10.1136/bmjopen-2016-011636

285 King C, McCollum ED, Mankhambo L, et al. Can We Predict Oral Antibiotic Treatment Failure in Children with Fast-Breathing Pneumonia Managed at the Community Level? A Prospective Cohort Study in Malawi. PLoS One. 2015;10(8):e0136839. doi:10.1371/journal.pone.0136839

286 King C, Nightingale R, Phiri T, et al. Non-adherence to oral antibiotics for community paediatric pneumonia treatment in Malawi – A qualitative investigation. PLoS One. 2018;13(10):e0206404. doi:10.1371/journal.pone.0206404

287 Kipp AM, Maimbolwa M, Brault MA, et al. Improving access to child health services at the community level in Zambia: a country case study on progress in child survival, 2000–2013. Health Policy Plan. 2017;32(5):603-612. doi:10.1093/heapol/czw141

288 Kitamura T, Fergusson P, Ravalomanda AN, et al. Perspectives of health care workers and village health volunteers on community-based Integrated Management of Childhood Illness in Madagascar. Heliyon. 2020;6(11):e05326. doi:10.1016/j.heliyon.2020.e05326

289 Kitutu F, Mayora C, Awor P, Birger F, Peterson S, Wamani H. Inclusion of private sector in district health systems; case study of private drug shops implementing modified Integrated Community Case Management (iCCM) strategy in Rural Uganda. BMC Health Serv Res. 2014;14(Suppl 2):P65. doi:10.1186/1472-6963-14-S2-P65

290 Kitutu FE, Kalyango JN, Mayora C, Selling KE, Peterson S, Wamani H. Integrated community case management by drug sellers influences appropriate treatment of paediatric febrile illness in South Western Uganda: a quasi-experimental study. Malar J. 2017;16:425. doi:10.1186/s12936-017-2072-9

291 Kitutu FE, Mayora C, Johansson EW, et al. Health system effects of implementing integrated community case management (iCCM) intervention in private retail drug shops in South Western Uganda: a qualitative study. BMJ Glob Health. 2017;2(Suppl 3):e000334. doi:10.1136/bmjgh-2017-000334

292 Kitutu FE, Wamani H, Selling KE, et al. Can malaria rapid diagnostic tests by drug sellers under field conditions classify children 5 years old or less with or without Plasmodium falciparum malaria? Comparison with nested PCR analysis. Malar J. 2018;17:365. doi:10.1186/s12936-018-2508-x

293 Koffi AK, Kalter HD, Kamwe MA, Black RE. Verbal/social autopsy analysis of causes and determinants of under-5 mortality in Tanzania from 2010 to 2016. J Glob Health. 10(2):020901. doi:10.7189/jogh.10.020901

294 Kok MC, Namakhoma I, Nyirenda L, et al. Health surveillance assistants as intermediates between the community and health sector in Malawi: exploring how relationships influence performance. BMC Health Serv Res. 2016;16:164. doi:10.1186/s12913-016-1402-x

295 Kok MC, Vallières F, Tulloch O, et al. Does supportive supervision enhance community health worker motivation? A mixed-methods study in four African countries. Health Policy Plan. 2018;33(9):988-998. doi:10.1093/heapol/czy082

296	Kozuki N, Ericson K, Marron B, Lainez YB, Miller NP. The resilience of integrated community case management in acute emergency: a case study from Unity State, South Sudan. J Glob Health. 8(2):020602. doi:10.7189/jogh.08.020602
297	Kozuki N, Van Boetzelaer E, Tesfai C, Zhou A. Severe acute malnutrition treatment delivered by low-literate community health workers in South Sudan: A prospective cohort study. J Glob Health. 10(1):010421. doi:10.7189/jogh.10.010421
298	Kumar S, Roy R, Dutta S. Scaling–up public sector childhood diarrhea management program: Lessons from Indian states of Gujarat, Uttar Pradesh and Bihar. J Glob Health. 5(2):020414. doi:10.7189/jogh.05.020414
299	Kyaw SS, Drake T, Thi A, et al. Malaria community health workers in Myanmar: a cost analysis. Malar J. 2016;15:41. doi:10.1186/s12936-016-1102-3
300	Laínez YB, Wittcoff A, Mohamud AI, Amendola P, Perry HB, D'Harcourt E. Insights from community case management data in six sub-Saharan African countries. Am J Trop Med Hyg. 2012;87(5 Suppl):144-150. doi:10.4269/ajtmh.2012.12-0106
301	Lake A. Special CCM Supplement in the American Journal of Tropical Medicine and Hygiene. Preface. Am J Trop Med Hyg. 2012;87(5 Suppl):1. doi:10.4269/ajtmh.2012.12-0546
302	Laktabai J, Platt A, Menya D, et al. A mobile health technology platform for quality assurance and quality improvement of malaria diagnosis by community health workers. PLoS One. 2018;13(2):e0191968. doi:10.1371/journal.pone.0191968
303	Lal S, Ndyomugenyi R, Alexander ND, et al. Health Facility Utilisation Changes during the Introduction of Community Case Management of Malaria in South Western Uganda: An Interrupted Time Series Approach. PLoS One. 2015;10(9):e0137448. doi:10.1371/journal.pone.0137448
304	Lal S, Ndyomugenyi R, Magnussen P, et al. Referral Patterns of Community Health Workers Diagnosing and Treating Malaria: Cluster-Randomized Trials in Two Areas of High- and Low-Malaria Transmission in Southwestern Uganda. Am J Trop Med Hyg. 2016;95(6):1398-1408. doi:10.4269/ajtmh.16-0598
305	Lal S, Ndyomugenyi R, Paintain L, et al. Caregivers' compliance with referral advice: evidence from two studies introducing mRDTs into community case management of malaria in Uganda. BMC Health Serv Res. 2018;18:317. doi:10.1186/s12913-018-3124-8
306	Lal S, Ndyomugenyi R, Paintain L, et al. Community health workers adherence to referral guidelines: evidence from studies introducing RDTs in two malaria transmission settings in Uganda. Malar J. 2016;15:568. doi:10.1186/s12936-016-1609-7
307	Langston A, Weiss J, Landegger J, et al. Plausible role for CHW peer support groups in increasing care-seeking in an integrated community case management project in Rwanda: a mixed methods evaluation. Glob Health Sci Pract. 2014;2(3):342-354. doi:10.9745/GHSP-D-14-00067
308	Langston A, Wittcoff A, Ngoy P, et al. Testing a simplified tool and training package to improve integrated Community Case Management in Tanganyika Province, Democratic Republic of Congo: a quasi-experimental study. J Glob Health. 9(1):010810. doi:10.7189/jogh.09.010810
309	Larsen DA, Winters A, Cheelo S, et al. Shifting the burden or expanding access to care? Assessing malaria trends following scale-up of community health worker malaria case management and reactive case detection. Malar J. 2017;16(1):441. doi:10.1186/s12936-017-2088-1
310	Larson BA, Ngoma T, Silumbe K, et al. A framework for evaluating the costs of malaria elimination interventions: an application to reactive case detection in Southern Province of Zambia, 2014. Malar J. 2016;15(1):408. doi:10.1186/s12936-016-1457-5
311	Lauria ME, Fiori KP, Jones HE, et al. Assessing the Integrated Community-Based Health Systems Strengthening initiative in northern Togo: a pragmatic effectiveness-implementation study protocol. Implement Sci. 2019;14:92. doi:10.1186/s13012-019-0921-3
312	Legesse H. National scale-up of integrated community case management in rural Ethiopia: implementation and early lessons learned. Ethiop Med J. 2014;52 Suppl 3:15-26.
313	Lim S, Yasuoka J, Poudel KC, Ly P, Nguon C, Jimba M. Promoting community knowledge and action for malaria control in rural Cambodia: potential contributions of Village Malaria Workers. BMC Res Notes. 2012;5:405. doi:10.1186/1756-0500-5-405
314	Linn AM, Ndiaye Y, Hennessee I, et al. Reduction in symptomatic malaria prevalence through proactive community treatment in rural Senegal. Trop Med Int Health. 2015;20(11):1438-1446. doi:10.1111/tmi.12564
315	Linn NYY, Kathirvel S, Das M, et al. Are village health volunteers as good as basic health staffs in providing malaria care? A country wide analysis from Myanmar, 2015. Malar J. 2018;17:242. doi:10.1186/s12936-018-2384-4
316	Linn NYY, Tripathy JP, Maung TM, et al. How are the village health volunteers deliver malaria testing and treatment services and what are the challenges they are facing? A mixed methods study in Myanmar. Trop Med Health. 2018;46:28. doi:10.1186/s41182-018-0110-0

317 Littrell M, Moukam LV, Libite R, Youmba JC, Baugh G. Narrowing the treatment gap with equitable access: mid-term outcomes of a community case management program in Cameroon. Health Policy Plan. 2013;28(7):705-716. doi:10.1093/heapol/czs110

318 Lohfeld L, Kangombe-Ngwenya T, Winters AM, et al. A qualitative review of implementer perceptions of the national community-level malaria surveillance system in Southern Province, Zambia. Malar J. 2016;15:400. doi:10.1186/s12936-016-1455-7

319 López-Ejeda N, Charle Cuellar P, Vargas A, Guerrero S. Can community health workers manage uncomplicated severe acute malnutrition? A review of operational experiences in delivering severe acute malnutrition treatment through community health platforms. Matern Child Nutr. 2018;15(2):e12719. doi:10.1111/mcn.12719

320 López-Ejeda N, Charle-Cuellar P, G. B. Alé F, Álvarez JL, Vargas A, Guerrero S. Bringing severe acute malnutrition treatment close to households through community health workers can lead to early admissions and improved discharge outcomes. PLoS One. 2020;15(2):e0227939. doi:10.1371/journal.pone.0227939

321 Lubell Y, Mills AJ, Whitty CJM, Staedke SG. An Economic Evaluation of Home Management of Malaria in Uganda: An Interactive Markov Model. PLoS One. 2010;5(8):e12439. doi:10.1371/journal.pone.0012439

322 Lubogo P, Lukyamuzi JE, Kyambadde D, Komakech AA, Kitutu FE, Mulogo EM. Cost-effectiveness analysis of integrated community case management delivery models utilizing drug sellers and community health workers for treatment of under-five febrile cases of malaria, pneumonia, diarrhoea in rural Uganda. Malar J. 2021;20:407. doi:10.1186/s12936-021-03944-3

323 Luckow PW, Kenny A, White E, et al. Implementation research on community health workers' provision of maternal and child health services in rural Liberia. Bull World Health Organ. 2017;95(2):113-120. doi:10.2471/BLT.16.175513

324 Lungu EA, Darker C, Biesma R. Determinants of healthcare seeking for childhood illnesses among caregivers of under-five children in urban slums in Malawi: a population-based cross-sectional study. BMC Pediatr. 2020;20:20. doi:10.1186/s12887-020-1913-9

325 Ma C, Gunaratnam LC, Ericson A, et al. Handheld Point-of-Care Lactate Measurement at Admission Predicts Mortality in Ugandan Children Hospitalized with Pneumonia: A Prospective Cohort Study. Am J Trop Med Hyg. 2019;100(1):37-42. doi:10.4269/ajtmh.18-0344

326 Ma Y, Sudfeld CR, Kim H, et al. Evaluating the impact of community health volunteer home visits on child diarrhea and fever in the Volta Region, Ghana: A cluster-randomized controlled trial. PLoS Med. 2019;16(6):e1002830. doi:10.1371/journal.pmed.1002830

327 Machuki JA, Aduda DSO, Omondi AB, Onono MA. Patient-level cost of home- and facility-based child pneumonia treatment in Suba Sub County, Kenya. PLoS One. 2019;14(11):e0225194. doi:10.1371/journal.pone.0225194

328 Malama A, Zulu JM, Nzala S, Kombe MM, Silumbwe A. Health research knowledge translation into policy in Zambia: policy-maker and researcher perspectives. Health Res Policy Syst. 2021;19:42. doi:10.1186/s12961-020-00650-5

329 Maleka EN, Currie P, Schneider H. Research collaboration on community health worker programmes in low-income countries: an analysis of authorship teams and networks. Glob Health Action. 2019;12(1):1606570. doi:10.1080/16549716.2019.1606570

330 Mamo D, Hazel E, Lemma I, Guenther T, Bekele A, Demeke B. Assessment of the monitoring and evaluation system for integrated community case management (ICCM) in Ethiopia: a comparison against global benchmark indicators. Ethiop Med J. 2014;52 Suppl 3:119-128.

331 Mangham-Jefferies L, Mathewos B, Russell J, Bekele A. How do health extension workers in Ethiopia allocate their time? Hum Resour Health. 2014;12:61. doi:10.1186/1478-4491-12-61

332 Manzi A, Hirschhorn LR, Sherr K, Chirwa C, Baynes C, Awoonor-Williams JK. Mentorship and coaching to support strengthening healthcare systems: lessons learned across the five Population Health Implementation and Training partnership projects in sub-Saharan Africa. BMC Health Serv Res. 2017;17(Suppl 3):831. doi:10.1186/s12913-017-2656-7

333 Marita E, Oule J, Mungai M, Thiam S, Ilako F. Capacity and readiness of civil society organisations to implement community case management of malaria in Kenya. Pan Afr Med J. 2016;25(Suppl 2):6. doi:10.11604/pamj.supp.2016.25.2.9305

334 Marita EO, Gichuki R, Watulo E, Thiam S, Karanja S. Determinants of quality in home-based management of malaria by community health volunteers in rural Kenya. J Infect Dev Ctries. 2021;15(7):897-903. doi:10.3855/jidc.13565

335 Marsh A, Munos M, Baya B, Sanon D, Gilroy K, Bryce J. Using LiST to model potential reduction in under-five mortality in Burkina Faso. BMC Public Health. 2013;13(Suppl 3):S26. doi:10.1186/1471-2458-13-S3-S26

336 Marsh DR, Gilroy KE, Van de Weerdt R, Wansi E, Qazi S. Community case management of pneumonia: at a tipping point? Bull World Health Organ. 2008;86(5):381-389. doi:10.2471/blt.07.048462

337	Marsh DR, Hamer DH, Pagnoni F, Peterson S. Introduction to a Special Supplement: Evidence for the Implementation, Effects, and Impact of the Integrated Community Case Management Strategy to Treat Childhood Infection. Am J Trop Med Hyg. 2012;87(5 Suppl):2-5. doi:10.4269/ajtmh.2012.12-0504
338	Marsh DR, Nefdt R, Hazel E. Introduction to a special supplement: delivering integrated community case management to treat childhood illness at scale in Ethiopia. Ethiop Med J. 2014;52 Suppl 3:1-6.
339	Marsh DR, Tesfaye H, Degefie T, et al. Performance of Ethiopia's health system in delivering integrated community-based case management. Ethiop Med J. 2014;52 Suppl 3:27-35.
340	Martin S, Leitão J, Muhangi D, Nuwa A, Magul D, Counihan H. Community dialogues for child health: results from a qualitative process evaluation in three countries. J Health Popul Nutr. 2017;36:29. doi:10.1186/s41043-017-0106-0
341	Maru S, Nirola I, Thapa A, et al. An integrated community health worker intervention in rural Nepal: a type 2 hybrid effectiveness-implementation study protocol. Implement Sci. 2018;13(1):53. doi:10.1186/s13012-018-0741-x
342	Mastellos N, Tran T, Dharmayat K, et al. Training community healthcare workers on the use of information and communication technologies: a randomised controlled trial of traditional versus blended learning in Malawi, Africa. BMC Med Educ. 2018;18:61. doi:10.1186/s12909-018-1175-5
343	Mathewos B, Musema Y, Bekele A, et al. Community-Based Newborn Care in Ethiopia: Implementation Strength and Lessons Learned. Ethiopian Medical Journal. 2019;(3). Accessed October 25, 2021. https://www.emjema.org/index.php/EMJ/article/view/1403
344	Matovu F, Nanyiti A, Rutebemberwa E. Household health care-seeking costs: experiences from a randomized, controlled trial of community-based malaria and pneumonia treatment among under-fives in eastern Uganda. Malar J. 2014;13:222. doi:10.1186/1475-2875-13-222
345	Matsumoto-Takahashi ELA, Tongol-Rivera P, Villacorte EA, Angluben RU, Jimba M, Kano S. Bottom-up approach to strengthen community-based malaria control strategy from community health workers' perceptions of their past, present, and future: a qualitative study in Palawan, Philippines. Trop Med Health. 2018;46:24. doi:10.1186/s41182-018-0105-x
346	Mayora C, Kitutu FE, Kandala NB, Ekirapa-Kiracho E, Peterson SS, Wamani H. Private retail drug shops: what they are, how they operate, and implications for health care delivery in rural Uganda. BMC Health Serv Res. 2018;18:532. doi:10.1186/s12913-018-3343-z
347	Mbonye AK, Awor P, Kayendeke M, Hansen KS, Magnussen P, Clarke SE. Management of Childhood Infections in Poorly Planned Urban Settlements in Kampala and Wakiso Districts of Uganda. Am J Trop Med Hyg. 2020;103(4):1681-1690. doi:10.4269/ajtmh.20-0115
348	Mbonye AK, Buregyeya E, Rutebemberwa E, et al. Treatment of Sick Children Seeking Care in the Private Health Sector in Uganda: A Cluster Randomized Trial. Am J Trop Med Hyg. 2020;102(3):658-666. doi:10.4269/ajtmh.19-0367
349	McCollum ED, King C, Deula R, et al. Pulse oximetry for children with pneumonia treated as outpatients in rural Malawi. Bull World Health Organ. 2016;94(12):893-902. doi:10.2471/BLT.16.173401
350	McCord GC, Liu A, Singh P. Deployment of community health workers across rural sub-Saharan Africa: financial considerations and operational assumptions. Bull World Health Organ. 2013;91(4):244-253B. doi:10.2471/BLT.12.109660
351	McGorman L, Marsh DR, Guenther T, et al. A Health Systems Approach to Integrated Community Case Management of Childhood Illness: Methods and Tools. Am J Trop Med Hyg. 2012;87(5 Suppl):69-76. doi:10.4269/ajtmh.2012.11-0758
352	McLean ARD, Indrasuta C, Khant ZS, et al. Mass drug administration for the acceleration of malaria elimination in a region of Myanmar with artemisinin-resistant falciparum malaria: a cluster-randomised trial. Lancet Infect Dis. Published online June 17, 2021:S1473-3099(20)30997-X. doi:10.1016/S1473-3099(20)30997-X
353	McLean ARD, Wai HP, Thu AM, et al. Malaria elimination in remote communities requires integration of malaria control activities into general health care: an observational study and interrupted time series analysis in Myanmar. BMC Med. 2018;16:183. doi:10.1186/s12916-018-1172-x
354	Memon ZA, Muhammad S, Soofi S, et al. Effect and feasibility of district level scale up of maternal, newborn and child health interventions in Pakistan: a quasi-experimental study. BMJ Open. 2020;10(7):e036293. doi:10.1136/bmjopen-2019-036293
355	Mengistu B, Karim AM, Eniyew A, et al. Effect of performance review and clinical mentoring meetings (PRCMM) on recording of community case management by health extension workers in Ethiopia. Ethiop Med J. 2014;52 Suppl 3:73-81.
356	Mengistu B, Paulos M, Agonafir N, et al. Barriers to the uptake of community-based curative child health services in Ethiopia. BMC Public Health. 2021;21:1551. doi:10.1186/s12889-021-11558-2
357	Mercader HFG, Kyomuhangi T, Buchner DL, Kabakyenga J, Brenner JL. Drugs for some but not all: inequity within community health worker teams during introduction of integrated community case management. BMC Health Serv Res. 2014;14(Suppl 1):S1. doi:10.1186/1472-6963-14-S1-S1

358	Metuge A, Omam LA, Jarman E, Njomo EO. Humanitarian led community-based surveillance: case study in Ekondo-titi, Cameroon. Confl Health. 2021;15:17. doi:10.1186/s13031-021-00354-9
359	Miller JS, English L, Matte M, et al. Quality of care in integrated community case management services in Bugoye, Uganda: a retrospective observational study. Malar J. 2018;17:99. doi:10.1186/s12936-018-2241-5
360	Miller JS, Mbusa RK, Baguma S, et al. A cross-sectional study comparing case scenarios and record review to measure quality of Integrated Community Case Management care in western Uganda. Trans R Soc Trop Med Hyg. 2021;115(6):627-633. doi:10.1093/trstmh/traa097
361	Miller JS, Mbusa RK, Baguma S, et al. Assessing Village Health Workers' Ability to Perform and Interpret Rapid Diagnostic Tests for Malaria 4 Years after Initial Training: A Cross-Sectional Study. Am J Trop Med Hyg. 2021;104(1):294-297. doi:10.4269/ajtmh.20-0747
362	Miller JS, Patel P, Mian-McCarthy S, et al. Usage of and satisfaction with Integrated Community Case Management care in western Uganda: a cross-sectional survey. Malar J. 2021;20:65. doi:10.1186/s12936-021-03601-9
363	Miller N, Degefie T, Hazel E, Legesse H, Balcha T, Amouzou A. Coverage and equitability of interventions to prevent child mortality in rural Jimma and West Hararghe Zones, Oromia Region, Ethiopia. Ethiopian medical journal. 2014;52.
364	Miller NP, Amouzou A, Hazel E, et al. Assessing the Quality of Sick Child Care Provided by Community Health Workers. PLoS One. 2015;10(11):e0142010. doi:10.1371/journal.pone.0142010
365	Miller NP, Amouzou A, Hazel E, et al. Assessment of the impact of quality improvement interventions on the quality of sick child care provided by Health Extension Workers in Ethiopia. J Glob Health. 6(2):020404. doi:10.7189/jogh.06.020404
366	Miller NP, Amouzou A, Tafesse M, et al. Integrated Community Case Management of Childhood Illness in Ethiopia: Implementation Strength and Quality of Care. Am J Trop Med Hyg. 2014;91(2):424-434. doi:10.4269/ajtmh.13-0751
367	Miller NP, Milsom P, Johnson G, et al. Community health workers during the Ebola outbreak in Guinea, Liberia, and Sierra Leone. J Glob Health. 8(2):020601. doi:10.7189/jogh-08-020601
368	Miller NP, Zunong N, Al-Sorouri TAA, Alqadasi YM, Ashraf S, Siameja C. Implementing integrated community case management during conflict in Yemen. J Glob Health. 10(2):020601. doi:10.7189/jogh.10.020601
369	Minn PW, Shewade HD, Kyaw NTT, et al. Quality of Malaria Treatment Provided under 'Better Health Together' Project in Ethnic Communities of Myanmar: How Are We Performing? Trop Med Infect Dis. 2019;4(4):140. doi:10.3390/tropicalmed4040140
370	Mir F, Ali Nathwani A, Chanar S, et al. Impact of pulse oximetry on hospital referral acceptance in children under 5 with severe pneumonia in rural Pakistan (district Jamshoro): protocol for a cluster randomised trial. BMJ Open. 2021;11(9):e046158. doi:10.1136/bmjopen-2020-046158
371	Mischlinger J, Dudek V, Ramharter M. Predictive Performance of Rapid Diagnostic Tests for Falciparum Malaria and Its Modeled Impact on Integrated Community Case Management of Malaria in Sub-Saharan African Febrile Children. Clin Infect Dis. 2021;73(5):e1158-e1167. doi:10.1093/cid/ciaa1942
372	Mischlinger J, Dudek V, Ramharter M. Predictive performance of rapid diagnostic tests for malaria and its impact on integrated community case management of malaria in Africa. TROPICAL MEDICINE & INT'L HEALTH. 2021;26:82-82.
373	Mitsunaga T, Hedt-Gauthier B, Ngizwenayo E, et al. Utilizing community health worker data for program management and evaluation: Systems for data quality assessments and baseline results from Rwanda. SOCIAL SCIENCE & MEDICINE. 2013;85:87-92. doi:10.1016/j.socscimed.2013.02.033
374	Mohanraj R, Kumar S, Jayakumar S, et al. Where do mothers take their children for pneumonia care? Findings from three Indian states. PLoS One. 2019;14(4):e0214331. doi:10.1371/journal.pone.0214331
375	Morrow M, Sarriot E, Nelson AR, et al. Applying the Community Health Worker Coverage and Capacity Tool for Time-Use Modeling for Program Planning in Rwanda and Zanzibar. Glob Health Sci Pract. 2021;9(Suppl 1):S65-S78. doi:10.9745/GHSP-D-20-00324
376	Mothabbir G, Rana S, Baqui AH, et al. Management of fast breathing pneumonia in young infants aged 7 to 59 days by community level health workers: protocol for a multi-centre cluster randomized controlled trial. Int J Clin Trials. 2020;7(2):83-93. doi:10.18203/2349-3259.ijct20201715
377	Mubi M, Janson A, Warsame M, et al. Malaria Rapid Testing by Community Health Workers Is Effective and Safe for Targeting Malaria Treatment: Randomised Cross-Over Trial in Tanzania. PLoS One. 2011;6(7):e19753. doi:10.1371/journal.pone.0019753
378	Mubiru D, Byabasheija R, Bwanika JB, et al. Evaluation of Integrated Community Case Management in Eight Districts of Central Uganda. PLoS One. 2015;10(8):e0134767. doi:10.1371/journal.pone.0134767

379 Mugeni C, Levine AC, Munyaneza RM, et al. Nationwide implementation of integrated community case management of childhood illness in Rwanda. Glob Health Sci Pract. 2014;2(3):328-341. doi:10.9745/GHSP-D-14-00080

380 Muhumuza G, Mutesi C, Mutamba F, Ampuriire P, Nangai C. Acceptability and Utilization of Community Health Workers after the Adoption of the Integrated Community Case Management Policy in Kabarole District in Uganda. Health Syst Policy Res. 2015;2(1):13.

381 Mukanga D, Babirye R, Peterson S, et al. Can lay community health workers be trained to use diagnostics to distinguish and treat malaria and pneumonia in children? Lessons from rural Uganda. TROPICAL MEDICINE & INTERNATIONAL HEALTH. 2011;16(10):1234-1242. doi:10.1111/j.1365-3156.2011.02831.x

382 Mukanga D, Tibenderana JK, Kiguli J, et al. Community acceptability of use of rapid diagnostic tests for malaria by community health workers in Uganda. Malar J. 2010;9:203. doi:10.1186/1475-2875-9-203

383 Mukanga D, Tibenderana JK, Peterson S, et al. Access, acceptability and utilization of community health workers using diagnostics for case management of fever in Ugandan children: a cross-sectional study. Malar J. 2012;11:121. doi:10.1186/1475-2875-11-121

384 Mukanga D, Tiono AB, Anyorigiya T, et al. Integrated Community Case Management of Fever in Children under Five Using Rapid Diagnostic Tests and Respiratory Rate Counting: A Multi-Country Cluster Randomized Trial. Am J Trop Med Hyg. 2012;87(5 Suppl):21-29. doi:10.4269/ajtmh.2012.11-0816

385 Mullany LC, van Boetzelaer EW, Gutman JR, et al. Universal versus conditional day 3 follow-up for children with non-severe unclassified fever at the community level in the Democratic Republic of the Congo: A cluster-randomized, community-based non-inferiority trial. PLoS Med. 2018;15(4):e1002552. doi:10.1371/journal.pmed.1002552

386 Mumuni MZ, Soghaier MA, Baba S. Zankawah K, et al. Knowledge and Skills of Mothers/Care Givers of Children Under Five Years in Communities with Home Based Management of Malaria in Tamale, Northern Region, Ghana, 2013. AIMS Public Health. 2016;3(4):923-932. doi:10.3934/publichealth.2016.4.923

387 Munos M, Guiella G, Roberton T, et al. Independent Evaluation of the Rapid Scale-Up Program to Reduce Under-Five Mortality in Burkina Faso. Am J Trop Med Hyg. 2016;94(3):584-595. doi:10.4269/ajtmh.15-0585

388 Muro F, Meta J, Renju J, et al. "It is good to take her early to the doctor" – mothers' understanding of childhood pneumonia symptoms and health care seeking in Kilimanjaro region, Tanzania. BMC Int Health Hum Rights. 2017;17:27. doi:10.1186/s12914-017-0135-1

389 Mushi AK, Massaga JJ, Mandara CI, et al. Acceptability of malaria rapid diagnostic tests administered by village health workers in Pangani District, North eastern Tanzania. Malar J. 2016;15(1):439. doi:10.1186/s12936-016-1495-z

390 Musoke D, Kitutu FE, Mugisha L, et al. A One Health Approach to Strengthening Antimicrobial Stewardship in Wakiso District, Uganda. Antibiotics (Basel). 2020;9(11):764. doi:10.3390/antibiotics9110764

391 Musoke D, Namata C, Lubega GB, et al. Access, use and disposal of antimicrobials among humans and animals in Wakiso district, Uganda: a qualitative study. J Pharm Policy Pract. 2021;14:69. doi:10.1186/s40545-021-00361-4

392 Musoke D, Ndejjo R, Atusingwize E, et al. Panacea or pitfall? The introduction of community health extension workers in Uganda. BMJ Glob Health. 2020;5(8):e002445. doi:10.1136/bmjgh-2020-002445

393 Musoke D, Ndejjo R, Atusingwize E, Mukama T, Ssemugabo C, Gibson L. Performance of community health workers and associated factors in a rural community in Wakiso district, Uganda. Afr Health Sci. 2019;19(3):2784-2797. doi:10.4314/ahs.v19i3.55

394 Musoke D, Ssemugabo C, Ndejjo R, Atusingwize E, Mukama T, Gibson L. Strengthening the community health worker programme for health improvement through enhancing training, supervision and motivation in Wakiso district, Uganda. BMC Res Notes. 2019;12:812. doi:10.1186/s13104-019-4851-6

395 Musoke D, Ssemugabo C, Ndejjo R, Ekirapa-Kiracho E, George AS. Reflecting strategic and conforming gendered experiences of community health workers using photovoice in rural Wakiso district, Uganda. Hum Resour Health. 2018;16:41. doi:10.1186/s12960-018-0306-8

396 Musoke D, Ssemugabo C, Ndejjo R, Molyneux S, Ekirapa-Kiracho E. Ethical practice in my work: community health workers' perspectives using photovoice in Wakiso district, Uganda. BMC Med Ethics. 2020;21:68. doi:10.1186/s12910-020-00505-2

397 Mutsigiri-Murewanhema F, Mafaune PT, Shambira G, et al. Factors associated with severe malaria among children below ten years in Mutasa and Nyanga districts, Zimbabwe, 2014-2015. Pan Afr Med J. 2017;27:23. doi:10.11604/pamj.2017.27.23.10957

398 Mvumbi PM, Musau J, Faye O, Situakibanza H, Okitolonda E. Adherence to the referral advice after introduction of rectal artesunate for pre-referral treatment of severe malaria at the community level: a noninferiority trial in the Democratic Republic of the Congo. Malar J. 2019;18:438. doi:10.1186/s12936-019-3074-6

399 Mwandama D, Mwale C, Bauleni A, et al. Clinical outcomes among febrile children aged 2 to 59 months with negative malaria rapid diagnostic test results in Mchinji District, Malawi. Malawi Med J. 2016;28(4):150-153.

400 Nagel CL, Kirby MA, Zambrano LD, et al. Study design of a cluster-randomized controlled trial to evaluate a large-scale distribution of cook stoves and water filters in Western Province, Rwanda. Contemp Clin Trials Commun. 2016;4:124-135. doi:10.1016/j.conctc.2016.07.003

401 Najjemba R, Kiapi L, Demissie SD, et al. Integrated community case management: quality of care and adherence to medication in Beneshangul-Gumuz Region, Ethiopia. Ethiop Med J. 2014;52 Suppl 3:83-90.

402 Nanyonjo A, Bagorogoza B, Kasteng F, et al. Estimating the cost of referral and willingness to pay for referral to higher-level health facilities: a case series study from an integrated community case management programme in Uganda. BMC Health Serv Res. 2015;15:347. doi:10.1186/s12913-015-1019-5

403 Nanyonjo A, Counihan H, Siduda SG, Belay K, Sebikaari G, Tibenderana J. Institutionalization of integrated community case management into national health systems in low- and middle-income countries: a scoping review of the literature. Glob Health Action. 2019;12(1):1678283. doi:10.1080/16549716.2019.1678283

404 Nanyonjo A, Kertho E, Tibenderana J, Källander K. District Health Teams' Readiness to Institutionalize Integrated Community Case Management in the Uganda Local Health Systems: A Repeated Qualitative Study. Glob Health Sci Pract. 2020;8(2):190-204. doi:10.9745/GHSP-D-19-00318

405 Nanyonjo A, Makumbi F, Etou P, Tomson G, Källander K. Perceived Quality of Care for Common Childhood Illnesses: Facility versus Community Based Providers in Uganda. PLoS One. 2013;8(11):e79943. doi:10.1371/journal.pone.0079943

406 Nanyonjo A, Nakirunda M, Makumbi F, Tomson G, Källander K. Community Acceptability and Adoption of Integrated Community Case Management in Uganda. Am J Trop Med Hyg. 2012;87(5 Suppl):97-104. doi:10.4269/ajtmh.2012.11-0763

407 Nanyonjo A, Ssekitooleko J, Counihan H, Makumbi F, Tomson G, Källander K. Impact of an integrated community case management programme on uptake of appropriate diarrhoea and pneumonia treatments in Uganda: A propensity score matching and equity analysis study. Int J Equity Health. 2015;14:74. doi:10.1186/s12939-015-0202-y

408 Napier HG, Baird M, Wong E, et al. Evaluating Vertical Malaria Community Health Worker Programs as Malaria Declines: Learning From Program Evaluations in Honduras and Lao PDR. Glob Health Sci Pract. 2021;9(Suppl 1):S98-S110. doi:10.9745/GHSP-D-20-00379

409 Ndiaye JLA, Ndiaye Y, Ba MS, et al. Seasonal malaria chemoprevention combined with community case management of malaria in children under 10 years of age, over 5 months, in south-east Senegal: A cluster-randomised trial. PLoS Med. 2019;16(3):e1002762. doi:10.1371/journal.pmed.1002762

410 Ndiaye Y, Ndiaye JLA, Cisse B, et al. Community case management in malaria: review and perspectives after four years of operational experience in Saraya district, south-east Senegal. Malar J. 2013;12:240. doi:10.1186/1475-2875-12-240

411 Ndima SD, Sidat M, Give C, Ormel H, Kok MC, Taegtmeyer M. Supervision of community health workers in Mozambique: a qualitative study of factors influencing motivation and programme implementation. Hum Resour Health. 2015;13:63. doi:10.1186/s12960-015-0063-x

412 Ndong IC, Okyere D, Enos JY, et al. Challenges and perceptions of implementing mass testing, treatment and tracking in malaria control: a qualitative study in Pakro sub-district of Ghana. BMC Public Health. 2019;19:695. doi:10.1186/s12889-019-7037-1

413 Ndyomugyenyi R, Magnussen P, Lal S, Hansen K, Clarke SE. Appropriate targeting of artemisinin-based combination therapy by community health workers using malaria rapid diagnostic tests: findings from randomized trials in two contrasting areas of high and low malaria transmission in south-western Uganda. Trop Med Int Health. 2016;21(9):1157-1170. doi:10.1111/tmi.12748

414 Nefdt R, Marsh DR, Hazel E. Conclusions: delivering integrated community case management (ICCM) to treat childhood illness at scale in Ethiopia. Ethiop Med J. 2014;52 Suppl 3:163-167.

415 Nefdt R, Ribaira E, Diallo K. Costing commodity and human resource needs for integrated community case management in thie differing community health strategies of Ethiopia, Kenya and Zambia. Ethiop Med J. 2014;52 Suppl 3:137-149.

416 Ngilangwa DP, Mgomella GS. Factors associated with retention of community health workers in maternal, newborn and child health programme in Simiyu Region, Tanzania. Afr J Prim Health Care Fam Med. 2018;10(1):1506. doi:10.4102/phcfm.v10i1.1506

417 Niessen LW, ten Hove A, Hilderink H, Weber M, Mulholland K, Ezzati M. Comparative impact assessment of child pneumonia interventions. Bull World Health Organ. 2009;87(6):472-480. doi:10.2471/blt.08.050872

418 Nigatu A, Homa G, Getachew D, et al. Can training health extension workers in the integrated pharmaceutical logistics system (IPLS) be effective, affordable, and opportunistic? Ethiop Med J. 2014;52 Suppl 3:11.

419	Nightingale R, Colbourn T, Mukanga D, et al. Non-adherence to community oral-antibiotic treatment in children with fast-breathing pneumonia in Malawi– secondary analysis of a prospective cohort study. Pneumonia (Nathan). 2016;8:21. doi:10.1186/s41479-016-0024-8
420	Nigussie ZY, Zemicheal NF, Tiruneh GT, et al. Using mHealth to Improve Timeliness and Quality of Maternal and Newborn Health in the Primary Health Care System in Ethiopia. Glob Health Sci Pract. 2021;9(3):668-681. doi:10.9745/GHSP-D-20-00685
421	Niyibitegeka F, Riewpaiboon A, Sangroongruangsri S. Cost-Effectiveness Analysis of Community Case Management of Childhood Diarrhea in Burundi. Value Health Reg Issues. 2021;25:157-164. doi:10.1016/j.vhri.2021.03.005
422	Nkonki L LL, Chola L L, Tugendhaft A A, Hofman K K. Modelling the cost of community interventions to reduce child mortality in South Africa using the Lives Saved Tool (LiST). BMJ Open. 2017;7(8):e011425. doi:10.1136/bmjopen-2016-011425
423	Nsabagasani X, Jesca-Nsungwa-Sabiiti, Källander K, Peterson S, Pariyo G, Tomson G. Home-based management of fever in rural Uganda: community perceptions and provider opinions. Malar J. 2007;6:11. doi:10.1186/1475-2875-6-11
424	Nsabagasani X, Ogwal-Okeng J, Hansen EH, Mbonye A, Muyinda H, Ssengooba F. 'Better medicines for children' within the Integrated Management of Childhood Illness framework: a qualitative inquiry in Uganda. J Pharm Policy Pract. 2016;9:22. doi:10.1186/s40545-016-0071-9
425	Nsabagasani X, Ogwal-Okeng J, Mbonye A, et al. The "child size medicines" concept: policy provisions in Uganda. J Pharm Policy Pract. 2015;8(1):2. doi:10.1186/s40545-015-0025-7
426	Nsibande D, Loveday M, Daniels K, Sanders D, Doherty T, Zembe W. Approaches and strategies used in the training and supervision of Health Extension Workers (HEWs) delivering integrated community case management (iCCM) of childhood illness in Ethiopia: a qualitative rapid appraisal. Afr Health Sci. 2018;18(1):188-197. doi:10.4314/ahs.v18i1.24
427	Nsona H, Mtimuni A, Daelmans B, et al. Scaling Up Integrated Community Case Management of Childhood Illness: Update from Malawi. Am J Trop Med Hyg. 2012;87(5 Suppl):54-60. doi:10.4269/ajtmh.2012.11-0759
428	Ntamabyaliro NY, Burri C, Lula YN, et al. Knowledge of Antimalarials and Health Seeking Behaviour of Households in Case of Suspected Malaria in Democratic Republic of the Congo. Trop Med Infect Dis. 2021;6(3):157. doi:10.3390/tropicalmed6030157
429	Ntopi S, Chirwa E, Maluwa A. Relationship between role stressors, job tasks and job satisfaction among health surveillance assistants in Malawi: a cross-sectional study. BMJ Open. 2020;10(11):e037000. doi:10.1136/bmjopen-2020-037000
430	Nyangara FM, Hai T, Zalisk K, et al. Assessment of data quality and reporting systems for underserved populations: the case of integrated community case management programs in Nigeria. Health Policy Plan. 2018;33(4):465-473. doi:10.1093/heapol/czy003
431	Nyunt MH, Aye KM, Kyaw KT, et al. Challenges encountered by local health volunteers in early diagnosis and prompt treatment of malaria in Myanmar artemisinin resistance containment zones. Malar J. 2016;15:308. doi:10.1186/s12936-016-1368-5
432	O'Connor Y, Ryan D, Hardy V, et al. Stakeholders perspectives on paper-based and electronic clinical decision support systems in Malawi Africa. JOURNAL OF DECISION SYSTEMS. 2016;25:410-420. doi:10.1080/12460125.2016.1187400
433	O'Donovan J, Kabali K, Taylor C, et al. The use of low-cost Android tablets to train community health workers in Mukono, Uganda, in the recognition, treatment and prevention of pneumonia in children under five: a pilot randomised controlled trial. Hum Resour Health. 2018;16:49. doi:10.1186/s12960-018-0315-7
434	Odaga J, Henriksson DK, Nkolo C, et al. Empowering districts to target priorities for improving child health service in Uganda using change management and rapid assessment methods. Glob Health Action. 2016;9:10.3402/gha.v9.30983. doi:10.3402/gha.v9.30983
435	Ogundele OA, Ogundele T. Analysis of the Effect of Health Education Activities on Selected Child Health Determinants in Two Communities of Ile Ife, Nigeria. Ethiop J Health Sci. 2018;28(2):217-226. doi:10.4314/ejhs.v28i2.13
436	Ohnmar, Tun-Min, San-Shwe, Than-Win, Chongsuvivatwong V. Effects of malaria volunteer training on coverage and timeliness of diagnosis: a cluster randomized controlled trial in Myanmar. Malar J. 2012;11:309. doi:10.1186/1475-2875-11-309
437	Okafor CE, Ekwunife OI, Nduaguba SO. Promoting the integrated community case management of pneumonia in children under 5 years in Nigeria through the proprietary and patent medicine vendors: a cost-effectiveness analysis. Cost Eff Resour Alloc. 2021;19:12. doi:10.1186/s12962-021-00265-9
438	Okebe J, Ribera JM, Balen J, et al. Reactive community-based self-administered treatment against residual malaria transmission: study protocol for a randomized controlled trial. Trials. 2018;19:126. doi:10.1186/s13063-018-2506-x

439 Okwaraji YB, Hill Z, Defar A, et al. Implementation of the 'Optimising the Health Extension Program' Intervention in Ethiopia: A Process Evaluation Using Mixed Methods. Int J Environ Res Public Health. 2020;17(16):5803. doi:10.3390/ijerph17165803

440 Oliphant NP, Muñiz M, Guenther T, et al. Multi–country analysis of routine data from integrated community case management (iCCM) programs in sub–Saharan Africa. J Glob Health. 2014;4(2):020408. doi:10.7189/jogh.04.020408

441 Oliphant NP, Ray N, Bensaid K, et al. Optimising geographical accessibility to primary health care: a geospatial analysis of community health posts and community health workers in Niger. BMJ Glob Health. 2021;6(6):e005238. doi:10.1136/bmjgh-2021-005238

442 Olsen M, Norheim OF, Memirie ST. Reducing regional health inequality: a sub-national distributional cost-effectiveness analysis of community-based treatment of childhood pneumonia in Ethiopia. Int J Equity Health. 2021;20:9. doi:10.1186/s12939-020-01328-8

443 Olson CK, Blum LS, Patel KN, et al. Community case management of childhood diarrhea in a setting with declining use of oral rehydration therapy: findings from cross-sectional studies among primary household caregivers, Kenya, 2007. Am J Trop Med Hyg. 2011;85(6):1134-1140. doi:10.4269/ajtmh.2011.11-0178

444 Onono M, Abdi M, Mutai K, et al. Community case management of lower chest indrawing pneumonia with oral amoxicillin in children in Kenya. Acta Paediatr. 2018;107 Suppl 471:44-52. doi:10.1111/apa.14405

445 Onono M, Abdi M, Opondo I, et al. Using the RE-AIM framework to evaluate the implementation of integrated community case management in Kenya. Acta Paediatr. 2018;107 Suppl 471:53-62. doi:10.1111/apa.14662

446 Onyango D, Kikuvi G, Amukoye E, Omolo J. Risk factors of severe pneumonia among children aged 2-59 months in western Kenya: a case control study. Pan Afr Med J. 2012;13:45.

447 Oo WH, Thi A, Htike W, et al. Evaluation of the effectiveness and cost effectiveness of a Community-delivered Integrated Malaria Elimination (CIME) model in Myanmar: protocol for an open stepped-wedge cluster-randomised controlled trial. BMJ Open. 2021;11(8):e050400. doi:10.1136/bmjopen-2021-050400

448 Oresanya O, Counihan H, Nndaliman I, et al. Effect of community-based intervention on improving access to treatment for sick under-five children in hard-to-reach communities in Niger State, Nigeria. J Glob Health. 9(1):010803. doi:10.7189/jogh.09.010803

449 Orji BC, Rao N, Thompson E, Brieger WR, 'Dipo Otolorin E. Community health workers provide integrated community case management using malaria rapid diagnostic test kits. Res Social Adm Pharm. 2017;13(4):875-879. doi:10.1016/j.sapharm.2016.09.006

450 Othero DM, Orago ASS, Groenewegen T, Kaseje DO, Otengah PA. Home management of diarrhea among underfives in a rural community in Kenya: household perceptions and practices. East Afr J Public Health. 2008;5(3):142-146. doi:10.4314/eajph.v5i3.38992

451 Owek CJ, Oluoch E, Wachira J, Estambale B, Afrane YA. Community perceptions and attitudes on malaria case management and the role of community health workers. Malar J. 2017;16(1):272. doi:10.1186/s12936-017-1916-7

452 Oyeyemi AS, Oladepo O, Adeyemi AO, Titiloye MA, Burnett SM, Apera I. The potential role of patent and proprietary medicine vendors' associations in improving the quality of services in Nigeria's drug shops. BMC Health Serv Res. 2020;20:567. doi:10.1186/s12913-020-05379-z

453 Palazuelos D, Ellis K, DaEun Im D, et al. 5-SPICE: the application of an original framework for community health worker program design, quality improvement and research agenda setting. Glob Health Action. 2013;6:10.3402/gha.v6i0.19658. doi:10.3402/gha.v6i0.19658

454 Pasquale H, Jarvese M, Julla A, et al. Malaria control in South Sudan, 2006–2013: strategies, progress and challenges. Malar J. 2013;12:374. doi:10.1186/1475-2875-12-374

455 Patel S, Zambruni JP, Palazuelos D, et al. Rethinking the scale up of Integrated Management of Childhood Illness. BMJ. 2018;362:k2993. doi:10.1136/bmj.k2993

456 Paz-Soldan VA, Morrison AC, Sopheab H, et al. Potential Use of Community-Based Rapid Diagnostic Tests for Febrile Illnesses: Formative Research in Peru and Cambodia. PLoS Negl Trop Dis. 2019;13(10):e0007773. doi:10.1371/journal.pntd.0007773

457 Pearson L, Degefie T, Hiluf M, et al. From integrated community case management to community-based newborn care. Ethiop Med J. 2014;52 Suppl 3:9.

458 Pearson L, Hazel E, Tam Y. Modeling potential reduction of child mortality after national scale-up of community-based treatment of childhood illnesses in Ethiopia. Ethiop Med J. 2014;52 Suppl 3:129-136.

459 Perez F, Ba H, Dastagire SG, Altmann M. The role of community health workers in improving child health programmes in Mali. BMC Int Health Hum Rights. 2009;9:28. doi:10.1186/1472-698X-9-28

460 Perin J, Kim JS, Hazel E, Park L, Heidkamp R, Zeger S. Hierarchical Statistical Models to Represent and Visualize Survey Evidence for Program Evaluation: iCCM in Malawi. PLoS One. 2016;11(12):e0168778. doi:10.1371/journal.pone.0168778

461 Perry H, Morrow M, Borger S, et al. Care Groups I: An Innovative Community-Based Strategy for Improving Maternal, Neonatal, and Child Health in Resource-Constrained Settings. Glob Health Sci Pract. 2015;3(3):358-369. doi:10.9745/GHSP-D-15-00051

462 Phiri TB, Kaunda-Khangamwa BN, Bauleni A, et al. Feasibility, acceptability and impact of integrating malaria rapid diagnostic tests and pre-referral rectal artesunate into the integrated community case management programme. A pilot study in Mchinji district, Malawi. Malar J. 2016;15:177. doi:10.1186/s12936-016-1237-2

463 Pitt C, Roberts B, Checchi F. Treating childhood pneumonia in hard-to-reach areas: A model-based comparison of mobile clinics and community-based care. BMC Health Serv Res. 2012;12:9. doi:10.1186/1472-6963-12-9

464 Pratt A, Dale M, Olivi E, Miller J. Spatial distribution and deployment of community–based distributors implementing integrated community case management (iCCM): Geographic information system (GIS) mapping study in three South Sudan states. J Glob Health. 2014;4(2):020402. doi:10.7189/jogh.04.020402

465 Priyanka, Acharya AS. Is community case management of severe pneumonia with oral amoxicillin feasible in India? Natl Med J India. 2012;25(6):352-353.

466 Prosnitz D, Herrera S, Coelho H, Moonzwe Davis L, Zalisk K, Yourkavitch J. Evidence of Impact: iCCM as a strategy to save lives of children under five. J Glob Health. 9(1):010801. doi:10.7189/jogh.09.010801

467 Prost A, Sanders D, Costello A, et al. Strengthening the capabilities of families and communities to improve child health in low and middle income countries. BMJ. 2018;362:bmj.k2649. doi:10.1136/bmj.k2649

468 Prudhomme O'Meara W, Menya D, Laktabai J, et al. Improving rational use of ACTs through diagnosis-dependent subsidies: Evidence from a cluster-randomized controlled trial in western Kenya. PLoS Med. 2018;15(7):e1002607. doi:10.1371/journal.pmed.1002607

469 Puett C, Alderman H, Sadler K, Coates J. "Sometimes they fail to keep their faith in us": community health worker perceptions of structural barriers to quality of care and community utilisation of services in Bangladesh. Matern Child Nutr. 2015;11(4):1011-1022. doi:10.1111/mcn.12072

470 Puett C, Coates J, Alderman H, Sadler K. Quality of care for severe acute malnutrition delivered by community health workers in southern Bangladesh. Matern Child Nutr. 2012;9(1):130-142. doi:10.1111/j.1740-8709.2012.00409.x

471 Puett C, Coates J, Alderman H, Sadruddin S, Sadler K. Does greater workload lead to reduced quality of preventive and curative care among community health workers in Bangladesh? Food Nutr Bull. 2012;33(4):273-287. doi:10.1177/156482651203300408

472 Rabarijaona LP, Randrianarivelojosia M, Raharimalala LA, et al. Longitudinal survey of malaria morbidity over 10 years in Saharevo (Madagascar): further lessons for strengthening malaria control Malar J.2009;8:190. doi:10.1186/1475-2875-8-190

473 Rabbani F, Mukhi AAA, Perveen S, et al. Improving community case management of diarrhoea and pneumonia in district Badin, Pakistan through a cluster randomised study--the NIGRAAN trial protocol. Implement Sci. 2014;9:186. doi:10.1186/s13012-014-0186-9

474 Rabbani F, Perveen S, Aftab W, Zahidie A, Sangrasi K, Qazi SA. Health workers' perspectives, knowledge and skills regarding community case management of childhood diarrhoea and pneumonia: a qualitative inquiry for an implementation research project "Nigraan" in District Badin, Sindh, Pakistan. BMC Health Serv Res. 2016;16(1):462. doi:10.1186/s12913-016-1699-5

475 Rabbani F, Shipton L, Aftab W, Sangrasi K, Perveen S, Zahidie A. Inspiring health worker motivation with supportive supervision: a survey of lady health supervisor motivating factors in rural Pakistan. BMC Health Serv Res. 2016;16:397. doi:10.1186/s12913-016-1641-x

476 Rahimi A, Kassam R, Dang Z, Sekiwunga R. Challenges with accessing health care for young children presumed to have malaria in the rural district of Butaleja, Uganda: a qualitative study. Pharm Pract (Granada). 2019;17(4):1622. doi:10.18549/PharmPract.2019.4.1622

477 Raihana S, Dunsmuir D, Huda T, et al. Development and Internal Validation of a Predictive Model Including Pulse Oximetry for Hospitalization of Under-Five Children in Bangladesh. PLoS One. 2015;10(11):e0143213. doi:10.1371/journal.pone.0143213

478 Ramsey K, Hingora A, Kante M, et al. The Tanzania Connect Project: a cluster-randomized trial of the child survival impact of adding paid community health workers to an existing facility-focused health system. BMC Health Serv Res. 2013;13(Suppl 2):S6. doi:10.1186/1472-6963-13-S2-S6

479 Ranasinghe S, Ansumana R, Lamin JM, et al. Attitudes toward home-based malaria testing in rural and urban Sierra Leone. Malar J. 2015;14:80. doi:10.1186/s12936-015-0582-x

480 Rao V, Schellenberg D, Ghani A. Overcoming health systems barriers to successful malaria treatment. TRENDS IN PARASITOLOGY. 2013;29(4):164-180. doi:10.1016/j.pt.2013.01.005

481 Rasanathan K, Bakshi S, Rodriguez DC, et al. Where to from here? Policy and financing of integrated community case management (iCCM) of childhood illness in sub–Saharan Africa. J Glob Health. 2014;4(2):020304. doi:10.7189/jogh.04.020304

482 Rasanathan K, Muñiz M, Bakshi S, et al. Community case management of childhood illness in sub–Saharan Africa – findings from a cross–sectional survey on policy and implementation. J Glob Health. 2014;4(2):020401. doi:10.7189/jogh.04.020401

483 Rasanathan K. Policy analysis--important for improving iCCM implementation; essential for success of global health efforts. Health Policy Plan. 2015;30 Suppl 2:ii1-ii2. doi:10.1093/heapol/czv097

484 Ratnayake R, Ratto J, Hardy C, et al. The Effects of an Integrated Community Case Management Strategy on the Appropriate Treatment of Children and Child Mortality in Kono District, Sierra Leone: A Program Evaluation. Am J Trop Med Hyg. 2017;97(3):964-973. doi:10.4269/ajtmh.17-0040

485 Ratsimbasoa A, Ravony H, Vonimpaisomihanta JA, et al. Management of uncomplicated malaria in febrile under five-year-old children by community health workers in Madagascar: reliability of malaria rapid diagnostic tests. Malar J. 2012;11:85. doi:10.1186/1475-2875-11-85

486 Raven J, Akweongo P, Baba A, et al. Using a human resource management approach to support community health workers: experiences from five African countries. Hum Resour Health. 2015;13:45. doi:10.1186/s12960-015-0034-2

487 Raven J, Wurie H, Idriss A, et al. How should community health workers in fragile contexts be supported: qualitative evidence from Sierra Leone, Liberia and Democratic Republic of Congo. Hum Resour Health. 2020;18:58. doi:10.1186/s12960-020-00494-8

488 Razakamanana M, Audibert M, Andrianantoandro V, Harimanana A. IMPACT AND EFFICIENCY OF THE INTEGRATION OF DIAGNOSIS AND TREATMENT OF PNEUMONIA IN THE COMMUNITY MANAGEMENT OF MALARIA IN MADAGASCAR. REVUE ECONOMIQUE. 2020;71(1):5-30.

489 Ricca J, Prosnitz D, Perry H, et al. Comparing estimates of child mortality reduction modelled in LiST with pregnancy history survey data for a community-based NGO project in Mozambique. BMC Public Health. 2011;11(Suppl 3):S35. doi:10.1186/1471-2458-11-S3-S35

490 Rivera D, Shah R, Guenther T, et al. Integrated community case management (iCCM) of childhood infection saves lives in hard-to-reach communities in Nicaragua. Rev Panam Salud Publica. 2017;41:e66. doi:10.26633/RPSP.2017.66

491 Roberton T, Kasungami D, Guenther T, Hazel E. Monitoring iCCM: a feasibility study of the indicator guide for monitoring and evaluating integrated community case management. Health Policy Plan. 2016;31(6):759-766. doi:10.1093/heapol/czv129

492 Robinson E, Crispino V, Ouabo A, et al. Mortality and health survey, Walikale, Democratic Republic of the Congo, 2017: an example of the use of survey data for humanitarian program planning. Confl Health. 2019;13:56. doi:10.1186/s13031-019-0232-y

493 Rockers PC, Fink G, Zanolini A, et al. Impact of a community-based package of interventions on child development in Zambia: a cluster-randomised controlled trial. BMJ Glob Health. 2016;1(3):e000104. doi:10.1136/bmjgh-2016-000104

494 Roder-DeWan S, Gupta N, Kagabo DM, et al. Four delays of child mortality in Rwanda: a mixed methods analysis of verbal social autopsies. BMJ Open. 2019;9(5):e027435. doi:10.1136/bmjopen-2018-027435

495 Rodríguez DC, Banda H, Namakhoma I. Integrated community case management in Malawi: an analysis of innovation and institutional characteristics for policy adoption. Health Policy Plan. 2015;30 Suppl 2:ii74-ii83. doi:10.1093/heapol/czv063

496 Rodríguez DC, Shearer J, Mariano AR, Juma PA, Dalglish SL, Bennett S. Evidence-informed policymaking in practice: country-level examples of use of evidence for iCCM policy. Health Policy Plan. 2015;30(Suppl 2):ii36-ii45. doi:10.1093/heapol/czv033

497 Rogers E, Ali M, Fazal S, et al. Quality of care of treatment for uncomplicated severe acute malnutrition provided by lady health workers in Pakistan. PUBLIC HEALTH NUTRITION. 2018;21(2):385-390. doi:10.1017/S1368980017002610

498 Rogers E, Martínez K, Morán JLA, et al. Cost-effectiveness of the treatment of uncomplicated severe acute malnutrition by community health workers compared to treatment provided at an outpatient facility in rural Mali. Hum Resour Health. 2018;16:12. doi:10.1186/s12960-018-0273-0

499 Ruckstuhl L, Lengeler C, Moyen JM, Garro H, Allan R. Malaria case management by community health workers in the Central African Republic from 2009–2014: overcoming challenges of access and instability due to conflict. Malar J. 2017;16:388. doi:10.1186/s12936-017-2005-7

500 Ruizendaal E, Schallig HDFH, Scott S, et al. Evaluation of Malaria Screening during Pregnancy with Rapid Diagnostic Tests Performed by Community Health Workers in Burkina Faso. Am J Trop Med Hyg. 2017;97(4):1190-1197. doi:10.4269/ajtmh.17-0138

501 Rutebemberwa E, Kadobera D, Katureebe S, Kalyango JN, Mworozi E, Pariyo G. Use of Community Health Workers for Management of Malaria and Pneumonia in Urban and Rural Areas in Eastern Uganda. Am J Trop Med Hyg. 2012;87(5 Suppl):30-35. doi:10.4269/ajtmh.2012.11-0732

502 Rutebemberwa E, Mpeka B, Pariyo G, et al. High prevalence of antibiotic resistance in nasopharyngeal bacterial isolates from healthy children in rural Uganda: A cross-sectional study. Ups J Med Sci. 2015;120(4):249-256. doi:10.3109/03009734.2015.1072606

503 Rutta ASM, Francis F, Mmbando BP, et al. Using community-owned resource persons to provide early diagnosis and treatment and estimate malaria burden at community level in north-eastern Tanzania. Malar J. 2012;11:152. doi:10.1186/1475-2875-11-152

504 Rwabukwisi FC, Bawah AA, Gimbel S, Phillips JF, Mutale W, Drobac P. Health system strengthening: a qualitative evaluation of implementation experience and lessons learned across five African countries. BMC Health Serv Res. 2017;17(Suppl 3):826. doi:10.1186/s12913-017-2662-9

505 Sabot K, Blanchet K, Berhanu D, Spicer N, Schellenberg J. Professional advice for primary healthcare workers in Ethiopia: a social network analysis. BMC Health Serv Res. 2020;20:551. doi:10.1186/s12913-020-05367-3

506 Sadruddin S, Khan I ul H, Bari A, Khan A, Ahmad I, Qazi SA. Effect of community mobilization on appropriate care seeking for pneumonia in Haripur, Pakistan. J Glob Health. 5(1):010405. doi:10.7189/jogh.05.010405

507 Sadruddin S, Khan I ul H, Fox MP, et al. Comparison of 3 Days Amoxicillin Versus 5 Days Co-Trimoxazole for Treatment of Fast-breathing Pneumonia by Community Health Workers in Children Aged 2–59 Months in Pakistan: A Cluster-randomized Trial. Clin Infect Dis. 2019;69(3):397-404. doi:10.1093/cid/ciy918

508 Sadruddin S, Pagnoni F, Baugh G. Lessons from the integrated community case management (iCCM) Rapid Access Expansion Program. J Glob Health. 9(2):020101. doi:10.7189/jogh.09.020101

509 Sadruddin S, Shehzad S, Bari A, et al. Household Costs for Treatment of Severe Pneumonia in Pakistan. Am J Trop Med Hyg. 2012;87(5 Suppl):137-143. doi:10.4269/ajtmh.2012.12-0242

510 Salam RA, Das JK, Bhutta ZA. Integrating nutrition into health systems: What the evidence advocates. Matern Child Nutr. 2019;15(Suppl 1):e12738. doi:10.1111/mcn.12738

511 Samuel S, Arba A. Utilization of Integrated Community Case Management Service and Associated Factors Among Mothers/Caregivers Who Have Sick Eligible Children in Southern Ethiopia. Risk Manag Healthc Policy. 2021;14:431-438. doi:10.2147/RMHP.S278231

512 Saran I, Winn L, Kipkoech Kirui J, Menya D, Prudhomme O'Meara W. The relative importance of material and non-material incentives for community health workers: Evidence from a discrete choice experiment in Western Kenya. Soc Sci Med. 2020;246:112726. doi:10.1016/j.socscimed.2019.112726

513 Sarriot E, Morrow M, Langston A, Weiss J, Landegger J, Tsuma L. A causal loop analysis of the sustainability of integrated community case management in Rwanda. Soc Sci Med. 2015;131:147-155. doi:10.1016/j.socscimed.2015.03.014

514 Savy M, Briaux J, Seye M, Douti MP, Perrotin G, Martin-Prevel Y. Tailoring Process and Impact Evaluation of a "Cash-Plus" Program: The Value of Using a Participatory Program Impact Pathway Analysis. Curr Dev Nutr. 2020;4(7):nzaa099. doi:10.1093/cdn/nzaa099

515 Schneider H, Okello D, Lehmann U. The global pendulum swing towards community health workers in low- and middle-income countries: a scoping review of trends, geographical distribution and programmatic orientations, 2005 to 2014. Hum Resour Health. 2016;14:65. doi:10.1186/s12960-016-0163-2

516 Schurer JM, Fowler K, Rafferty E, et al. Equity for health delivery: Opportunity costs and benefits among Community Health Workers in Rwanda. PLoS One. 2020;15(9):e0236255. doi:10.1371/journal.pone.0236255

517 Schwarz D, Kim JH, Ratcliffe H, et al. The status of Ghanaian community health workers' supervision and service delivery: descriptive analyses from the 2017 Performance Monitoring and Accountability 2020 survey. Gates Open Res. 2019;3:1468. doi:10.12688/gatesopenres.12979.3

518 Seidenberg PD, Hamer DH, Iyer H, et al. Impact of Integrated Community Case Management on Health-Seeking Behavior in Rural Zambia. Am J Trop Med Hyg. 2012;87(5 Suppl):105-110. doi:10.4269/ajtmh.2012.11-0799

519 Semu Y, Tekle E, Bekele A, et al. Making Community Based Newborn Care Sustainable in Ethiopia. Ethiopian Medical Journal. 2019;(3). Accessed October 25, 2021. https://www.emjema.org/index.php/EMJ/article/view/1404

520 Setiawan A, Dawson A. Strengthening the primary care workforce to deliver community case management for child health in rural Indonesia. Aust Health Rev. 2018;42(5):536-541. doi:10.1071/AH17092

521 Shah R, Miller NP, Mothabbir G. Approaches to support continued iCCM implementation during a flooding emergency in rural Bangladesh. J Glob Health. 9(2):021001. doi:10.7189/jogh.09.021001

522	Sharkey AB, Martin S, Cerveau T, Wetzler E, Berzal R. Demand generation and social mobilisation for integrated community case management (iCCM) and child health: Lessons learned from successful programmes in Niger and Mozambique. J Glob Health. 2014;4(2):020410. doi:10.7189/jogh.04.020410
523	Shaw B, Amouzou A, Miller NP, Bryce J, Surkan PJ. A qualitative exploration of care-seeking pathways for sick children in the rural Oromia region of Ethiopia. BMC Health Serv Res. 2017;17:184. doi:10.1186/s12913-017-2123-5
524	Shaw B, Amouzou A, Miller NP, et al. Determinants of Utilization of Health Extension Workers in the Context of Scale-Up of Integrated Community Case Management of Childhood Illnesses in Ethiopia. Am J Trop Med Hyg. 2015;93(3):636-647. doi:10.4269/ajtmh.14-0660
525	Shaw B, Amouzou A, Miller NP, Tafesse M, Bryce J, Surkan PJ. Access to integrated community case management of childhood illnesses services in rural Ethiopia: a qualitative study of the perspectives and experiences of caregivers. Health Policy Plan. 2016;31(5):656-666. doi:10.1093/heapol/czv115
526	Shaw BI, Asadhi E, Owuor K, et al. Perceived Quality of Care of Community Health Worker and Facility-Based Health Worker Management of Pneumonia in Children Under 5 Years in Western Kenya: A Cross-Sectional Multidimensional Study. Am J Trop Med Hyg. 2016;94(5):1170-1176. doi:10.4269/ajtmh.15-0784
527	Shearer JC, Abelson J, Kouyaté B, Lavis JN, Walt G. Why do policies change? Institutions, interests, ideas and networks in three cases of policy reform. Health Policy Plan. 2016;31(9):1200-1211. doi:10.1093/heapol/czw052
528	Shearer JC, Dion M, Lavis JN. Exchanging and using research evidence in health policy networks: a statistical network analysis. Implement Sci. 2014;9:126. doi:10.1186/s13012-014-0126-8
529	Shearer JC. Policy entrepreneurs and structural influence in integrated community case management policymaking in Burkina Faso. Health Policy Plan. 2015;30(Suppl 2):ii46-ii53. doi:10.1093/heapol/czv044
530	Shieshia M, Noel M, Andersson S, et al. Strengthening community health supply chain performance through an integrated approach: Using mHealth technology and multilevel teams in Malawi. J Glob Health. 2014;4(2):020406. doi:10.7189/jogh.04.020406
531	Shiroya-Wandabwa M, Kabue M, Kasungami D, et al. Coaching Community Health Volunteers in Integrated Community Case Management Improves the Care of Sick Children Under-5: Experience from Bondo, Kenya. Int J Integr Care. 18(4):5. doi:10.5334/ijic.3971
532	Siekmans K, Sohani S, Boima T, Koffa F, Basil L, Laaziz S. Community-based health care is an essential component of a resilient health system: evidence from Ebola outbreak in Liberia. BMC Public Health. 2017;17:84. doi:10.1186/s12889-016-4012-y
533	Siekmans K, Sohani S, Kisia J, et al. Community case management of malaria: a pro-poor intervention in rural Kenya. Int Health. 2013;5(3):196-204. doi:10.1093/inthealth/iht017
534	Sileshi L. Integrated management of childhood illness: a review of the Ethiopian experience and prospects for child health. Ethiopian Medical Journal. Published online 2002. Accessed December 13, 2021. https://read.qxmd.com/read/12240581/integrated-management-of-childhood-illness-a-review-of-the-ethiopian-experience-and-prospects-for-child-health
535	Simba DO, Kakoko D, Nyamhanga T, Mrango Z, Mujinja P. Improving prompt access to malaria diagnostics and treatment in rural remote areas using financial benefit for community health workers in Kilosa district, Tanzania. Res Rep Trop Med. 2018;9:137-146. doi:10.2147/RRTM.S172944
536	Simen-Kapeu A, Lewycka S, Ibe O, et al. Strengthening the community health program in Liberia: Lessons learned from a health system approach to inform program design and better prepare for future shocks. J Glob Health. 11:07002. doi:10.7189/jogh.11.07002
537	Simões EAF. Community case management of severe pneumonia. Lancet. 2012;379(9827):1703; author reply 1703-1704. doi:10.1016/S0140-6736(12)60717-X
538	Singlovic J, Ajayi IO, Nsungwa-Sabiiti J, et al. Compliance With Malaria Rapid Diagnostic Testing by Community Health Workers in 3 Malaria-Endemic Countries of Sub-Saharan Africa: An Observational Study. Clin Infect Dis. 2016;63(Suppl 5):S276-S282. doi:10.1093/cid/ciw626
539	Sinyangwe C, Graham K, Nicholas S, et al. Assessing the Quality of Care for Pneumonia in Integrated Community Case Management: A Cross-Sectional Mixed Methods Study. PLoS One. 2016;11(3):e0152204. doi:10.1371/journal.pone.0152204
540	Siribié M, Ajayi IO, Nsungwa-Sabiiti J, et al. Training Community Health Workers to Manage Uncomplicated and Severe Malaria: Experience From 3 Rural Malaria-Endemic Areas in Sub-Saharan Africa. Clin Infect Dis. 2016;63(Suppl 5):S264-S269. doi:10.1093/cid/ciw624

541	Siribié M, Diarra A, Tiono AB, Soulama I, Sirima SB. [Effect of a large scale community-based distribution of artemether-lumefantrine on its therapeutic efficacy among children living in a rural area of Burkina Faso]. Bull Soc Pathol Exot. 2015;108(2):120-123. doi:10.1007/s13149-015-0420-y
542	Siribié M, Diarra A, Tiono AB, Soulama I, Sirima SB. [Efficacy of artemether-lumefantrine in the treatment of uncomplicated malaria in children living in a rural area of Burkina Faso in 2009]. Bull Soc Pathol Exot. 2012;105(3):202-207. doi:10.1007/s13149-012-0209-6
543	SIRIBIE M, Tchouatieu AM, Soulama I, et al. Protocol for a quasi-experimental study to assess the feasibility, acceptability and costs of multiple first-lines artemisinin-based combination therapies for uncomplicated malaria in the Kaya health district, Burkina Faso. BMJ Open. 2021;11(2):e040220. doi:10.1136/bmjopen-2020-040220
544	Sivhaga K, Hlabano B, Odhiambo PO. Using partnership approach to reduce mortality and morbidity among children under five in Limpopo province, South Africa. Pan Afr Med J. 2012;13(Suppl 1):14.
545	Smith S, Deveridge A, Berman J, et al. Task-shifting and prioritization: a situational analysis examining the role and experiences of community health workers in Malawi. Hum Resour Health. 2014;12:24. doi:10.1186/1478-4491-12-24
546	Soofi S, Ahmed S, Fox MP, et al. Effectiveness of community case management of severe pneumonia with oral amoxicillin in children aged 2-59 months in Matiari district, rural Pakistan: a cluster-randomised controlled trial. Lancet. 2012;379(9817):729-737. doi:10.1016/S0140-6736(11)61714-5
547	Soremekun S, Kasteng F, Lingam R, et al. Variation in the quality and out-of-pocket cost of treatment for childhood malaria, diarrhoea, and pneumonia: Community and facility based care in rural Uganda. PLoS One. 2018;13(11):e0200543. doi:10.1371/journal.pone.0200543
548	Spence H, Baker K, Wharton-Smith A, et al. Childhood pneumonia diagnostics: community health workers' and national stakeholders' differing perspectives of new and existing aids. Glob Health Action. 2017;10(1):1290340. doi:10.1080/16549716.2017.1290340
549	Sreeramareddy CT, Shankar RP, Sreekumaran BV, Subba SH, Joshi HS, Ramachandran U. Care seeking behaviour for childhood illness--a questionnaire survey in western Nepal. BMC Int Healt Hum Rights.2006;6:7. doi:10.1186/1472-698X-6-7
550	Stellenberg E, Van Zyl M, Eygelaar J. Knowledge of community care workers about key family practices in a rural community in South Africa. Afr J Prim Health Care Fam Med. 2015;7(1):892. doi:10.4102/phcfm.v7i1.892
551	Story WT, Pritchard S, Hejna E, Olivas E, Sarriot E. The role of integrated community case management projects in strengthening health systems: case study analysis in Ethiopia, Malawi and Mozambique. Health Policy Plan. 2021;36(6):900-912. doi:10.1093/heapol/czaa177
552	Strachan C, Wharton–Smith A, Sinyangwe C, et al. Integrated community case management of malaria, pneumonia and diarrhoea across three African countries: A qualitative study exploring lessons learnt and implications for further scale up. J Glob Health. 2014;4(2):020404. doi:10.7189/jogh.04.020404
553	Strachan CE, Nuwa A, Muhangi D, Okui AP, Helinski MEH, Tibenderana JK. Community understanding of the concept of pre-referral treatment and how this impacts on referral related decision-making following the provision of rectal artesunate: a qualitative study in western Uganda. BMC Health Serv Res. 2018;18:470. doi:10.1186/s12913-018-3209-4
554	Strachan DL, Källander K, Nakirunda M, Ndima S, Muiambo A, Hill Z. Using theory and formative research to design interventions to improve community health worker motivation, retention and performance in Mozambique and Uganda. Hum Resour Health. 2015;13:25. doi:10.1186/s12960-015-0020-8
555	Strachan DL, Källander K, ten Asbroek AHA, et al. Interventions to Improve Motivation and Retention of Community Health Workers Delivering Integrated Community Case Management (iCCM): Stakeholder Perceptions and Priorities. Am J Trop Med Hyg. 2012;87(5 Suppl):111-119. doi:10.4269/ajtmh.2012.12-0030
556	Swana EK, Makan GY, Mukeng CK, et al. Feasibility and implementation of community-based malaria case management with integrated vector control in the Democratic Republic of Congo. Malar J. 2016;15:413. doi:10.1186/s12936-016-1475-3
557	Tadesse L, Sylla M, Pearson L, Tam Y, Tariku A, Avan B. Modeling the Potential Reduction of Newborn Mortality with National Scaling up of Community-based Newborn Care in Ethiopia. Ethiopian Medical Journal. 2019;(3). Accessed October 25, 2021. https://www.emjema.org/index.php/EMJ/article/view/1402
558	Tadesse Y, Eniyew A, Mengistu B, Eniyew A, Marsh DR. Utilization of integrated community case management services in three regions in Ethiopia after two years of implementation. Ethiop Med J. 2014;52 Suppl 3:47-55.
559	Tagbor H, Antwi GD, Acheampong PR, Bart Plange C, Chandramohan D, Cairns M. Seasonal malaria chemoprevention in an area of extended seasonal transmission in Ashanti, Ghana: an individually randomised clinical trial. Trop Med Int Health. 2016;21(2):224-235. doi:10.1111/tmi.12642

560	Tamiru D, Berhanu M, Dagne T, et al. Quality of integrated community case management services at public health posts, Southwest Ethiopia. J Pediatr Nurs. 2021;57:32-37. doi:10.1016/j.pedn.2020.11.003
561	Taneja S, Dalpath S, Bhandari N, et al. Operationalising integrated community case management of childhood illnesses by community health workers in rural Haryana. Acta Paediatr. 2018;107 Suppl 471:80-88. doi:10.1111/apa.14428
562	Tani K, Exavery A, Baynes CD, et al. Unit cost analysis of training and deploying paid community health workers in three rural districts of Tanzania. BMC Health Serv Res. 2016;16:237. doi:10.1186/s12913-016-1476-5
563	Tariku A, Okwaraji YB, Worku A, Biks GA, Åke Persson L, Berhane Y. Prevention and treatment of suspected pneumonia in Ethiopian children less than five years from household to primary care. Acta Paediatr. 2021;110(2):602-610. doi:10.1111/apa.15380
564	Taylor C, Griffiths F, Lilford R. Affordability of comprehensive community health worker programmes in rural sub-Saharan Africa. BMJ Glob Health. 2017;2(3):e000391. doi:10.1136/bmjgh-2017-000391
565	Taylor CA, Lilford RJ, Wroe E, Griffiths F, Ngechu R. The predictive validity of the Living Goods selection tools for community health workers in Kenya: cohort study. BMC Health Serv Res. 2018;18:803. doi:10.1186/s12913-018-3620-x
566	Tefera W, Tesfaye H, Bekele A, Kayessa E, Waltensperger KZ, Marsh DR. Factors influencing the low utilization of curative child health services in Shebedino District, Sidama Zone, Ethiopia. Ethiop Med J. 2014;52 Suppl 3:109-117.
567	Teferi E, Alemu H, Bulto T, Ali I, Teno D. A descriptive study of the changes in coverage of preventive and promotive interventions before and after the introduction of integrated community case management (ICCM) in Ethiopia. Ethiop Med J. 2014;52 Suppl 3:151-155.
568	Teferi E, Teno D, Ali I, Alemu H, Bulto T. Quality and use of IMNCI services at health center under-five clinics after introduction of integrated community-based case management (ICCM) in three regions of Ethiopia. Ethiop Med J. 2014;52 Suppl 3:91-98.
569	Thiha Y, Zin T, Win KM, Soe MT, Aung PL. Performance of Malaria Volunteers regarding Malaria Control Activities in Southeastern Myanmar: A Study in the Areas under Coverage of an Ethnic Health Organization. J Trop Med. 2021;2021:6642260. doi:10.1155/2021/6642260
570	Thompson ME, Harutyunyan TL. Impact of a community-based integrated management of childhood illnesses (IMCI) programme in Gegharkunik, Armenia. Health Policy Plan. 2009;24(2):101-107. doi:10.1093/heapol/czn048
571	Thomson A, Khogali M, de Smet M, et al. Low referral completion of rapid diagnostic test-negative patients in community-based treatment of malaria in Sierra Leone. Malar J. 2011;10:94. doi:10.1186/1475-2875-10-94
572	Thondoo M, Strachan DL, Nakirunda M, et al. Potential Roles of Mhealth for Community Health Workers: Formative Research With End Users in Uganda and Mozambique. JMIR Mhealth Uhealth. 2015;3(3):e76. doi:10.2196/mhealth.4208
573	Tiffany A, Moundekeno FP, Traoré A, et al. Encouraging impact following 2.5 years of reinforced malaria control interventions in a hyperendemic region of the Republic of Guinea. Malar J. 2016;15:298. doi:10.1186/s12936-016-1353-z
574	Tine RCK, Ndiaye P, Ndour CT, et al. Acceptability by community health workers in Senegal of combining community case management of malaria and seasonal malaria chemoprevention. Malar J. 2013;12:467. doi:10.1186/1475-2875-12-467
575	Tiono AB, Diarra A, Sanon S, et al. Erratum to: Low Specificity of a Malaria Rapid Diagnostic Test During an Integrated Community Case Management Trial. Infect Dis Ther. 2013;2(2):227. doi:10.1007/s40121-013-0017-3
576	Tiono AB, Diarra A, Sanon S, et al. Low Specificity of a Malaria Rapid Diagnostic Test During an Integrated Community Case Management Trial. Infect Dis Ther. 2013;2(1):27-36. doi:10.1007/s40121-013-0006-6
577	Treleaven E, Liu J, Prach LM, Isiguzo C. Management of paediatric illnesses by patent and proprietary medicine vendors in Nigeria. Malar J. 2015;14:232. doi:10.1186/s12936-015-0747-7
578	Tuhebwe D, Tumushabe E, Leontsini E, Wanyenze RK. Pneumonia among children under five in Uganda: symptom recognition and actions taken by caretakers. Afr Health Sci. 2014;14(4):993-1000. doi:10.4314/ahs.v14i4.31
579	Tumusiime DK, Agaba G, Kyomuhangi T, Finch J, Kabakyenga J, MacLeod S. Introduction of mobile phones for use by volunteer community health workers in support of integrated community case management in Bushenyi District, Uganda: development and implementation process. BMC Health Serv Res. 2014;14(Suppl 1):S2. doi:10.1186/1472-6963-14-S1-S2
580	van Boetzelaer E, Ho LS, Gutman JR, et al. Universal versus conditional three-day follow up visit for children with uncomplicated fever at the community level: design of a cluster-randomized, community-based, non-inferiority trial in Tanganyika, Democratic Republic of Congo. BMC Pediatr. 2017;17:36. doi:10.1186/s12887-017-0792-1
581	Van Boetzelaer E, Zhou A, Tesfai C, Kozuki N. Performance of low-literate community health workers treating severe acute malnutrition in South Sudan. Matern Child Nutr. 2019;15(Suppl 1):e12716. doi:10.1111/mcn.12716

582 Waiswa P, Namazzi G, Kerber K, Peterson S. Designing for action: adapting and implementing a community-based newborn care package to affect national change in Uganda. Glob Health Action. 2015;8:10.3402/gha.v8.24250. doi:10.3402/gha.v8.24250

583 Waiswa P. Institutionalization of Projects Into Districts in Low- and Middle-Income Countries Needs Stewardship, Autonomy, and Resources. Glob Health Sci Pract. 2020;8(2):144-146. doi:10.9745/GHSP-D-20-00170

584 Walker CLF, Taneja S, LeFevre A, Black RE, Mazumder S. Appropriate Management of Acute Diarrhea in Children Among Public and Private Providers in Gujarat, India: A Cross-Sectional Survey. Glob Health Sci Pract. 2015;3(2):230-241. doi:10.9745/GHSP-D-14-00209

585 Wanduru P, Tetui M, Tuhebwe D, et al. The performance of community health workers in the management of multiple childhood infectious diseases in Lira, northern Uganda – a mixed methods cross-sectional study. Glob Health Action. 2016;9:10.3402/gha.v9.33194. doi:10.3402/gha.v9.33194

586 Wang W, MacDonald VM, Paudel M, Banke KK. National Scale-up of Zinc Promotion in Nepal: Results from a Post-project Population-based Survey. J Health Popul Nutr. 2011;29(3):207-217.

587 Ward C, Baker K, Marks S, et al. Determining the Agreement Between an Automated Respiratory Rate Counter and a Reference Standard for Detecting Symptoms of Pneumonia in Children: Protocol for a Cross-Sectional Study in Ethiopia. JMIR Res Protoc. 2020;9(4):e16531. doi:10.2196/16531

588 Ward C, Baker K, Smith H, et al. Usability and acceptability of an automated respiratory rate counter to assess children for symptoms of pneumonia: A cross-sectional study in Ethiopia. Acta Paediatr. 2020;109(6):1196-1206. doi:10.1111/apa.15074

589 Warsame M, Gyapong M, Mpeka B, et al. Pre-referral Rectal Artesunate Treatment by Community-Based Treatment Providers in Ghana, Guinea-Bissau, Tanzania, and Uganda (Study 18): A Cluster-Randomized Trial. Clin Infect Dis. 2016;63(Suppl 5):S312-S321. doi:10.1093/cid/ciw631

590 Warsame M, Kimbute O, Machinda Z, et al. Recognition, Perceptions and Treatment Practices for Severe Malaria in Rural Tanzania: Implications for Accessing Rectal Artesunate as a Pre-Referral. PLoS One. 2007;2(1):e149. doi:10.1371/journal.pone.0000149

591 Waters D, Theodoratou E, Campbell H, Rudan I, Chopra M. Optimizing community case management strategies to achieve equitable reduction of childhood pneumonia mortality: An application of Equitable Impact Sensitive Tool (EQUIST) in five low- and middle-income countries. J Glob Health. 2012;2(2):020402. doi:10.7189/jogh.02.020402

592 Wazny K, Sadruddin S, Zipursky A, et al. Setting global research priorities for integrated community case management (iCCM): Results from a CHNRI (Child Health and Nutrition Research Initiative) exercise. J Glob Health. 2014;4(2):020413. doi:10.7189/jogh.04.020413

593 Weiss J, Makonnen R, Sula D. Shifting management of a community volunteer system for improved child health outcomes: results from an operations research study in Burundi. BMC Health Serv Res. 2015;15(Supl 1)doi:10.1186/1472-6963-15-S1-S2

594 Whidden C, Kayentao K, Liu JX, et al. Improving Community Health Worker performance by using a personalised feedback dashboard for supervision: a randomised controlled trial. J Glob Health. 8(2):020418. doi:10.7189/jogh.08.020418

595 Whidden C, Treleaven E, Liu J, et al. Proactive community case management and child survival: protocol for a cluster randomised controlled trial. BMJ Open. 2019;9(8):e027487. doi:10.1136/bmjopen-2018-027487

596 White EE, Downey J, Sathananthan V, et al. A Community Health Worker Intervention to Increase Childhood Disease Treatment Coverage in Rural Liberia: A Controlled Before-and-After Evaluation. Am J Public Health. 2018;108(9):1252-1259. doi:10.2105/AJPH.2018.304555

597 Win Han Oo, Hoban E, Gold L, et al. Community demand for comprehensive primary health care from malaria volunteers in South-East Myanmar: a qualitative study. Malar J. 2021;20:19. doi:10.1186/s12936-020-03555-4

598 Win Han Oo, Hoban E, Gold L, et al. Optimizing Myanmar's community-delivered malaria volunteer model: a qualitative study of stakeholders' perspectives. Malar J. 2021;20:79. doi:10.1186/s12936-021-03612-6

599 Winch PJ, Leban K, Casazza L, Walker L, Pearcy K. An implementation framework for household and community integrated management of childhood illness. Health Policy Plan. 2002;17(4):345-353. doi:10.1093/heapol/17.4.345

600 Winn LK, Lesser A, Menya D, et al. Motivation and satisfaction among community health workers administering rapid diagnostic tests for malaria in Western Kenya. J Glob Health. 8(1):010401. doi:10.7189/jogh.08.010401

601 Winskill P, Hogan AB, Thwing J, Mwandigha L, Walker PGT, Lambert B. Health inequities and clustering of fever, acute respiratory infection, diarrhoea and wasting in children under five in low- and middle-income countries: a Demographic and Health Surveys analysis. BMC Med. 2021;19:144. doi:10.1186/s12916-021-02018-0

602 Winskill P, Mousa A, Oresanya O, Counihan H, Okell LC, Walker PG. Does integrated community case management (iCCM) target health inequities and treatment delays? Evidence from an analysis of Demographic and Health Surveys data from 21 countries in the period 2010 to 2018. J Glob Health. 11:04013. doi:10.7189/jogh.11.04013

603 Wirth JP, Matji J, Woodruff BA, et al. Scale up of nutrition and health programs in Ethiopia and their overlap with reductions in child stunting. Matern Child Nutr. 2016;13(2):e12318. doi:10.1111/mcn.12318

604 Wogi A, Teno D, Bulto T, Deressa W, Alemu H, Nigussie M. Effect of integrated community case management of common childhood illnesses on the quality of malaria case management provided by health extension workers at health posts. Ethiop Med J. 2014;52 Suppl 3:99-108.

605 Yansaneh AI, George AS, Sharkey A, et al. Determinants of Utilization and Community Experiences with Community Health Volunteers for Treatment of Childhood Illnesses in Rural Sierra Leone. J Community Health. 2016;41(2):376-386. doi:10.1007/s10900-015-0107-0

606 Yansaneh AI, Moulton LH, George AS, et al. Influence of community health volunteers on care seeking and treatment coverage for common childhood illnesses in the context of free health care in rural Sierra Leone. Trop Med Int Health. 2014;19(12):1466-1476. doi:10.1111/tmi.12383

607 Yasuoka J, Jimba M, Levins R. Application of loop analysis for evaluation of malaria control interventions. Malar J. 2014;13:140. doi:10.1186/1475-2875-13-140

608 Yeboah-Antwi K, Pilingana P, Macleod WB, et al. Community case management of fever due to malaria and pneumonia in children under five in Zambia: a cluster randomized controlled trial. PLoS Med. 2010;7(9):e1000340. doi:10.1371/journal.pmed.1000340

609 Yeboah-Antwi K, Snetro-Plewman G, Waltensperger KZ, et al. Measuring teamwork and taskwork of community-based "teams" delivering life-saving health interventions in rural Zambia: a qualitative study. BMC Med Res Methodol. 2013;13:84. doi:10.1186/1471-2288-13-84

610 Yohannes S, Habtu Y, Abreham B, Ayele M. Utilization of Integrated Community Case Management and Its Factors in Southern Ethiopia: Facility Based-Cross-Sectional Study. ADVANCES IN PUBLIC HEALTH. 2021;2021. doi:10.1155/2021/8835804

611 Young M, Sharkey A, Aboubaker S, Kasungami D, Swedberg E, Ross K. The way forward for integrated community case management programmes: A summary of lessons learned to date and future priorities. J Glob Health. 2014;4(2):020303. doi:10.7189/jogh.04.020303

612 Young M, Wolfheim C, Marsh DR, Hammamy D. World Health Organization/United Nations Children's Fund Joint Statement on Integrated Community Case Management: An Equity-Focused Strategy to Improve Access to Essential Treatment Services for Children. Am J Trop Med Hyg. 2012;87(5 Suppl):6-10. doi:10.4269/ajtmh.2012.12-0221

613 Yourkavitch J, Davis LM, Hobson R, et al. Integrated community case management: planning for sustainability in five African countries. J Glob Health. 9(1):010802. doi:10.7189/jogh.09.010802

614 Yourkavitch J, Prosnitz D, Herrera S. Data quality assessments stimulate improvements to health management information systems: evidence from five African countries. J Glob Health. 9(1):010806. doi:10.7189/jogh.09.010806

615 Yourkavitch J, Zalisk K, Prosnitz D, Luhanga M, Nsona H. How do we know? An assessment of integrated community case management data quality in four districts of Malawi. Health Policy Plan. 2016;31(9):1162-1171. doi:10.1093/heapol/czw047

616 Yukich JO, Scott C, Silumbe K, et al. Cost-Effectiveness of Focal Mass Drug Administration and Mass Drug Administration with Dihydroartemisinin–Piperaquine for Malaria Prevention in Southern Province, Zambia: Results of a Community-Randomized Controlled Trial. Am J Trop Med Hyg. 2020;103(2 Suppl):46-53. doi:10.4269/ajtmh.19-0661

617 Zaidi S, Kazi AM, Riaz A, et al. Operability, Usefulness, and Task-Technology Fit of an mHealth App for Delivering Primary Health Care Services by Community Health Workers in Underserved Areas of Pakistan and Afghanistan: Qualitative Study. J Med Internet Res. 2020;22(9):e18414. doi:10.2196/18414

618 Zakus D, Moussa M, Ezechiel M, et al. Clinical evaluation of the use of an mhealth intervention on quality of care provided by Community Health Workers in southwest Niger. J Glob Health. 9(1):010812. doi:10.7189/jogh.09.010812

619 Zalisk K, Guenther T, Prosnitz D, Nsona H, Chimbalanga E, Sadruddin S. Achievements and challenges of implementation in a mature iCCM programme: Malawi case study. J Glob Health. 9(1):010807. doi:10.7189/jogh.09.010807

620 Zembe-Mkabile WZ, Jackson D, Sanders D, et al. The 'community' in community case management of childhood illnesses in Malawi. Glob Health Action. 2016;9:10.3402/gha.v9.29177. doi:10.3402/gha.v9.29177

621 Zhang S, Incardona B, Qazi SA, Stenberg K, Campbell H, Nair H. Cost–effectiveness analysis of revised WHO guidelines for management of childhood pneumonia in 74 Countdown countries. Journal of Global Health. 2017;7(1):010409. doi:10.7189/jogh.07.010409

622	Zhang S, Sammon PM, King I, et al. Cost of management of severe pneumonia in young children: systematic analysis. J Glob Health. 6(1):010408. doi:10.7189/jogh.06.010408
623	Zipursky A, Wazny K, Black R, et al. Global action plan for childhood diarrhoea: Developing research priorities. J Glob Health. 2013;3(1):010406. doi:10.7189/jogh.03.010406
624	Zulu JM, Hurtig AK, Kinsman J, Michelo C. Innovation in health service delivery: integrating community health assistants into the health system at district level in Zambia. BMC Health Serv Res. 2015;15:38. doi:10.1186/s12913-015-0696-4
625	Zulu JM, Kinsman J, Michelo C, Hurtig AK. Hope and despair: community health assistants' experiences of working in a rural district in Zambia. Human Resources for Health. 2014;12(1):30. doi:10.1186/1478-4491-12-30

SUPPLEMENTARY APPENDIX 2

Table S2. iCCM Systems Framework

Domains, Categories, Definitions, and Critical Questions

Domain 1: Systems Context

Domain No.	Domain	Category No.	Category	Description	Critical Questions
1	Systems Context	1.1	Epidemiological Profile	Describes the burden of disease of the areas of implementation.	• What is the under-five mortality burden attributable to malaria, pneumonia, and diarrhea? • How does this burden potentially waver across target areas? • Are there other diseases or conditions relevant to the under-five mortality burden that can be incorporated into the iCCM service delivery package?
		1.2	SES, Livelihood & Living Standards	Describes the socio-economic context of areas of implementation, including both the recipients and providers of care.	• What are the general socioeconomic conditions of target populations and the CHWs that serve them? To what extent does this affect their ability to perform their roles within the iCCM intervention? (For example, the community's ability to assist CHW, caregivers' abilities to adhere to referral, CHW's ability to forego income to serve community, etc.) • To what extent does the socioeconomic status (SES) of caregivers influence careseeking behavior at health facilities? How does this influence iCCM? • To what extent does the SES of the CHW impact their ability to provide services and perform other iCCM-related activities?
		1.3	Geography & Topography	Describes the geophysical context of the areas of implementation, including the geographic spread of administrative areas.	• What is the topographical makeup of iCCM target areas? (I.e. lakes, mountains, rivers, physical boundaries, etc.) How does this affect iCCM activities and service delivery? • What is the geographical positioning of the target areas? Is this fairly homogenous? How does this affect iCCM activities and service delivery? • What is the geographical spread of iCCM target areas? Are iCCM clusters relatively condensed, or spread across a wide territory? Is this relatively homogenous? How does this affect the need for iCCM, the implementation of iCCM activities, and service delivery? • How is this geographical positioning and spread related to distance from conventional health facilities? • Are there other geographical considerations (i.e. sea level) that could impact iCCM service delivery?

1.4	**Climate & Seasonality**	Describes the climate and its seasonal change of the areas of intervention.	• What is the climate of iCCM target areas? How and to what extent does this affect infrastructure on which iCCM activities and service delivery are reliant? • How does the seasonality of iCCM target areas affect disease incidence and demand for iCCM services? • Are iCCM target areas affected by imminent climate change that could hinder or usurp iCCM activities?
1.5	**Roads & Buildings Infrastructure**	Describes the condition of the public and private building and transportation infrastructure of areas of implementation.	• What are the conditions of roads between districts* and health facilities, and health facilities and iCCM catchment areas? • To what extent is the iCCM intervention dependent upon functional transport infrastructure? • Does the iCCM strategy take variation in infrastructure into consideration in planning activities and targets?
1.6	**Internet, Telephone & Power Source Infrastructure**	Describes the electrical infrastructure of the areas of implementation, and inputs or program operations that may be dependent upon them.	• How reliable is the telephone network in iCCM target areas? • Do CHWs, supervisors, and/or district staff have regular access to the internet? How reliable is this connection? • Is the program or any of its applications dependent upon the availability of a specific cellular or mobile network, and if so, is this available in program areas? • What is the electricity or power source infrastructure of implementation areas? How might this waver across sub-administrative areas? • What is the main source of energy or power source in households? (i.e. public electricity network; private solar panel; generator; electric; nothing; other, etc.)
1.7	**Population & Cultural Demographics**	Describes the ethnographic makeup of the population of areas of implementation.**	• What is the demographic makeup of the target population? How does this affect how iCCM service delivery and its recipients? • Is there a primary religious denomination of iCCM target areas? How does this affect iCCM service delivery and its recipients? • For CHWs that practice iCCM in assigned external communities: are local language differences taken into consideration in the placement of CHWs?
1.8	**Geopolitical Context**	Describes the geopolitical situation of the areas of implementation, including themes of political unrest and migratory or refugee populations.	• What is the distinct geopolitical situation of iCCM target areas? How could this affect the safety of CHWs, their ability to carry out activities, and/or the sustainability of iCCM services? • Are refugee settlements in proximity to target areas? Are children under five in these settlements eligible for iCCM services?

Supplementary Appendix 2- iCCM Systems Framework: Domains, Categories, Definitions, and Critical Questions

	1.9	**Health System and Health Program Context**	Describes the organizational health systems infrastructure, including the landscape of current health interventions, the structure of health care services, and other health systems context considerations.	• What are the current community health and child health programs, services or interventions in the areas of implementation? How does this affect the implementation of iCCM? • Are there other CHW-based programs currently in operation? How does this affect iCCM, and are there synergies upon which iCCM can capitalize? • What is the current PHC service delivery structure in the areas of implementation, and how does iCCM fit into this? What are the consequences of iCCM on the current PHC structure? • Do health facilities charge user fees for Integrated Management of Childhood Illness (IMCI) services? How could this affect iCCM, specifically careseeking for referral, supervisor support of the CHW, etc.? • For supervisors based at a referral health facility: are supervisor salaries dependent upon user fees? Would iCCM absorb supervisors' clientele, and if so what are the unintended consequences of this?
	1.10	**Systems Considerations**	Describes context-related considerations for iCCM and the health system.	• Is iCCM well-suited to the epidemiological, geographic, socio-economic, cultural, and health systems context of areas of implementation?

**The term "district" is intended as universal nomenclature in this document to encompass all types of sub-national administrative units*

***Cultural demographics are distinguished from cultural norms in that this category pertains to the presence of ethnic and religious groups in an area, as opposed to the values and practices associated with these.*

Supplementary Appendix 2- iCCM Systems Framework: Domains, Categories, Definitions, and Critical Questions

Domain 2: Program Architecture

Domain No.	Domain	Category No.	Category	Description	Critical Questions
2	**Program Architecture**	2.1	**CHW Density & Distribution**	Describes the number of CHWs trained for iCCM, their geographic distribution, and how these are determined.	• How many CHWs were trained in iCCM? How was this number determined, and using which information? • How is the geographic density and distribution (i.e. CHWs per square kilometer or population) determined? Is there a strategy for concentrating or assigning CHWs, or is this based on a preexisting contextual setup? • Is CHW allotment and distribution based on the number of children under five in a defined catchment area, or based on the number of households? • Can more than one CHW be assigned to the same catchment area or community? • Can catchment communities overlap with each other?
		2.2	**CHW-to-Catchment Population Ratio**	Describes questions related to the catchment populations assigned to CHWs.	• What is the defined minimum and maximum catchment population assigned to one CHW? • Is the defined maximum population a feasible figure for one CHW? Is this a feasible number for service provision? • Does the CHW arrangement strategy allot more communities or a greater geographic catchment breadth to CHWs to fulfill a defined CHW-to-population ratio? • In the case that the catchment population exceeds the defined maximum, is another CHW assigned to the area, or is the area split into two catchment areas? • How does the program adapt to rapidly fluctuating populations in target areas?
		2.3	**CWH-to-Supervisor ratio**	Describes questions related to the number of CHWs allotted to supervisors.	• What is the current minimum and maximum number of CHWs that are assigned to a supervisor? • What is the theoretical maximum threshold for the number of CHWs assigned to supervisors to ensure timely, frequent, and quality supervision for iCCM services? • How were these determined?
		2.4	**CHW Profile, Demographics, & Cadre Structure**	Describes the demographic and service delivery profile of CHW cadres.	• Does the program engage iCCM practicing CHWs based on a preexisting cadre of CHWs, or are CHWs newly nominated and trained for iCCM? • Are CHWs chosen for practice within their own communities, or are they dispersed to other communities? • What is the current and/or intended sex and age distribution of CHWs practicing iCCM? Has the program identified a target sex distribution? • Is the iCCM program based on a volunteer service provision structure? Are iCCM-practicing CHWs performing services on a volunteer basis, or as a remunerated job? Are they expected to have a primary vocation, or practice service delivery full-time? • Does this align with national standards for CHW cadres? • Are there other CHW-like cadres which can support, complement or interfere with iCCM implementation (i.e. community-medicine distributors, traditional birth attendants, etc.)?

Supplementary Appendix 2- iCCM Systems Framework: Domains, Categories, Definitions, and Critical Questions

2.5	**Housing & Residency**	Describes the housing and residency requirements and situation of CHWs.	• Is there an official policy outlining housing and residency requirements for iCCM-practicing CHWs? • Are housing and residency standards and expectations addressed by policy or any official documentation? If so what are these standards and requirements? • Are CHWs expected to reside in the catchment area where they provide iCCM services? • Who is expected to fund CHW residency costs in catchment areas? Do these costs fall on the CHW, the community, or the program? • What proportion of CHWs currently reside in their catchment areas? • In the case that the CHW rents a housing structure or builds an area to provide iCCM services, are these costs expected to be borne by the CHW? • Is the onus on the CHW to facilitate renting contracts and facility locations for residency and the provision of iCCM services in locations of which they are not a community member?
2.6	**Service Delivery Location**	Describes the official designated locations and areas of practice for iCCM as defined by program standards.	• Where are CHWs expected to provide iCCM services: from their homes, from a separate clinic structure, a public facility, in a designated outdoor space, home visits, or other? • Who is expected to search for and/or provide this structure? • Do standardized requirements for the location of iCCM service delivery exist? • If so, what do these comprise? Do these requirements include stipulations for roofing standards, waste disposal, sanitary facilities, and/or drug storage areas? • What are possible consequences of home service delivery that could compromise the quality of iCCM services? Of other service delivery locations? • Is the community expected to provide a service delivery location for the CHW?
2.7	**Catchment Area**	Describes the definition and geophysical determination of catchment areas for iCCM practice.	• Are there strict boundaries defined for catchment areas, and are CHWs and/or supervisors expected to know these? • How is a catchment area defined, and what are the specific criteria for a catchment area to be termed as an iCCM-eligible area? Is this based on predetermined administrative area criteria or physical geography? Can this entail one village or a cluster of villages? • How are iCCM catchment areas determined within the context of the national child health strategy? This could mean processes required to establish that a catchment area requires iCCM. • What is the maximum breadth of a catchment area? • Is geographic spread used to determine target catchment areas? • Are population estimates used to determine defined catchment areas? • Can the CHW be feasibly accessed on foot by those residing in the entire breadth of the catchment area? • Can the entire catchment area breadth be feasibly accessed by the CHW? • In the case that the catchment area breadth exceeds the defined maximum, is this separated into two catchment areas, or are multiple CHWs assigned to this catchment area?

Supplementary Appendix 2- iCCM Systems Framework: Domains, Categories, Definitions, and Critical Questions

2.8	**Health Facility Accessibility**	Describes how health facility accessibility is accounted for in the definition of catchment areas and locations of iCCM practice.	• How are reference health facilities determined? Was a health facility assessment conducted to ensure that they are functional and capable of acting as reference health facilities? • Is there a policy which defines access and/or distance from community to health facility for the purposes of iCCM? • Is there a defined minimum and maximum distance to the reference health facility from iCCM target areas? Do these values align with actual distances from iCCM target areas? • Is there a defined minimum and maximum time to reach the health facility from iCCM target areas, either on foot or by local transport? Do these values align with actual time to health facilities from iCCM target areas? • How easy is it to reach the health facility from the defined catchment area? Are there financial, geographical, or infrastructural constraints that make this more difficult for caregivers?
2.9	**Protocols, Guidelines, Algorithms, & SOPs**	Describes the official documentation, manuals, protocols, guidelines, standard operating procedures (SOPs), service delivery algorithms, and defined roles and responsibilities of stakeholders in the iCCM program.	• Do service delivery algorithms developed for iCCM align with national standards? • Have standardized SOPs for the implementation of iCCM been developed for district staff? • Do the programmatic guidelines and SOPs developed for iCCM activities align with national standards? • Have standardized protocols and guidelines been developed for other key iCCM processes, such as the drug supply chain, data transmission and reporting, or social mobilization processes? • In addition to training manuals, have standardized protocols and guidelines been developed for human resources involved in the implementation of iCCM services and activities? • Have district-level guidelines and/or SOPs been developed outlining roles and responsibilities of iCCM activities? • Is there documentation which defines the specific roles and responsibilities for each program partner involved in the implementation of iCCM?
2.10	**Inputs, Tools, Supplies, Equipment, Transport & Logistics**	Describes the physical inputs of the iCCM program outside of drugs and tests, including tools, supplies, equipment, transport and logistic necessities.	• Outside of drugs and testing devices, what programmatic inputs, supplies, and equipment are provided to CHWs and supervisors to assist them in performing their role? • Do CHWs receive transport or compensation specifically allocated for transport to the health facility to perform iCCM activities? • Do supervisors receive transport or compensation specifically allocated for transport to the community to perform iCCM supervision activities? • Do caregivers receive transport or compensation specifically allocated for transport to the health facility to ensure adherence to referral? • Is this transport commensurate with health facility distance from the catchment area, and frequency of travel? • Does the type and/or amount of travel stipend provided to CHWs vary per CHW according to their distances and travelling frequency, or is this a standardized amount? • If a transport device is provided, does this function appropriately in accordance with local infrastructure and climate conditions? • Do CHWs receive writing supplies and paper to record information?

Supplementary Appendix 2- iCCM Systems Framework: Domains, Categories, Definitions, and Critical Questions

			• Do CHWs receive flashlights or a lighting source to perform iCCM services in the absence of the availability of electricity or alternative power source? • Do CHWs receive protective equipment to enable them to travel and perform iCCM activities in difficult weather conditions? • Do CHWs receive gear to protect iCCM documents and drugs supplies from the elements during transport? • In the case of an epidemic, do CHWs receive adequate personal protective equipment (PPE)?
2.11	**Supportive or Alternative iCCM Service Structures**	Describes the existence of other mechanisms that aid and/or support the iCCM service delivery structure, such as pharmacies.	• Do supportive or alternative structures, such as private dispensaries or certified drug shops, act as product distribution channels for iCCM? • If so, how does this influence or interact with coexisting classical iCCM structures?
2.12	**Implementation & Sustainability Plan**	Describes the plan for implementation, as well as the existence and/or development of an overall sustainability or transition plan that details how programs are to transition from ownership of one entity to another, especially to local government	• How long is the expected duration of the implementation of iCCM, via the supporting agent(s) and/or thereafter? • If implementation occurs as an initial standalone pilot intended for scale-up, what aspects of iCCM are to be addressed? • Has a transition plan or roadmap been developed during the initial planning and implementation stages of the iCCM program? • Does this sustainability plan designate the roles and responsibilities of national and international stakeholders post-transition? • Does this sustainability plan designate the roles and responsibilities of the district-level stakeholders post-transition? • Does the sustainability plan designate feasible financing mechanisms for the continuity of iCCM? • How does program design engender Ministry of Health ownership in the case where iCCM implementation is supported by third parties?
2.13	**Systems Considerations**	Describes program design considerations for the overall health system, and synergies between domains.	• Is the iCCM program designed to be integrated as a formal part of the health system? • Does the program use existing national/public structures and processes for service delivery, data transmission and reporting, drug procurement and supply, mobilization, or are these designed for or tailored specifically to the program? • Are existing systems developed for iCCM service delivery expected to be integrated or aligned with national systems?

Supplementary Appendix 2- iCCM Systems Framework: Domains, Categories, Definitions, and Critical Questions

Domain 3: Policy, Governance, Management & Coordination

Domain No.	Domain	Category No.	Category	Description	Critical Questions
3	**Policy, Governance, Management, & Coordination**	3.1	**Child Health Policy Landscape and Evolution**	Describes the general Primary Health Care (PHC) and child health policy environment of the areas of implementation, including predicating IMCI programs, and how these evolved over time.	• What kind of child health policies predicated the implementation of iCCM? • What is the history of the PHC model of the country, and the role of CHWs? • What is evolution of IMCI policy within the country? • How are policy and subsequent ministry administrative responsibilities for PHC, child health, community health, and malaria divided?
		3.2	**iCCM Policies**	Describes the current existence of iCCM specific policies, their content, scope, and conflicts or areas of contention with other policy.	What are the current iCCM-specific policies that exist within the country of implementation? • What aspects of iCCM do these policies entail? Are they generic or specific? • Do these policies form an explicit part of the national health strategy or the national Maternal and Child Health policy? • Are CHW responsibilities for iCCM predicated on a pre-existing country policies for CHWs? • Are there sub-administrative unit (i.e. state or district) specific policy documents for iCCM? If so, what are their content and scope? • Does iCCM policy or its aspects contradict pre-existing policy for other aspects of the health system? (i.e. emphasis on decreasing reliance on CHWs, gravitation away from community-based care, etc.) • What is the timeline for iCCM policy revision?
		3.3	**iCCM Policy "Housing" & Placement**	Describes where ministerial responsibilities for iCCM policy development and implementation lie.	• In which ministry departments is iCCM policy housed? In other words, which administrative units are tasked with the development, management and implementation of iCCM policies (Child health department, malaria department etc.) • Is iCCM policy couched within one department or shared administratively? How does this affect management and implementation of iCCM policy?
		3.4	**Policy Entrepreneurs**	Describes the actors involved in the influence, development, and implementation of iCCM policy and policies which influence iCCM.	• Who are the stakeholders involved in the influence of, development and implementation of iCCM policy? • Are these actors shared evenly between program partners and local ministry? • Are there other policy actors which influence policy that indirectly affects iCCM? • Do sub-national actors influence iCCM policy?

Supplementary Appendix 2- iCCM Systems Framework: Domains, Categories, Definitions, and Critical Questions

3.5	**Policy Drivers & Evidence Use**	Describes the drivers of iCCM policy development, and how evidence is used to underpin this.	• Who or what drove the emphasis of iCCM as a strategy within country? Was this primarily internal or external? • How is evidence used in the development and prioritization of the iCCM strategy?
3.6	**Policy Processes, Roles & Responsibilities**	Describes the policy-making processes, (i.e. steps), and the roles of entities in policy development and/or implementation.	• What are the concrete steps necessary to developing iCCM-specific policy, or policies which enshrine iCCM as a core part of the national health strategy? • Who are the actors involved in these steps, and what are their roles and responsibilities with regards to policy development or implementation?
3.7	**Compatibility with International Guidelines**	Describes the extent to which iCCM policy is compatible with international guidelines. This encompasses drug-specific policies and pharmaceutical regulation.	• What pre-existing policies overlap with iCCM-specific policy? For example, CHW policies, essential drugs and medicines, etc. • Is iCCM policy the way it is detailed in ministry-sanctioned documentation compatible with international guidelines? • Do overlapping policies encompassed by iCCM align with global standards? (i.e. iCCM drugs are on the essential medicines list, etc.)
3.8	**Policy Implementation**	Describes how iCCM policy is actually realized, and to what extent implementation mirrors policy design.	• What mechanisms, timelines, or benchmarks are in place to realize the implementation of iCCM policy? • To what extent does iCCM in areas of implementation mirror policy? How does this differ?
3.9	**Dissemination Fora**	Describes the different discussion fora of iCCM policy and decision-making, and the dissemination of policy-related decisions.	• How is policy information disseminated from political actors to implementers? • What are the different arenas or opportunities for the discussion and decision-making of iCCM policy?
3.10	**Management Structures & Coordination Mechanisms**	Describes the management structures which oversee iCCM, and the coordination mechanisms in place.	• What are the managing structures which oversee the implementation and management of iCCM? • How do managing partners for iCCM coordinate with each other? In what capacity, forum, and with what frequency?

Supplementary Appendix 2- iCCM Systems Framework: Domains, Categories, Definitions, and Critical Questions

3.11	**Management Ministry Roles & Responsibilities**	Describes the roles and responsibilities of management entities, with particular emphasis on those of ministry partners. This includes contractual agreements related to iCCM between the national government and external parties, or lower levels of government.	• Are there clearly defined roles and responsibilities for all entities implementing iCCM? This includes international partners, NGOs, national, and sub-national ministry departments. • Are these roles and responsibilities outlined in any documentation? • Is there an assigned manager to oversee each thematic domain (i.e. supply chain, social mobilization, etc.) at the state, regional, and/or national level? • What is the level of national and sub-national ministry member involvement in the management and implementation of iCCM? • To what extent are NGOs and partner organizations which manage iCCM tasked with implementation? How is responsibility shared between the ministry and partners? • Are ministry-led focal persons or teams developed specifically for the current and future implementation of iCCM? • Are there any memorandum of understandings (MoUs) between the national government and member states or external entities? If so, do these detail expected roles and responsibilities of implicated parties? • To what extent is ministry capacity built and applied in the implementation of iCCM? • Do ministry personnel or teams accompany state- or district-level program partners in the implementation of iCCM? If yes, in what capacity, and if not, how can this be improved?
3.12	**Partnerships**	Describes the global entities that may not be explicit policy entrepreneurs, but are partnered in the implementation of iCCM and may curry political influence.	• Who are the global partners actively involved or have a stake in the implementation of iCCM or the development of iCCM policy? • What kind of inter-sectoral action is necessary to support change on the local social determinants of health? • Which partners are necessary to support such change? • How does partner involvement affect program sustainability, dependency of local ministries, and the potential for autonomous governmental iCCM implementation?
3.13	**Transparency & Corruption**	Describes extent to which iCCM political processes are transparent to stakeholders at different levels of the program and system. It also examines if and how the presence of corruption by policy actors can impact the development and implementation of iCCM policies or activities.	• How are political and managing processes transparent, if at all? What is impeding transparency between actors and entities? • Is there a potential for corruption to occur in the implementation of iCCM? If so, how, and what measures can be taken to prevent or mitigate this? • How would this impact the policy development and/ or implementation of iCCM?

	3.14	Systems Considerations	Describes governance and management-related considerations for the overall health system, and synergies between domains.	• Is the design of iCCM policy in this country context intended such that iCCM is considered a short-term solution, or a long-term one? What is the expected duration of this strategy with regards to policy development? • Does the way iCCM policy is embedded into the country's health strategy encourage its scale-up and/or sustainability? If this is intended outcome, what is required in order for this to occur? • How does policy recognition of national dependency on a volunteer structure for health service delivery affect the priorities and future development of the country's healthcare system? • Is local capacity used for priority-setting, planning, contracting and/or coordination? • How does volunteer labor to fulfill the implementing country's goal of reducing child mortality relate to international labor law or the SDGs? • How does the presence of community-based programs and external partners to continue supporting them affect governmental responsibility towards the construction and sustained functioning of the overall health system? • What is the overall organizational, policy, and management, and institutional readiness for change in the context of iCCM adaptation? • Is there a vision that is collectively owned, with clear change management strategies for leadership of change?

Supplementary Appendix 2- iCCM Systems Framework: Domains, Categories, Definitions, and Critical Questions

Domain 4: Financing & Costing

Domain No.	Domain	Category No.	Categories	Description	Critical Questions
4	Financing	4.1	Costing & Financial Planning	Describes short- and long-term financial planning for iCCM, including what information is collected and used for this purpose.	• Does an itemized costing document exist to plan for the appropriate allocation of funds for inputs and activities required for iCCM implementation? • Do these documents incorporate demographic, population and seasonal data? • Do district-specific costing and financial planning documents for iCCM exist? • Do these costs and data inform the design and scope of iCCM implementation?
		4.2	Financing Sources	Describes the potential and actual types and sources of funds applicable to iCCM.	• Does the country have a specific resource mobilization plan for iCCM? • What are the current and potential sources of funding for iCCM, and who are the primary financing actors? • What proportion of these sources are publically provided by the national health system? • What components of the intervention will these sources cover? • Are there overlapping sources of funding that contribute to the same inputs or program activities? How can these be aligned to promote rational allocation of funds?
		4.3	Financing Recipients	Describes what stakeholders or entities are entitled to receive funds intended for iCCM.	• What actors, structures, entities or organizations are direct beneficiaries of funds intended for iCCM? • Which specific administrative divisions (i.e. districts, zones) are funds allocated towards for iCCM? • Which governmental administrative departments at sub-national levels receive funds? • Is there more than one parallel iCCM program that receives funding from different sources? • If financial responsibilities for iCCM are to be handed over to different entities (i.e. partner to ministry), will the same administrative areas previously implementing iCCM continue to be the recipients of funds?
		4.4	Financing Mandates	Describes current or potential government-based financing mandates that are applicable to iCCM.	• Are there any current or potential child health governmental mandates or schemes that provide funding intended for iCCM or components of the intervention? • How are financing mandates affecting iCCM managed at the highest decentralized administrative division?
		4.5	Public-Private Partnerships	Describes any public-private partnerships that contribute towards iCCM.	• Do any public-private partnerships exist that provide financing, inputs, or services for the implementation of iCCM? • If so, who are the entities that provide these? How is this organized, and what is the longevity of these provisions?

4.6	**Financing & Disbursement Structures**	Describes how financing dispersal structures operate, and how funds are allocated and distributed.	• What are the primary financial dispersal structures that allot funds for iCCM? • Who controls these, and how do these function? • How are funds intended for iCCM allocated and distributed at lower-level administrative units? Upon what criteria is this dependent? • Are funds for iCCM appropriated and disbursed in a timely manner and in accordance with deadlines or due dates? If not, then what are the reasons for this?
4.7	**Budgets**	Describes how national and sub-national budgets allocate for iCCM, and the operational stakeholders that control and influence these.	• Do budgets at the decentralized administrative division (i.e. district) clearly earmark funds for iCCM or activities related to iCCM? • What actors implementing iCCM have access to and provide input towards these budgets? • To what extent do budgets take into consideration external sources of funding? • Are budgets transparent regarding the intended recipients (administrative areas, expected inputs) of funds allocated for iCCM?
4.8	**Duration & Sustainability**	Describes the existence and development of financial plans to ensure the continuity of iCCM, and the sustainability of current funding sources.	• Does a financial plan exist for the planning and sustainability of iCCM? • How long are these funding sources expected to provide financing intended for iCCM or its inputs and/or activities? • What financial avenues could be pursued to ensure continued funds for iCCM?
4.9	**Out-of-Pocket Expenditures (OOPs) and Opportunity Costs**	Examines out-of-pocket expenditures and opportunity costs of service delivery providers, supervisors, and recipients of care in the implementation of iCCM.	• In what ways do stakeholders providing iCCM services incur out-of-pocket expenditures in the implementation of ICCM activities? What is the valuation of these expenditures? • In what ways do stakeholders providing iCCM services incur opportunity costs in the implementation of ICCM activities? What is the valuation of these costs? • What is the fiscal value of person-time that CHWs allocate to service delivery? (i.e. local value of labor) • Does the iCCM program strategy compensate these costs, or provide a plan to mitigate them? • Are there social cash transfer programs, community-based cost sharing funds, or other financing mechanisms or health insurance schemes that support OOPs incurred by care recipients?
4.10	**Systems Considerations**	Describes finance-related considerations for the overall health system, and synergies between domains.	• What are the unintended outcomes of interrupted funding for iCCM activities? Are there mechanisms in place to protect against these? • How do donor priorities, "Big Disease" funding, and external funding cycles affect iCCM? • In the future provision of funding for primary healthcare, are national strategies, plans or budgets diverting financing away from building other components of local health systems to focus on expanding iCCM, CHW cadres, and/or community-based care? If so, what are the potential consequences of this?

Supplementary Appendix 2- iCCM Systems Framework: Domains, Categories, Definitions, and Critical Questions

Domain 5: Health Management Information Systems and Monitoring & Evaluation

Domain No.	Domain	Category No.	Category	Description	Critical Questions
5	**Health Management Information Systems and Monitoring & Evaluation**	5.1	**Indicators & Data Elements**	Describes the availability of data elements necessary to collecting useable data on the intervention, how they inform indicator definitions, how these align with the national health system.	• How are standard country-wide indicators for iCCM defined? (i.e. according to national guidelines, global benchmarks, etc.) • Using routine data collected for iCCM, is it possible to calculate critical case pathway indicators such as: (i) proportion of cases tested; (ii) proportion of positive test results; (iii) proportion of cases treated; (iv) proportion of cases not treated due to stock-out; iv) proportion of cases referred; (vi) proportion of cases adhered to referral? • Can these be disaggregated by condition or symptom? (i.e. fever, diarrhea, cough + fast breathing) • Can these be disaggregated by sex (male and female)? • Have iCCM reporting indicators changed recently, and are these changes reflected across data collection tools, registries, and databases? • To what extent do data elements and indicators collected for iCCM align with those collected by the national health information system? • Does data exist and is available on the population per CHW catchment area? • Is geographical data available and updated on the breadth of the catchment area? • Is geodata available and updated on the distribution of CHWs? • Is there an available and updated list of active CHWs per supervisor? • Can the number of patients and the number of cases, especially in the case of comorbidities, be differentiated across aggregated forms? (i.e. The same child presents with malaria-positive fever and diarrhea) • Can critical case pathway indicators be calculated and disaggregated by health facility or supervisor using the data system available at national level? • Are key iCCM indicators integrated into a national electronic health platform such as District Health Information Systems (DHIS2)? If so, what data elements are not available or cannot be calculated using DHIS2? • Are both global and country-wide iCCM indicators incorporated into the national monitoring system?
		5.2	**Forms, Registers, & Reporting**	Describes the types and formats of registries and reporting forms, and other reporting mechanisms.	• Have standardized registers and reporting documents been developed and reviewed for iCCM? • At which levels are forms, registers, and reporting documents paper-based, and at which levels are they electronically-based? • Which data elements can only be found in paper format? • If paper forms or registries are used, what data elements are lost in the transfer of data to electronic databases? In other words, what information cannot be transferred into electronic format, or what information cannot be extracted from electronic databases which can be from paper registries?

Supplementary Appendix 2- iCCM Systems Framework: Domains, Categories, Definitions, and Critical Questions

			• By what mechanisms do CHWs report data to their supervisors, and supervisors to district staff? • How many forms are CHWs expected to fill and/or submit to their supervisor or mentor? • Are reporting forms integrated with other nationally standardized community health data collection forms, or are these specific only to iCCM? • Do data elements on these forms overlap with each other? If so, which type of data overlap with each other and on which forms? • How can data collection at CHW and supervisor level be optimized to economize on repetitive recording? • Who is responsible for physically transporting monthly forms from the health facility to the district, and what is the procedure? • Is supervision data reported by both CHWs and supervisors? Does supervision data reported by both the CHW and supervisor appear on monthly aggregate forms reported to the district? • Which forms are used to calculate official supervision rates? Are these corroborated by forms provided by CHWs? • Where are supervision forms stored? • How is replenishment of physical forms and registry booklets organized? • Are iCCM data collected and reported using a system that is separate from the national health information system (NHIS)? • To what extent is this system, if separate from the NHIS, interoperable? • To what extent are registers and reporting documents aligned with the NHIS?
5.3	**Accuracy, Completeness & Quality**	Describes data quality in the recording and aggregation process, including accuracy of data entry, how completely forms are filled, the proportion of CHWs reporting, and the availability and use of quality control checks.	• What quality control mechanisms are in place at the different steps in the data chain to reduce factors affecting data quality, such as missing fields, miscalculations, or poor reporting? Is there a specific data verification process that occurs between the CHW and supervisor? • What quality control mechanisms are built into the data transmission scheme to ensure that forms and information are not lost, and arrive in a timely manner to their destination? • In the case of calculation errors or mismatched data elements submitted by CHWs, are these reported as-is in consolidated supervisor forms, or are these changed by the supervisor? If these are changed, on which forms are these changes made? • If these are changed, are these corrections made in reference to the original registry data, or changes to simply ensure alignment of totaled figures? • How are errors corrected in the aggregation process, including inaccurate data inputs or missing fields on incomplete forms? • How is completeness of reporting defined? • Are number of CHWs per supervisor available on reporting forms to calculate true completeness of reporting per month? • If a monthly form is submitted late, is this data aggregated with the month it was generated, or the current month's data? • How often is a Data Quality Assessment (DQA) conducted? • Is the DQA conducted internally or externally? • Are there elements excluded from the DQA that could better inform the assessment?

Supplementary Appendix 2- iCCM Systems Framework: Domains, Categories, Definitions, and Critical Questions

5.4	**Data Aggregation**	Describes the processes by which data is accumulated and compiled across different levels, and the granularity of iCCM data.	• At which steps in the data aggregation processes, from CHW, to supervisor, to district, can data aggregation and entry errors occur? • What is the lowest level of granularity visible in the national or provincial-level electronic database of iCCM routine monitoring indicators? (i.e. health facility/supervisor, CHW) • When data is aggregated at the supervisor, is this done by CHWs, supervisor, or both? Whose calculation is used for submission to the next administrative level? • Who aggregates data at the district level? How is this done?
5.5	**Data Transmission**	Describes the data transmission processes at different levels, and responsibilities of stakeholders involved in these processes.	• What is the data transmission process at each level? Are there multiple mechanisms by which data or forms are delivered? • Where is this transmission executed-at the community level or at the health facility? • Who is expected to transmit data and forms from CHW to supervisor, and from supervisor to the next administrative level? • Do CHWs drop off monthly forms with the supervisor, or does the supervisor review each form with the CHW when it is received? • Is there a group meeting forum during which monthly forms are submitted between the CHW and supervisor? • Are all iCCM data elements submitted by the CHW in the same format, or are some submitted electronically while others are submitted on paper? • If a CHW is unable to submit their monthly form, how is this transmitted? • What feedback loops exist to ensure data and information has been transmitted, received, and in necessary cases, acted upon?
5.6	**Data Management & Storage**	Describes how, where and in what format iCCM data is managed and stored	• Is DHIS2 or a national online system used in the management of iCCM indicators? • Is there any separate program, or physical or electronic database that stores only iCCM data? • For data elements which can only be found in paper format, where are these forms stored?
5.7	**Visibility, Transparency, and Availability**	Describes the extent of accessibility, availability, visibility and transparency of iCCM data to stakeholders at different levels in the program	• Is routine iCCM data readily accessible in electronic format? • How easily can disaggregated data be accessed by stakeholders at each health system level? • How easily can electronic data be accessed by stakeholders at each level of the health system? • How easily can iCCM monitoring data at each level be accessed by national and district stakeholders? • How does routine data collected at the lowest level (i.e. CHW) differ from data available at subsequent administrative levels (i.e. health facility, district, national)? Do data elements collected by CHWs represent disaggregated versions of those available at the state-province-national level? • If there are implementing partners, is data exchanged regularly between local ministry HMIS officers and program partners? In what format and with what frequency? • Are there key district personnel who could benefit from iCCM data exchange who currently do not have access to it?

Supplementary Appendix 2- iCCM Systems Framework: Domains, Categories, Definitions, and Critical Questions

5.8	**Data Use & Usability**	Describes if and how data is used in decision-making, and to what extent collected data is useable in generating useful information.	• Do CHWs or village health authorities use community-level data for decision-making? How? • If this data is used, is the impact of iCCM assessed to better understand how to improve or change the organization of the local health system and/or PHC? • Do supervisors or health facility staff use aggregate community-level data for decision-making? How? Is this standardized procedure, or are there guidelines dictating how this should be done? • Does the way specific indicators are formulated or reported clearly relay the intended information? (i.e. malaria treatment reported as number of drugs units consumed or as number of cases treated; stockouts reported as number of CHW-days stocked out or number of untreated cases due to stockout, etc.) • Can the instruments used for data collection generate pattern or trend information directly at the CHW or supervisor level? • How is supervision data used? • Have district personnel, supervisors, and/or CHWs been trained in how to use this data, or the significance of indicators?
5.9	**Data Communication**	Describes how iCCM data is communicated to different stakeholders. *This category is distinct from data transmission in that it does not address the physical transfer of data, but rather its interpretation and conveyance so that it is understood.*	• In what ways are iCCM data communicated (not simply transferred) to stakeholders at different levels, including community members, district staff, etc.? • Do stakeholders and health providers visually present data to different members of their own level? • Are data trends visually represented, discussed or reported at the community level? • Are data trends visually represented, discussed, or reported at the health facility/supervisor level? • What are the primary critical feedback loops in communicating iCCM data? Who are the stakeholders involved in these, and what are the gaps?
5.10	**HMIS Guidelines & SOPs**	Describes the HMIS-specific guidelines and SOPs related to the availability, collection, transmission, and use of data for iCCM.	• Are there clear designated roles and responsibilities defined for iCCM data collection and transmission procedures? • Do country- or program-specific iCCM reporting guidelines exist for CHWs, supervisors, and district representatives? • Have district-level HMIS officers been trained in the entry and use of iCCM data?
5.11	**Monitoring & Evaluation (M&E)**	Describes the general Monitoring & Evaluation of iCCM throughout the life of the program.	• Does a comprehensive M&E plan exist for iCCM? • Does this the M&E plan include program objectives and indicators for measurement and tracking progress? • How is data used, and which data is used, for M&E objectives?

Supplementary Appendix 2- iCCM Systems Framework: Domains, Categories, Definitions, and Critical Questions

			• Does it include standardized tools for data collection, how often this information is to be collected, at which administrative levels, and the methodology of collection? • How does the M&E plan ensure that information collected during regular monitoring provides a holistic picture of program success or failure? In other words, how does the M&E plan inform managers that the program is operating as intended? • In what ways is impact measured? How is this defined, and what are the necessary data elements to assess this? • Is there an information dissemination plan under M&E? Is there a data use plan? • Does the program have or has it developed implementation strength indicators? • Does operational research and/or evaluation take place in the same setting of the area of practice?
5.12	**Systems Considerations**	Describes HMIS-specific considerations for the overall health system, and synergies between domains.	• How linked are the iCCM data transmission pipeline and the supply chain for iCCM products? What must be done to assure synchronicity between the two and a seamless transition of this in the case of program handover? • What other health programs exist that are internally or externally operated which rely on community data collection mechanisms? Can these be leveraged or combined for greater efficiency of iCCM? Can their data be used to support operations or inform program implementation? • Can mHealth devices or electronic devices be streamlined across different interventions for better community-level data collection? • Is there a "data collection burden" placed on CHWs and supervisors? How does presence of iCCM or inefficiencies in its processes contribute to this, and what steps is the intervention taking to mitigate this?

Supplementary Appendix 2- iCCM Systems Framework: Domains, Categories, Definitions, and Critical Questions

Domain 6: Commodities & Supply Chain

Domain	Domain No.	Category No.	Category	Description	Critical Questions
6	Commodities & Supply Chain	6.1	Drugs & Commodities	Describes medical products and related materials, including drugs, testing devices, supplies, and other commodities required for the diagnosis and treatment of conditions within the iCCM package.	• Are all key iCCM medicines & diagnostics registered with the National Regulatory Authority (NRA) or similar agency? • Are all iCCM medicines and commodities included in country's Essential Drug List? • What are the categories and brands of materials and commodities designated for iCCM? • Are these brands or formulations different than their counterparts available in public government health facilities? • What specific diagnostic instruments and tools are required for iCCM services? • What instruments are necessary in the testing of pneumonia? • What is the guaranteed lifespan of these instruments and tools? Is this information taken into consideration in their selection and the resupply plan? • What other supplies and materials are required for diagnosis and treatment of cases? (i.e. water bottles, cups, mid-upper arm circumference (MUAC) measurement material, receptacles for sharp waste, etc.)
		6.2	Quantification	Describes the processes underlying the calculations for the amounts of required drugs and commodities intended for iCCM.	• How often are quantifications for iCCM medicines and supplies performed? • How are quantities of medicines and commodities procured from international suppliers calculated? Are there SOPs determining these? • What specific criteria are procurement and resupply calculations based upon? Do these account for population, seasonality, case rates, number of CHWs, their distribution, among others? • Are individual needs of CHWs calculated and aggregated per supervisor? Is this information used in quantification calculations? • Are quantities intended for downstream iCCM stakeholders based on fixed amounts, or do these vary based on certain criteria? • How are stockouts reported? As the number of CHWs stocked out per month; number of days CHW stocked out of key products; number of stocks received and stocks consumed; or the number of untreated or referred patients due to stockout? How is this information collected for tracking-at CHW level or supervisor level?
		6.3	Procurement	Describes the processes by which these drugs and commodities are procured.	• Has a standard procurement plan for iCCM commodities been developed? If so, where is this documented? • What is the procurement process, and which actors and entities are involved in this? • Is there a public-private partnership encompassing the supply of drugs and commodities? • What are the sources or manufacturers of each drug and commodity? Are these the same as for government-procured commodities and supplies?

			• From where are diagnostic equipment, tools and supplies procured? • What information gaps affect procurement and resupply procedures?
6.4	Distribution & Transport	Describes the transportation and distribution mechanisms of iCCM drugs and commodities.	• By what mechanisms are medicines and commodities transported and distributed from the national level to the community level? Outline each step. • Who are the main actors and entities implicated in these distribution processes? Are these always the same, or are different stakeholders responsible for the same role? • To what extent are these roles government-, program-, or privately operated? To what extent are ministry staff involved in the distribution of iCCM supplies? • Are pre-existing distribution channels used in the transport of iCCM supplies and drugs, or are there separate iCCM-specific distribution mechanisms in place? • Does distribution of iCCM commodities occur in conjunction with or independent of the resupply of government facilities with general health commodities? • With what frequency are drugs and commodities expected to be distributed to each restocking point? To what extent does the frequency align with demand? • With what frequency are drugs and commodities expected to be fetched at each restocking point? To what extent does the frequency align with demand?
6.5	Inventory & Storage	Describes the inventory control system and storage practices for iCCM products.	• Where are iCCM commodities stored-at the district, facility, and community level? • Are storage conditions of iCCM products assessed? How often is this done, and by whom? • Has a standard inventory control system for iCCM commodities been developed? If so, where is this documented? • Do these align with national standards? • Do all CHWs practicing iCCM have access to a standardized drugbox for storage of supplies? Who is expected to supply a drugbox?
6.6	Resupply & Allocation	Describes the frequency of and calculations by which iCCM product allocations are determined for stakeholders at different administrative levels, and the processes governing their resupply.	• Has a standardized resupply logistic system for iCCM drugs and commodities been developed? • With what frequency is each level in the logistic chain expected to be restocked with drugs and supplies? To what extent are these rates respected/observed? • Is drug restocking based on a push or pull system? Does this mirror resupply procedure for other community-based commodities? • Do supervisors determine overall monthly allocations for CHWs? • If so, how do supervisors determine how much to allocate to their CHWs? How are CHW resupply stocks calculated in general? • What factors and data are used to calculate district allocations of iCCM commodities to supervisors intended for CHWs? • Does each level calculate a buffer stock? Upon what criteria is the buffer stock calculation based? Are these orders fulfilled regularly?

Supplementary Appendix 2- iCCM Systems Framework: Domains, Categories, Definitions, and Critical Questions

			• What is the physical mechanism by which CHWs are resupplied with medicines and commodities? (I.e. delivery, pickup, meetings) Does this ever vary? • How are resupply notifications transferred? In what forms and by what mechanism? • Do districts pharmacists use disaggregated stock use data to determine procurement requirements per CHW? • Do district pharmacists examine trends of CHW-specific commodity use, and is there a mechanism to do this? • Do district pharmacists use any other information or forms outside of monthly summary forms to determine iCCM drug procurement requirements for their districts? • What information or communication gaps affect the regular availability of drugs and commodities?
6.7	**Availability & Stockouts**	Describes how drug stockouts are handled at different administrative levels, and factors affecting regular availability of drugs.	• How are stockouts of iCCM commodities handled at each level? How are stockouts communicated to the next procuring level? • What mechanisms are triggered at these levels to resupply drugs? How quickly does this occur? • Are sufficient stocks intended for health facility use available at health facilities such that community iCCM stocks are not used? • Are CHWs expected to continue to provide iCCM services when they are stocked out of key commodities? Do registry forms provide a section that documents this? • What factors drive stockouts at different levels? (i.e. Insufficient supply, overwhelming demand, poor distribution of iCCM-practicing sites, oversized catchment populations, erratic seasonal changes in morbidity, poor documentation, etc.)
6.8	**Commodity Quality & Sustainability**	Describes the quality and efficacy of drugs provided through the iCCM program, and its continuity.	• Are any of the drugs within the iCCM profile susceptible to drug resistance? If so how does this affect the supply chain, especially in the case of program handover? • Is drug resistance tracked, especially for antimalarials and antibiotics? • What is the efficacy and robustness of the different iCCM commodities offered through the iCCM package? Could these change? If so, how? • Are the drugs offered as a part of the iCCM portfolio of the same or differing quality than those offered through the routine health system? • How can the sustained quality of commodities be assured?
6.9	**Protocols, Guidelines, Manuals & SOPs**	Describes the availability and existence of guidelines, training tools, protocols, and SOPs related to the different steps in the supply chain of iCCM products.	• Are there protocols, guidelines, or SOPs for district pharmacists for the supply chain procedures for iCCM products? Are these separate than normal guidelines for commodities intended for health facilities? • Are there standardized protocols and guidelines for supervisors in the calculation or resupply stocks and distribution iCCM products to CHWs? • Are district pharmacists trained in iCCM drug allocation and distribution procedures? Is this standardized across districts, and are training tools readily accessible to them?

Supplementary Appendix 2- iCCM Systems Framework: Domains, Categories, Definitions, and Critical Questions

	6.10	**Systems Considerations**	Describes some supply chain-specific considerations for the overall health system, and synergies between domains.	• Is there an existing logistic management information system that incorporates iCCM? • What data gaps exist that affect the adequate procurement and quantification of drugs and supplies? • How is mHealth used in the documentation, quantification, and resupply of drugs and commodities? What are the advantages and disadvantages of this? • Does the supply chain for iCCM commodities operate in parallel to the country's existing procurement and delivery system? • Are there national regulatory supply chain policies that exist that govern how iCCM supplies are procured, distributed and allocated? • Are commodities supplied by different sources? List these sources. • Do commodities for iCCM overlap with those of other community programs? • In communities where supply is not commensurate with demand, are there contextual or social factors which may contribute to this?

Supplementary Appendix 2- iCCM Systems Framework: Domains, Categories, Definitions, and Critical Questions

Domain 7: Service Delivery

Domain No.	Domain	Category No.	Category	Description	Critical Questions
7	Service Delivery	7.1	Availability & Accessibility	Describes the location of iCCM practice and the service delivery schedule maintained by the CHW.	• Are CHWs required to reside within the communities they practice iCCM? • Have strict definitions of CHW availability been outlined in program documentation? • Do CHWs offer iCCM services outside of their post or catchment area, or treat individuals that are not from their catchment area? Are there guidelines that define these? • How many days per week and hours per day are CHWs expected to perform iCCM services? Do CHWs designate days and hours for the provision of iCCM services, or are CHWs expected to provide services at any time/day? • Does this vary between communities or is this standardized across the iCCM program? • Is this enough to provide effective coverage within their catchment areas? How has this been measured? • Is this schedule feasible for CHWs to maintain? • Does the defined iCCM service delivery schedule align with the CHW's actual service delivery times and hours? Do CHWs generally practice iCCM outside established hours and days of practice? • Who developed the iCCM service delivery schedule? • Are caregivers aware of this schedule? • Do caregivers respect this iCCM service delivery schedule, or are CHWs expected to be available outside of these days/times? In other words, what is both the caregiver and official expectation of CHW availability to perform iCCM services relative to their chosen availability? • Are CHWs expected to be on-call between certain hours? Are there guidelines which define communication expectations between CHWs and caregivers? • Are CHWs expected to provide their contact information to all caregivers within their catchment area? • Where are CHWs expected to provide services? Do standardize guidelines exist regarding where CHWs are expected to practice? • Do CHWs provide services out of physical structures, such as their homes, village clinics, public structures (i.e. school or hall)? • Do CHWs practice iCCM in a public space or outdoors (i.e. outdoor community or personal space)? • What does a caregiver do in the case of the unavailable CHW? Is this communicated to the caregiver? • Is the CHW's place of practice easily accessible within the community? • Do CHWs provide services out of a roofed structure? Do guidelines or regulations exist regulating the minimum required structural standards for the provision of iCCM services? • Are there other infrastructural requirements (such as sharp and general waste disposal, water infrastructure) that are defined in program guidelines? • Is there anything about the CHW's place of practice that would disincentivize caregivers to seek services provided by the CHW, or the ability or desire of the CHW to practice iCCM? • If the CHW practices out of their home, how does this affect availability of iCCM services? What are the advantages and disadvantages of this for the CHW and community?

7.2	**Assessment, Testing & Treatment**	Describes the CHW's core service delivery package of iCCM activities, including diagnostics, testing, and treatment.	• Do standardized algorithms exist for the assessment, testing, and treatment of fever, diarrhea, and cough and fast breathing by CHWs? • Does a plan for rational use of medicines exist? • Do iCCM service delivery protocols align with national standards for assessment, testing and treatment of defined illnesses? • Are RDTs used to test for malaria? • How is pneumonia diagnosed- through respiratory rate counting, pulse oximetry, or other methods? What are the challenges associating with chosen pneumonia diagnostic methods? • How are comorbidities handled during the diagnostic process? • How are danger signs handled during the diagnostic process? • How do protocols, guidelines and algorithms address the potential of failure-to-refer, especially in the case of difficult-to-diagnose severe cases (i.e. severe pneumonia)? • Are CHW service delivery manuals and protocols available to all actors at all levels? Are these available electronically? • Do protocols, algorithms, plans, and guidelines emanate from the ministry of health, or are these partner program documents? Do they align with country policy, or exist as separate program documents?
7.3	**Referral & Adherence**	Describes the referral and counter-referral systems, and the protocols for confirming referral adherence by the CHW.	• Does a standardize referral and counter-referral system exist? • Have referral guidelines been developed? Where can these be found (i.e. policy documents, program documents, etc.) • Are the preexisting referral mechanisms for CHWs at service delivery point? • Which conditions fall outside iCCM service delivery and are therefore referred? • What are the mechanisms by which a CHW can confirm that a caregiver has adhered to referral? • What are the mechanisms by which a district official or supervisor can confirm that a caregiver has adhered to referral? (for data-quality purposes) • Is the onus on the caregiver, CHW, or supervisor to confirm referral adherence? Is this information transmitted by paper, telephone, or both? By whom? • Is referral adherence confirmation dependent upon follow-up? • How are the data collection system and referral adherence system interlinked? Can this data be accurately derived from existing records at district and/or national level? • What mechanisms are in place to support or encourage referral? (i.e. Transportation, reduction in service fees at select health facilities?)
7.4	**Follow-Up**	Describes SOPs for follow-up by the CHW, and defined expectations for the service provider and caregiver for follow-up.	• How are follow-up visits organized? Are CHWs expected to make home visits, or are caregivers expected to appear at the CHW? • How are follow-up visits tracked? • Are caregivers only expected to follow up with CHWs after a referral is made? • In the case that a physical follow-up assessment of the child is not performed, how is this recorded? Differentiate between expectation or policy, and what is normally actually done.

Supplementary Appendix 2- iCCM Systems Framework: Domains, Categories, Definitions, and Critical Questions

7.5	**Quality Assurance**	Describes the quality assurance mechanisms that are in place to ensure appropriate case management.	• How is Appropriate Case Management defined for each condition? • How is quality of care measured? • To what extent are caregiver experiences integrated into assessments of quality of care? • Is there a way to track this for each symptom/condition? (For example, by examining registry data can one track appropriate diagnosis and treatment of cough/fast breathing?) • What quality control checks are in place at different steps of the care continuum or service delivery algorithm to ensure timely and appropriate care? • Is there a plan to conduct Quality of Care Assessments? If so, who conducts these, and how often are they to be performed?
7.6	**Prevention Activities**	Describes prevention activities such as IEC as part of the CHW's package of services, if at all.*	• Are Information, Education, Communication (IEC) or prevention activities considered a core part of CHWs' terms of reference (ToR)? • If so, how are these organized, and how often are they expected to occur? • Do these overlap with other CHW program activities? • What are the advantages and drawbacks of including prevention as a core part of the CHW's activities for iCCM?
7.7	**Systems Considerations**	Describes some service delivery-specific considerations for the overall health system, and synergies between domains.	• How does service availability in communities affect, strengthen, or compromise the relationship of caregivers and the community with local health facilities, and the overall primary healthcare system? • How is residency or a separate clinic structures associated with availability? How is community support associated with residency or place of practice? • How are other health personnel that are dependent upon for-profit services for remuneration affected by the provision of free services within communities? • How are non-national residents of communities and ad-hoc settlements (i.e. refugees and asylum-seekers) treated with regards to their access of iCCM services? • How is denial of services to non-qualifying recipients of care at community-level (i.e. older than 5 years) viewed from an ethical vantage point? • Do local community structures support or help coordinate referrals?

**General IEC within the context of the full iCCM program is examined in the Community & Social Mobilization domain.*

Domain 8: Human Resources

Domain	Domain No.	Category No	Category	Description	Critical Questions
8	Human Resources	8.1	Terms of Reference (ToR)	Describes core responsibilities and expectations of the CHW, including their tasks, schedules, and what services and inputs they are expected to provide.	• What services and activities are iCCM-practicing CHWs expected to provide, including and beyond basic iCCM services? (i.e. pick up drugs, deliver forms, prevention activities, mobilization activities, etc.) Are these services and activities explicitly outlined in documentation agreed upon by the CHW? • What is the additional work burden of iCCM-practicing CHWs? I.e. How many other programs are iCCM-practicing CHWs involved in? How much time are CHWs expected to devote to these separate services? • What is the time allocation for iCCM that is outlined for CHWs? Are CHWs expected to provide iCCM services within a certain time frame or in accordance with a predetermined schedule? • Who determines time allocated for iCCM activities? • Are CHWs expected to be present at home at all times to receive patients? Are they expected to receive night calls? If so, is this explicitly outlined in documentation agreed upon by the CHW? • Are CHWs expected to provide their own finances, equipment, transport or other inputs towards the realization of iCCM activities? If so, is this explicitly outlined in documentation agreed upon by the CHW? • Are CHWs expected to know the total number of people and/or children under five in their catchment population, or report on changes in the population? • What are the roles and responsibilities that fall inside and outside the terms of reference of the CHWs? • Are supervisors expected to incorporate supervision of iCCM activity of CHWs as a regular part of their routine activities? Is this agreement done through spoken or written contract? • Irrespective of whether the CHW is a volunteer or governmental employee, are international labor standards respected in the determination of their terms of reference, including activities and time allocation towards these? • Are there any competing priorities that may override iCCM tasks among CHWs? • Are supervisors able to integrate iCCM activities into their existing ToR?
		8.2	Qualifications, Recruitment, & Selection	Describes the defined selection criteria of the CHW position, how CHWs are recruited to submit their candidature, and the selection processes employed.	• How are CHWs chosen? Does a standardized recruitment and selection process exist? • To what extent do local leaders, village chief(s), and the community influence who is chosen as a CHW? • Is the selection process performed democratically (i.e. by vote)?

			• If so, are votes cast anonymously (i.e. blind ballot), or publically (i.e. by a show of hands)? • Is the selection process performed in a public forum? If so, is the audience relatively heterogeneous, or are there more likely to be representatives of a certain demographic participating in selection? • Are steps taken to encourage gender balance in the recruitment process? • To what extent do caregivers represent the selection committee? Are there measures in place to ensure their representation? • Who conducts or presides over the selection process? Could this influence who is chosen? • How are supervisors chosen to be supervisors of iCCM-practicing CHWs? • To what extent do supervisors possess different qualifications than CHWs? Is this distinguishable through certification and/or training? • What are the recruitment and selection criteria for CHWs? Do these include certain educational requirements, village residency requirements, literacy requirements, gender or job requirements, or life-situation requirements? • What are the unintended consequences of over- or under-qualified recruitment criteria for staff? • What criteria are CHWs expected to fulfill before application and selection to the position? • Are those well-connected with influential community leaders more likely to be selected over someone who is better suited to the role, and does the selection process instigate measures to mitigate this likelihood?
8.3	**Training**	Describes the duration, frequency, and content of the training of both CHWs and supervisors for iCCM services, and knowledge retention.	• What content are iCCM training packages comprised of, and what knowledge and skills are CHWs and supervisors expected to possess after training? • How long are training sessions for CHWs and supervisors, and what is their spacing during initial iCCM training? Is this standardized and/or guided by national guidelines? • How often do refresher trainings occur? • With what frequency are training sessions conducted? • Do supervisors receive training on supervision and personnel management skills, beyond basic training for supervision of activities? • Have supervisors been trained in IMCI? • How is knowledge and skills retention of CHWs and supervisors tracked and measured?

Supplementary Appendix 2- iCCM Systems Framework: Domains, Categories, Definitions, and Critical Questions

8.4	**Supervision**	Describes the supervision practices and performance quality control mechanisms in place to oversee CHW activities.	• What is the modality of supervision? Does the supervisor visit the CHW or does the CHW go the Health Facility? • How often are supervisors expected to supervise CHWs for iCCM activities, and to what extent is this schedule respected? • If the supervision rate (i.e. no. of CHWs expected to receive a visit within a given timeframe) is sub-optimal, what are the primary reasons attributed to non-supervision? • Do supervisors always supervise one designated group of CHWs for iCCM, or does this change? • Are supervision duties for a group of CHWs shared by more than one supervisor? • Does anyone besides the supervisor perform supervision of CHWs for iCCM? • How often are supervisors transferred or reassigned, and what potential consequences could this have on supervision of CHWs for iCCM? • How often are supervisors supervised by the district? By the national team? • How is feedback provided to CHWs about their performance during a supervision visit? How is this tracked? • How is information about the content of the CHW supervision visit reported? At what level can this be accessed? • How is feedback provided to supervisors about their performance during a supervision visit? How is this tracked? • How is information about the content of the supervisor's district supervision visit reported? At what level can this be accessed?
8.5	**Mentorship**	Describes the continuous practices of skills-building mentorship to CHWs by qualified personnel. This is distinct from refresher training.	• Is there a mentorship structure in place for the training of CHWs? • If so, how is mentorship executed and by whom? • How often are CHWs expected to be mentored, and to what extent is this schedule respected? • What are the primary reasons for lack of mentorship or poor mentorship? • How can consistent, quality mentorship be arranged to support continuous capacity building of CHWs? • How can mentorship be leveraged for stronger links between the community, CHW; and health facility staff?
8.6	**Peers Support Groups & Cluster Meetings**	Describes the different opportunities for key iCCM stakeholders to congregate and exchange information and knowledge in a group setting, including peer support groups and cluster meetings.	• What are the primary forums where supervisors and CHWs meet amongst their peers to exchange information at community, health facility and/or district level? • Do CHWs meet in peer support groups or cluster meetings format? • Does the iCCM HR strategy incorporate a CHW head or captain for the purposes of organizing group meetings between CHWs? • How often and where are these meetings expected to occur, and how are these organized and reported?

Supplementary Appendix 2- iCCM Systems Framework: Domains, Categories, Definitions, and Critical Questions

			• Is problem-solving, data review, and idea exchange a core component of these group meetings? • How are these meetings documented and monitored? • What are the potential benefits of peer support group meetings, and how can these be leveraged to accomplish other tasks by iCCM stakeholders?
8.7	Retention & Attrition	Describes the strategies and challenges involved in retaining CHWs to practice iCCM.	• Are there identifiable retention strategies incorporated in the iCCM program plan? • Does program strategy favor training and retention of CHWs for long durations, or high turnover of CHWs? • Does the former model impose economic or development challenges on CHWs? Are there measures in place to address these? • What is the attrition rate of CHWs, and what are the primary reasons attributed to this? • How does the retention model for iCCM-practicing CHWs affect the sustainability of the program?
8.8	Compensation, Benefits, & Incentives	Describes the salary models and various incentives provided to CHWs for their services. Describes how incentives and benefits are perceived and expected, and their channels for distribution.	• How are CHWs incentivized to perform iCCM services? Which of these are intrinsic and which of these are extrinsic? • How does the program differentiate between salary, compensation to cover expenses related to the program, inputs to perform program activities, material benefits, and intangible incentives for performing iCCM activities for CHWs? • Are stipends framed as financial benefits to the CHW? • Are stipends a set sum or do they waver depending upon expenses incurred? • Are stipends sufficient to cover CHW and supervisor expenses related to iCCM activities? • If CHWs are compensated, do these funds originate from government funding, project funding, a combination of these, or multiple funding sources? What are the advantages and disadvantages of this? • What non-monetary tangible incentives are provided to CHWs performing iCCM services? • Which of these are expected to be provided by the program, and which are expected to be provided by the community? • Are there intangible incentives associated with performing the CHW role? What are these? • Is there an incentive structure where packages increase the longer the CHW performs iCCM activities? • Do supervisors receive any benefits or financial reimbursement for performing supervision of iCCM activities? Do supervisors expect any benefits?

Supplementary Appendix 2- iCCM Systems Framework: Domains, Categories, Definitions, and Critical Questions

	8.9	**Support, Tools & Resources**	Describes what kind of human resource tools and support mechanisms are available to CHWs and supervisors through the intervention.	• What support mechanisms or channels are available to CHWs and their supervisors? • Do forums exist where CHWs and supervisors can vocally express their concerns? How is information regarding concerns transferred to the district? • What kinds of tools and resources are provided to CHWs and their supervisors to support them in performing iCCM activities? • In what way are specific challenges related to gender differences taken into consideration when providing support to stakeholders performing iCCM?
	8.10	**Professional Advancement**	Describes what kind of career path or certification the program provides, if any, for CHWs practicing iCCM or their supervisors.	• Does a plan for upward career mobility exist for the CHW or supervisor? • Is career development, certification, or extended capacity building built into the framework of CHW training? • Is upward career mobility for the CHW or supervisor framed as an incentive for individuals to become CHWs, add iCCM supervision duties, or participate in iCCM activities?

Supplementary Appendix 2- iCCM Systems Framework: Domains, Categories, Definitions, and Critical Questions

Domain 9: Caregivers, Community & Social Mobilization

Domain No.	Domain	Category No.	Category	Description	Critical Questions
9	Caregivers, Community & Social Mobilization	9.1	Local Structures Engagement	Describes how local figures and influential groups, such as traditional leaders and village chiefs, are engaged in the planning and implementation of iCCM.	• Have traditional leaders, local authorities, and local chiefs been contacted and/or are actively engaged in the planning or implementation of iCCM mobilization activities? • How specifically is the village head or chief(s) involved in the implementation of iCCM activities, and the support of the CHW? • How are other local governance structures involved in support and implementation of iCCM? • Have any of these local actors and structures been recruited to provide financial, political, or material support for the continuation of the program? • If not, what evidence is there that demonstrates support from traditional structures and leaders for iCCM? • How will the engagement of traditional leaders and/or committees be ensured after program handover? • How do the traditional leaders and or committee perceive their roles in engaging with the larger community members for ownership and sustainability of iCCM?
		9.2	Awareness & Information Dissemination	Describes the understanding that caregivers and the community have towards CHWs and their roles, the iCCM program and its intent. It also describes IEC activities and communities' participation in these.	• Are targeted caregivers and the community aware of iCCM services, the intended treatment group and targeted conditions, and why? • Do targeted caregivers and the community understand the intention behind iCCM, and why the treatment group and targeted conditions are rigidly defined? • Are targeted caregivers and the community aware of the CHW and their status as either a volunteer or a remunerated service provider? • Are the community and caregivers aware that the CHW has been trained by certified authority? • Are targeted caregivers and the community aware of the benefits and constraints of the program? • Are targeted caregivers and the community aware of what the CHW can and cannot do, and why? • Do caregivers and/or community members actively participate in information dissemination, communication and/or prevention activities? • Who is the primary audience for IEC activities- mothers, village leaders, or all community members of all genders? • What are the channels for disseminating social mobilization information? • Are IEC materials developed in the local languages using local context? • Are there identified community champions who can attest to the efficacy of the services provided by the CHW who can be a part of the IEC campaign?

9.3	**Careseeking, Knowledge & Behavior**	Describes caregivers', tendencies, behaviors and careseeking practices; barriers to careseeking; and their understanding of the symptoms and causes of the illnesses covered in the iCCM package.	• Can caregivers within target areas actively recognize and differentiate between different childhood diseases, their causes, their symptoms, their treatment and preventative methods? • What practices do caregivers within target areas generally undertake to prevent diarrhea, pneumonia, and malaria, and ensure the health of their child? • What practices of caregivers within target areas can *cause* diarrhea, pneumonia, or diarrhea in children, or aggravate or worsen their symptoms? • If caregivers within target areas choose to manage illness within the home, what home management behaviors do they practice? • What barriers to careseeking exist within communities? • What providers do caregivers prefer and why? • What is non-careseeking primarily attributed to? Does iCCM as designed address this gap? • Does the presence of free services and treatment in the community delay careseeking to a health facility in the case of CHW absence or drug unavailability?
9.4	**Need, Demand, Acceptability, and Use**	Describes the demand for iCCM services and how this is related to actual demonstrated community need, and how social mobilization is tied to acceptability, buy-in and use of the intervention.	• Is there a social mobilization plan guiding the creation and implementation of informed demand in the communities? • What drives the underlying need for iCCM? Is this due to: distance or accessibility of the health facility; ill-equipped health facilities; inability to pay for services/transport; general lack of awareness of child health issues; poor careseeking at existing sources of care; a combination of these or other reasons? • Is demand for iCCM commensurate with services provided? • Is iCCM acceptable to caregivers when provided by CHWs? Why or why not? • How do mobilization strategies for iCCM encourage sustained acceptability and buy-in by communities & local patrons for continued financial support? • How do mobilization strategies influence use? • How is iCCM used within the community? Is it perceived as a replacement of primary health care services for children, or as supplement to existing health infrastructure?
9.5	**Treatment & Referral Adherence**	Describes caregivers' adherence to referral and prescriptive iCCM treatments in domicile (where applicable), and challenges related to these.	• What are the primary reasons for non-adherence to referrals? How has the mobilization strategy attempted to address this? • How is the tracking system for referral adherence designed, and is this conducive to caregiver participation? • How are transport and financial constraints associated with non-adherence to referral mitigated through iCCM or its mobilization strategy? • Are caregivers expected to administer any continuation of treatment at home? If so, do they follow through with the full course of treatment? • Are caregivers aware of follow up expectations with the CHW, both post-treatment and after referral?

Supplementary Appendix 2- iCCM Systems Framework: Domains, Categories, Definitions, and Critical Questions

9.6	**Mobilization, Support & Community Engagement**	Describes the iCCM social mobilization strategy deployed, its stakeholders, processes, content and messages.	• Have mobilization efforts practiced needs assessment of specific communities to determine in what ways the community can best support the CHW or iCCM activities? • Were the project beneficiaries informed about their roles and responsibilities in the successful implementation and sustainability of the program? • Who are the most appropriate actors to be trained as social mobilizers, (i.e. CHWs, supervisors, independent recruits) and how do these liaise with key iCCM stakeholders? • Have mobilization efforts encouraged financial or material support for CHWs or iCCM activities by members in target communities? • Have mobilization efforts encouraged the provision of services to support the CHW or iCCM activities? (I.e. babysitting, community works, farmhand help) • Have mobilization efforts encouraged the provision or development of housing or iCCM service delivery facilities by the community? • Have mobilization efforts encouraged the provision of goods or tokens of support or appreciation by local authorities or members in target communities? • By what mechanisms is the continuity of such support ensured? • Do mobilization efforts present such community support as mandatory or simply encouraged?
9.7	**Local Oversight and Health & Development Committees**	Describes how local development structures such as health and development committees are developed, revived, or included in the rollout of iCCM.	• Do any form of community-based organizations, or village health or development committees exist? If not, does the intervention mobilization plan intend to develop these? • How does the iCCM community mobilization plan promote, develop or encourage existing local health and development committees? • Who are these governed by, who are they composed of, how often do they meet, and what are their terms of reference? • Who are the members of these committees? Are CHWs, Social Mobilizers, caregivers, the CHW supervisors, village heads and/or traditional leaders involved, and if so what are their respective roles? • Do these actually meet regularly, and how is this recorded? • How do these committees specifically demonstrate support for iCCM, for example, through political championing, appeals for financial or material support? • What structures are in place to ensure the continuity of iCCM within their agendas? • What mechanisms are in place to ensure their sustained use over time?
9.8	**Ownership**	Describes the extent to which caregivers and community members have adopted iCCM as a locally-owned community good.	• How does the mobilization strategy engender ownership of iCCM? • How do communities perceive the iCCM intervention? Were their roles and responsibilities clearly defined at the onset of the program? • Do community members view iCCM as an intervention that they own and actively participate in, or rather as an imposed intervention? • What structures, forums, and behaviors are demonstrative of community ownership of iCCM?

Supplementary Appendix 2- iCCM Systems Framework: Domains, Categories, Definitions, and Critical Questions

Domain 10: Systems Software

Domain No.	Domain	Category No.	Category	Description	Critical Questions
10	System Software	10.1	Accountability & Enforceability	Describes the mechanisms and social contracts that ensure that stakeholders in iCCM are accountable to each other.	• To what actors and entities are different iCCM stakeholders accountable? It may be useful to map these connections. • What accountability and enforceability mechanisms exist within the iCCM intervention to ensure that activities are carried out according to program standards?*
		10.2	Appreciation & Recognition	Describes the CHWs' perceptions of being acknowledged, recognized, and appreciated for the work they perform in the context of iCCM.	• In what ways are CHW's roles recognized by their catchment communities? In what ways do CHWs express feeling that their role is recognized by their catchment communities? How important is this to the CHW to carry out their roles? • Do caregivers generally understand and acknowledge the CHW's status as a volunteer? How does this affect how the caregiver may interact with the CHW? • Is there an awareness, acknowledgement and/or recognition of their work burden and terms of service? • How might caregiver perceptions of the CHW's role affect how the caregiver interacts with the CHW, CHW morale, and their ability to carry out CHW activities?
		10.3	Social Capital & Prestige	Describes the social capital and prestige associated with the position of the CHW within the community.	• What forms of social capital, such as social status and prestige, are associated with the position of CHW? How is this influenced or encouraged by the program? • Do CHWs report feeling respected (beyond their role being recognized and appreciated)? What program elements exist to encourage this, if any? • Is the CHW role designed to provide CHWs with a voice in local governance or decision-making? How can this affect the motivation of the CHW and/or their ability to carry out iCCM activities? • Is the iCCM intervention dependent upon social capital provided to the CHW to function effectively?
		10.4	Communication & Cooperation	Describes the effect and value of effective communication and cooperation between stakeholders within iCCM.	• How important is effective communication between CHWs and supervisors to the performance of iCCM? Why? • How is communication and cooperation between CHWs supervisors encouraged? What are obstacles to this?

10.5	**Morale, Confidence & Esteem**	Describes CHW's perceptions and feelings of confidence, esteem and personal morale as they relate to their intrinsic motivation. It also describes potential demotivating factors.	• To what extent is the program dependent upon intrinsic CHW motivation to perform iCCM activities? • How does the morale, confidence, and motivation and CHW affect this intrinsic motivation? • What intangible factors can affect the morale of the CHW? • What different intangible benefits does iCCM provide to CHWs? • What factors, obstacles, or challenges could be considered demotivating factors? Could these include financial, commodity-related, work burden, or intangible reasons?
10.6	**Power & Agency**	Describes the clout and influence that stakeholders have within the iCCM intervention, and how they exercise these powers over others.	• To what extent do district managers exercise power implementing iCCM? • To what extent do they exercise power over supervisors? How does this affect the implementation of iCCM? • To what extent do supervisors exercise power in implementing iCCM? • To what extent do they exercise power over CHWs? How does this affect the implementation of iCCM? • To what extent do CHWs have agency within the iCCM intervention? In which ways do they not? • What other entities and agencies exercise power within iCCM?
10.7	**Expectations**	Describes the expectations of stakeholders within the iCCM intervention.	• Do caregiver expectations of the role of the CHW affect how the CHW performs iCCM services? • Do caregiver expectations of treatment affect the CHW's ability to perform iCCM effectively? • Do CHW and supervisor expectations of what the program does and does not provide affect the performance of activities? How?
10.8	**Culture, Religion, Values, & Norms**	Describes cultural and religious norms and values of CHWs and communities and their effect on iCCM implementation.	• How do religious and cultural norms influence CHWs interactions with caregivers and their communities? Their supervisors? • How do religious and cultural values affect the way iCCM is rolled out? • Do religious or cultural norms impose gatekeepers to the success of the iCCM intervention, or social networks that could be capitalized upon for its success?
10.9	**Gender Equity**	Describes specifically gender norms and issues of gender equity as they relate to the iCCM intervention.	• Does the program attempt to incorporate principles of gender equity as a part of its strategy? • Do gender disparities appear in recruited CHWs performing iCCM? How could this affect their activities and service delivery? • How do gender norms affect how iCCM is rolled out and its potential effectiveness?

Supplementary Appendix 2- iCCM Systems Framework: Domains, Categories, Definitions, and Critical Questions

10.10	**Trust**	Describes the wariness, skepticism and confidence stakeholders have with each other, and how this influences how iCCM operates.	• How does the program determine, measure, or assess community and caregiver trust of CHWs? • To what extent is the iCCM intervention dependent upon trust? How? • What might CHWs, supervisors, and caregivers be wary or skeptical of with regards to the iCCM intervention, and each other? How might this influence the iCCM intervention and its outcomes? • Is there top-down confidence or trust of CHWs demonstrated by supervisors, health facility staff, or district managers in CHW? • Does caregiver trust influence the implementation and potential outcomes of iCCM? In what ways? • Is supervisor trust in the CHW's capacities necessary to effective implementation? • Are there potential programmatic limitations which may undermine the trust that caregivers place in their CHWs? • How does the iCCM strategy engender trust among lower-level stakeholders? • Do caregivers trust the diagnostic instruments, test results, and/or the quality of drugs used in the treatment of their child? How might this influence the iCCM intervention and its outcomes? • Are CHWs trusted by the health professional staff? How does this affect iCCM services?
10.11	**Guilt & Pressure**	Describes how stakeholders may be beholden to each other outside of accountability and enforceability mechanisms.	• To what extent may CHWs feel pressured by or beholden to their communities? Their supervisors? • Is caregiver pressure to treat in the absence of a diagnosis a viable concern? How does the program prepare CHWs to handle this?
10.12	**Satisfaction**	Describes satisfaction of iCCM stakeholders performing their roles, including the recipients of care	• How is satisfaction of CHWs important to the iCCM intervention? Supervisors? • How is the satisfaction of caregivers important to the iCCM intervention? • Does the iCCM strategic plan take service provider and care recipient satisfaction into consideration? In what ways?
10.13	**Altruism & Desire to Contribute**	Describes the desire of service providers to participate in iCCM to contribute to a perceived higher cause, without expectation of reward.	• To what extent is the success of iCCM dependent upon the CHW's personal altruistic desire to contribute to the communities that they serve?

10.14	**Fear**	Describes how fear may influence decision-making among CHWs performing iCCM, and caregivers from seeking care.	• How and to what extent might fear influence CHWs to continue providing services even in the event that they are no longer able? • How might fear dissuade community members from seeking services from CHWs?
10.15	**Stigma**	Describes if and how stigma may be used inadvertently within iCCM, and how CHWs or other stakeholders may experience stigma.	• Is stigma ever used to guide behavior change? • Are caregivers who seek free iCCM services stigmatized based on their socioeconomic class? • Do CHWs or caregivers face other forms of stigma within their communities? If so, how and why?
10.16	**Willingness to Pay**	Describes the willingness to pay for child health services by caregivers. This is also framed as the extent to which CHWs and supervisors are willing to contribute personal funds for the operation of iCCM activities.	• What is the willingness to pay for housing, village clinics, fuel, transport, supplies among CHWs? What is this willingness to subsidize these financial tangibles related to iCCM among the community? How may this affect the success of iCCM? • What is caregiver willingness to pay for referral adherence or attendance to the health facility? How might this impact initial careseeking and the demand for iCCM, as well as referral adherence?
10.17	**Ethics**	Describes the potential ethical constructs underlying the iCCM intervention	• What ethical ideals does iCCM help contribute towards? • In what ways is iCCM unethical? Are there any marginalized actors or groups that do not benefit or may be further disenfranchised as a result of the implementation of iCCM? • Are any human rights violated in the implementation of iCCM? • Does the pursuit of iCCM compromise the attainment of other SDGs?

**Accountability and enforceability are distinguishable in that accountability implies a dependency upon approval from a source or entity to whom the actor is accountable. Enforceability encompasses the ability of an entity or actor to impose sanctions, reprimand, or reward upon an agent that is accountable to it.*

SUPPLEMENTARY APPENDIX 3

Figure S1. Interactive visualization of iCCM Systems Framework, available at: https://kumu.io/iccm/iccm-systems-framework