Digital Health for Community-Based Management of Febrile Illness (Version 1)

Introduction and Context

The Digital Health for Community-Based Management of Febrile Illness framework describes the desired state for community health worker (CHW) use of digital tools for managing malaria and other febrile illnesses—a state in which community health programs leverage digital health tools to strengthen service delivery and generate and use data that improve community health programming, with the goal of decreasing malaria morbidity and mortality and the burden of other febrile illnesses.

This framework is designed to support the development and prioritization of recommendations to advance the use of digital health tools for community case management of febrile illness. While this document focuses on malaria and other febrile illnesses, recommendations developed using this framework are intended to support an integrated approach in alignment with the delivery of CHW services. For example, if existing digital tools are already being used by CHWs for integrated community case management (iCCM) or other health programs, the key functionalities for the management of febrile illness described below should be integrated into the existing tools wherever possible, rather than creating parallel systems.

The framework provides an overview of the key components and functionalities that are necessary for expanding the use of digital technologies at the community level. Throughout this framework the use of digital health tools is envisioned from the CHWs' perspective, so that digital health tools and related systems support CHWs in providing high-quality care and reduce CHWs' reporting burden.

The nine key components within this framework fall into three domains:

- **People**—personnel, training, and technical support.
- **Governance**—policies, strategies, and governance structures and their implementation.
- **Systems**—dataflow, digital tool structures, functionalities, and use.

The development of these components was informed by the *Digital Health Tools for Community Health Worker Programs: Maturity Model and Toolkit* and adapted to incorporate content specific to malaria and other febrile illnesses, including COVID-19. Each of the components has a

brief description and a set of illustrative recommendations that programs could undertake to improve their status in that component. These nine components, when combined, complement each other to achieve the desired state.

The framework also provides descriptions of the functionalities that digital health tools need for malaria control and elimination and for management of other febrile illnesses. These functionalities were developed based on the work of the *Digital Solutions for Malaria Elimination Community of Practice*, the *Mobile Solutions for Malaria Elimination Surveillance Systems: A Roadmap*, and the World Health Organization (WHO) *Classification of Digital Health Interventions*. They were then further developed to address areas with a high burden of disease and further informed by the surveys and interviews conducted across the 27 President's Malaria Initiative partner countries as part of this work.

Functionalities have been divided into two groups:

- **Management of febrile illness**—functionalities that CHWs would use during febrile illness management activities.
- **CHW management and supervision**—functionalities relevant for program staff to manage and supervise CHW cadres in the provision of case management services.

Within the groups, the functionalities are further divided into "foundational" and "advanced value" functionalities. Foundational functionalities are "must haves" for any digital tool being considered for use at national scale for the management of febrile illness. Advanced value functionalities are those that would add value and could greatly improve CHW febrile illness management programming as a component of an ideal suite of digital tools.

Many of these functionalities, framed through a lens of malaria and febrile illness, apply to other health areas, such as iCCM and pandemic preparedness. These key functionalities may already be available within existing digital tools and may only need to be activated or adapted to address a specific disease area, such as malaria or COVID-19 case management. National programs and partners can use the functionalities as a checklist or menu when considering which digital health tools best meet each program's needs. The full list of functionalities that are required should be identified and documented; these documented functionalities should be considered for inclusion in a long-term development roadmap dependent on local needs and resource availability, and defined as components within a national scale-up plan. This type of advance planning helps to ensure all necessary functions can easily be added to existing tools when required in the future.

Successful use of digital health tools for community febrile illness management relies on a well-functioning national health system, robust community health and malaria programs, and a strong digital-enabling environment. While this framework aims to provide a comprehensive overview of all aspects of the desired state, it is focused on providing more detailed recommendations regarding the adoption, use, and scaling of digital health tools for febrile illness management, acknowledging that underlying program and system-wide challenges should be recognized and considered as part of this process.

Digital Health for Community-Based Management of Febrile Illness and Pandemic Preparedness

This framework was developed to guide the use of digital tools for CHW management of malaria cases and other febrile illnesses during routine service delivery. Given that COVID-19 and other emerging pandemic threats can present as febrile illnesses, this framework also applies to many aspects of CHWs' involvement in pandemic preparedness. For example, depending on national guidelines, CHWs may play a role in testing and diagnosing suspected COVID-19 cases; providing supportive treatments for symptom management; recording information on suspected cases, confirmed cases, and contacts; carrying out contact tracing; and participating in public awareness campaigns for disease prevention and vaccination. To support this work CHWs will need to have the necessary skills and equipment to provide these services. Each of the activities described above can be strengthened by the digital health–tool functionalities described below. For these functionalities to apply to specific pandemic threats, such as COVID-19, program managers and technical support staff will need to determine how best to operationalize these functions. For example, when designing case management algorithms for febrile illness, decision trees specific to COVID-19 diagnosis and management will need to be incorporated along with malaria and other diseases.

Beyond CHWs' involvement in COVID-19 management, digital tools have a role to play across the COVID-19 epidemiological curve. Additional work regarding use cases and the incorporation of digital tools for COVID-19 has been completed by the Map & Match project.

To find more information on adapting existing digital tools for outbreak management, refer to the Digital Applications and Tools Across an Epidemiological Curve (DATEC) framework.

Digital Health for Community-Based Management of Febrile Illness: Ideal State Framework

 **PEOPLE**	CHWs and supervisors have the necessary skills and are appropriately equipped and renumerated to provide high-quality care for febrile illness management, where needed	Guidance, training, and ongoing technical support are available for digital tools and data use, and tools make CHWs' job easier	Data generated by CHWs are used by CHWs and facility, regional, and national decision-makers to reduce the burden of febrile illnesses
 **GOVERNANCE**	National CHW policy and guidance exist, include on febrile illness management, and are costed, funded, and implemented	National digital health strategy policies and guidance exist and are costed, funded, and implemented	National digital health and community health strategies and policies are aligned and support each other
 **SYSTEMS**	There are clear data flows between CHW source data and national data warehouses	Implemented digital health tools are sustainable, adaptable, and aligned to national interoperability standards	Digital health tools are contextualized for individual country adoption, have functionalities for CHW febrile illness management, and are used where needed

Ideal State Framework Components

People

1.1 CHWs and supervisors are appropriately skilled, equipped, and paid and are delivering febrile illness management where needed

Description	Illustrative recommendations
• There is adequate coverage of CHWs, according to national guidelines, so that every area that requires CHW support has CHWs available. • Geolocation of active CHWs is mapped. • The community health cadre(s) have a management and support structure documented and implemented. • CHWs and supervisors are trained in febrile illness management. • CHWs have the commodities and equipment needed to provide febrile illness management services. • CHWs are routinely providing febrile illness management services. • CHWs have access to job aids and decision-support tools and are routinely supported through supervision visits, according to national guidelines. • Supervisors have access and respond to feedback from communities and CHWs in order to continuously improve skills. • As a reflection of national policy, CHWs are receiving adequate payment for their work.	• Develop/fund/implement costed roadmap to scale CHW program. • Develop/document/scale CHWs' management and supervision. • Develop malaria and febrile illness management training curriculum and integrate into existing CHW curricula where possible. • Streamline multiple training curricula into a single CHW training package and leverage blended learning approaches, similar to the *Digital Health Applied Leadership Program*. • Develop/implement/scale CHW malaria and febrile illness management training; use innovative approaches, including remote and interactive training techniques, such as job shadowing at health facilities; integrate into ongoing skill-building programs where possible. • Develop/implement/scale supportive supervision and peer-learning mechanisms. • Assess/address barriers to service delivery, such as access to commodities. • Support assessment/evaluation of CHW program implementation to describe impact and inform areas for improvement. • Develop/fund/implement feedback loop from communities and CHWs to supervisors for ongoing, continuous skills building.

People

1.2 Guidance, training, and ongoing technical support are available for digital tools and data use

Description	Illustrative recommendations
• There are staff with clear roles and responsibilities and a hierarchy from the local to the national level for information technology (IT) support, including dedicated technicians and a Help Desk, health information systems, human resources support, and support for data use. • There is documented guidance on how data can be used to guide decision-making from the local to the national level, such as monitoring and evaluation plans and data-to-action frameworks. • CHWs and supervisors are trained and motivated to use digital tools, and digital skill building is a component of routine pre-service and in-service training. • CHWs and staff at all levels are trained in data use for decision-making. • In-country capacity exists to adapt, configure, and support the implementation and maintenance of hardware and software. • Training and technical support effectiveness is continuously enhanced by CHW feedback, and iterative improvements are made based on that feedback.	• Identify/build capacity of existing staff and local IT providers to provide day-to-day digital and data use support from the local to the national level. • Develop/fund/implement comprehensive IT and data use support structures from the local to the national level. • Develop monitoring and evaluation plans and data-to-action frameworks, in collaboration with CHWs, to support data use and ensure that indicators and dashboards are responsive to CHWs' needs. • Develop training curricula for CHW use of digital tools and data for decision-making and incorporate into existing CHW curricula. • Develop/fund/scale innovative skill-building approaches to support the use of digital tools and data for decision-making, such as WhatsApp groups, to ask questions on tool functions and to discuss/share progress toward performance goals and support data interpretation. • Identify and engage in-country partners and global goods providers that have the capacity to adapt, configure, support, and maintain the sustained implementation of hardware and software. • Develop feedback and evaluation processes to continuously strengthen training and technical support programs.

People

1.3 Data generated by CHWs are used to reduce the burden of febrile illnesses

Description	Illustrative recommendations
• Data review meetings are routinely held at all levels to ensure data capture is of high quality and data comprehension is high. • Data management costs (e.g., transport and/or airtime for data review meetings) are incorporated into budgeting exercises. • All levels, from the community to the national, regularly use data to guide key decisions (e.g., for requesting commodities, scheduling activities, monitoring data completeness and quality, monitoring CHW performance, targeting interventions, etc.). • Data feedback loops are established between the national and community levels and maintained to improve data quality, including communication mechanisms to understand data-driven decisions and changes made to implementation to allow sharing and scaling of best practices.	• Assess existing barriers to CHW data use at all levels of the health system. • Develop/fund/scale routine data review meetings, leveraging existing data review processes and meetings and thereby strengthening the health management information systems of individual countries and promoting the sharing of best practices and standardization between systems. • Confirm resourcing plan for ongoing data management and ensure data management plan works within existing resource envelope. • Conduct data quality audits of CHW data, using national and WHO guidance on malaria and health systems data quality audits. • Institutionalize working groups, data review meetings, or other approaches at all levels to routinely review data and program progress and identify programmatic questions, integrating them with existing working groups and data review meetings where possible. • Reinforce the routine use of data-to-action frameworks in the planning and implementation of CHW programs. • Develop systems to optimize/incentivize data use (e.g., regular feedback and accountability mechanisms and recognition of data use) and automated data analytics *(see Systems 3.3 below)*. • Document/evaluate data use to record progress and best practices and identify opportunities for improvement; involve CHWs.

Governance

2.1 National CHW policies and guidance exist and are appropriately costed and funded, include febrile illness management, and are implemented

Description	Illustrative recommendations
• National CHW policies and guidance exist and include a standardized package of care; policy is being implemented consistently throughout the country with a standardized package of care. • CHW policy describes CHWs' role in malaria case management. • CHW program is funded.	• Develop national CHW policy and guidance, which include a clear, standardized package of care that describes CHWs' responsibilities in providing care. • Modify CHW policy to include CHWs' role in the management of malaria cases and other febrile illnesses. • Develop a CHW program funding strategy, incorporating input from and long-term strategies of implementing partners and donors. • Develop streamlined implementation strategy (vs. fragmented program-specific strategies). • Develop a coordinating body to coordinate across national programs (including the national malaria, community health, and digital health programs) and partners. • Support assessment/evaluation of policy implementation to improve effectiveness.

Governance

2.2 National digital health strategy and policies exist, are appropriately costed and funded, and are implemented

Description	Illustrative recommendations

• Digital health strategy exists.
• Digital health policies exist to guide:
  ○ Governance (digital health and health data governance roles, responsibilities, and structures).
  ○ Data management (data access, privacy, security, and confidentiality and data-sharing guidance).
  ○ Standards and interoperability (enterprise architecture, normative standards, and digital identity).
  ○ Infrastructure (data hosting and storage [e.g., local or cloud], mobile device management, and telecommunications access).
  ○ Workforce (job structures and descriptions, plans for capacity building, digital literacy expectations, and incentives for digital adoption).
• A robust, transparent procurement process supports national decision-making within governing bodies about digital tools used to support health systems.
• A country-led governance structure is established and leading the development/implementation of the strategy and policies.
	• Develop/update national digital health strategy, ensuring updates include global standards and policy frameworks that have been created and updated recently by WHO and others.
	• Develop policies in areas with identified gaps.
	• Develop roadmap for digital health strategy and policy implementation that includes a detailed costing plan to ensure adequate funding for implementation.
	• Support assessment/evaluation of strategy and policy implementation and enforcement to improve effectiveness.
	• Support digital data leadership, management, and governance training.
	• Develop a robust, transparent digital procurement process to support governing bodies in their decision-making.

Governance

2.3 National digital health and community health strategies and policies are aligned and support each other

Description	Illustrative recommendations
• Digital health strategy references and supports community health strategy and includes management of febrile illness. • Community health strategy references and supports digital health strategy and includes management of febrile illness. • Community health division and the National Malaria Control Program use the digital health strategy and policy to inform the use of digital tools in community-level malaria interventions. • There is a coordinating body that meets regularly to discuss and plan CHW program use of digital tools that includes representatives of CHWs, malaria and digital health programs, and partners. • CHW guidance on the use of digital tools is implemented and enforced.	• Develop a digital health strategy/approach specific to the CHW program and community malaria case management. • Support the CHW program to adapt principles for digital health strategy on use of CHW digital health tools. • Develop a coordinating body/technical working group for CHW digital health tools. • Develop digital health system requirements for community-level malaria case management.

Systems

3.1 There is clear febrile illness dataflows between CHW source data and national data warehouses

Description	Illustrative recommendations
• It is clearly documented how CHW data flow into the national data warehouses, including which system is used (paper or digital), which data are transferred, and what the roles, responsibilities, and reporting requirements are at each level. • All CHW-collected data regularly flow into the national data warehouses for storage and use, with minimal errors, disruptions, or downtime. • CHW data that are collected are complete, accurate, disaggregated by relevant categories to monitor for equitable service delivery (e.g., geography, gender), and timely. • A strong metadata management plan is in place and implemented to ensure up-to-date registry information in the national data warehouses (e.g., CHW roster, facility registry).	• Streamline/rationalize CHW malaria data flows by assessing current flows, identifying existing gaps, and coordinating with national programs and partners to improve system connections and interoperability. • Clarify roles and responsibilities for data management and reporting requirements. • Develop protocols and feedback mechanisms to improve data completeness, accuracy, and timeliness. • Develop plans to digitalize data collection systems. • Develop organizational procedures and policies for cleaning, managing, storing, and sharing data. • Develop organizational procedures and policies for metadata management and updates.

Systems

3.2 Digital health tools are sustainable, adaptable, and aligned to national interoperability standards

Description	Illustrative recommendations
• Digital health tools currently in use and prioritized by the government for use in CHW programs are: **Sustainable** (are in high demand and have a strong user community, a large user group, in-country technical support for software development and maintenance and for hardware maintenance, government endorsement and ownership, and a long-term financing plan). **Adaptable** (are designed to be flexible enough to accommodate ongoing demands for additional functionalities, new cases, and integration of other health services, while being nationally scalable). **Aligned to interoperability standards** (can exchange data with national health systems and have a data dictionary and documentation on data use and exchange).	• Conduct an in-depth assessment of existing tools against national policies to document the extent to which tools meet the sustainability, adaptability, and alignment criteria. • Prioritize tools that meet these criteria for potential scaling. • Develop plans to modify prioritized tools to meet the sustainability, adaptability, and alignment criteria, leveraging partners and existing global good implementers where possible. • Create a development plan, mapping out initial and ideal, long-term functionality to ensure flexibility to meet future needs is built into the initial design. • Develop/implement effective Ministry of Health information exchange infrastructures and components, including (but not limited to) specific web-based health facility registries and geo-registries, a patient registry, a CHW registry, and terminology services.

Systems

3.3 Digital health tools are contextualized for individual country adoption, have foundational functionalities for CHW febrile illness management, and are used where needed

Description	Illustrative recommendations
• Digital health tools meet user needs and adapt to changes in user needs over time, in terms of infrastructure (i.e., power and connectivity) hardware (i.e., maintaining charge) and software functionalities required. • Digital health tools are regularly reviewed to ensure they meet CHW ongoing needs, with the review including CHW input and user-centered design principles. • Digital health tools fit within current infrastructure constraints, if any, including considerations for availability of power, connectivity, and ongoing maintenance of hardware • Tools incorporate foundational and, where possible, advanced value functionalities (see functionalities section on next page). • Digital tools are used nationally by all CHW programs that provide services for the management of febrile illness. • Digital health tools that support febrile illness management services are integrated into a single tool that supports multiple health care programs (i.e., iCCM, maternal and child health, HIV) wherever possible, with iCCM being included at a minimum if febrile illness management is the starting point for the tool.	• Conduct an in-depth review of existing community digital health tools against CHW program needs for the management of malaria and other febrile illnesses; use the review to identify gaps and prioritize tools for piloting or scaling. • Develop costed plan for scaling CHW use of digital health tools. • Support national programs in prioritizing foundational and advanced functionalities for development, testing, and scaling. • Develop private-sector partnerships to support the funding/scaling of CHWs' use of digital tools.

Digital Health for Community-Based Management of Febrile Illness: Tool Functionalities

This section presents the relevant digital health–tool functionalities for malaria control and elimination and management of other febrile illnesses. These functionalities, considered within the context of the components above, support CHW training and technical support, implementation of policies and strategies, and the development of tools that support integrated febrile case management, with a focus on the delivery of high-quality services. The functionalities presented here can be thought of as a menu of modules to be incorporated into a new or existing digital health tool. Each functionality should be carefully considered for inclusion in a long-term development roadmap. Depending on local needs and resource availability, national programs may develop roadmaps that feature different orders of functionality development. The goal is to use these functionalities as a guide to ensure that functionalities can be easily incorporated over time, according to the roadmap, without requiring a new digital tool or a costly redevelopment of an existing system. Note that the “Foundational” and “Advanced value” designations listed below are specific to a digital tool, not a community health program. Thus, some foundational components of a community health program may be “Advanced value” in terms of its digitalization. For example, while strong supervision is a cornerstone of any community health program, digitally enabled supervision is a potential high-value function that could be incorporated into a digital tool as local context allows. The effectiveness of these tools and the use of the functionalities rely on a robust backend infrastructure that is interoperable with national health systems, including CHW registries, health facility registries, and national health management information systems that track malaria cases and other febrile illnesses, among others. Effective use of these national systems in CHW programs relies on national strategies and processes for ongoing updates and maintenance of these core systems and continued connection with CHW digital health tools. (These principles are described under the systems components 3.1 and 3.2 above.)

Community Based Management of Febrile Illness

Foundational	Advanced
Decision support	General notifications
Aggregate case reporting and analytics	Teleconsults / Telehealth
Individual case reporting and analytics	Digital diagnostics
Case geolocation	Client identification and linkage to health records
Interoperability with HMIS	Scheduling and work planning
Off-line capability	Client communication
Stock reporting and analytics	
Referral coordination	
Outbreak alerts	

CHW Management and Supervision

Foundational	Advanced
CHW identification	Continuous skill-building resources
CHW facility catchment location	CHW geolocation
CHW performance analytics	Digitally enabled supervision
CHW communication	Interoperability with other national health systems
	Digital payments

Functionalities: Community-Based Management of Febrile Illness

Foundational functionality	How this functionality is used
Decision support Tool provides algorithms or checklists to guide CHW service provision	Decision-support functionalities guide CHWs through national diagnosis and treatment algorithms and support. As recording of data is often built into these tools, they not only support adherence to national guidelines but also may help to improve recording and reporting of cases.
Aggregate case reporting and analytics Tool collects aggregate case data and has data analytic functions in tool or online	Digital tools to support malaria and treatment of other febrile illnesses must be able to collect aggregate data on cases seen by CHWs. Aggregate case data are essential to disease surveillance and targeting of interventions. To be useful, digital tools must allow case data to be easily viewed and analyzed, whether within the mobile tool itself for use by CHWs or through web-based dashboards accessible to staff at multiple levels of the health system. Dashboards may be native to the tool, or the tool may rely on interoperability with an external system that provides analytics.
Individual case reporting and analytics Tool collects individual case data and has data analytic functions in tool or online	While the ability to report aggregate data is essential in all settings, the ability of countries to collect data on individual case entry and reporting as they move from malaria control to elimination—as well as the ability of CHWs involved in contact tracing for emerging pandemics, such as COVID-19, to provide such data—is critical. CHWs need to be able to track individuals and identify relationships between index and related cases. With individual case follow-up, it becomes more important for basic analytics to be embedded within the mobile digital tool. CHWs should be able to assess their progress in completing case investigations within the tool.
Case geolocation Tool allows collection or use of geospatial data for individual cases	In low-malaria-burden and malaria-elimination settings, as well as in pandemic responses where individual cases are identified and tracked, geolocated case data allow program staff and CHWs to follow up more precisely with cases and their contacts and to identify hot spots for further targeting of interventions.
Interoperability with HMIS Tool sends information to the official national health management information system	High-quality surveillance requires a single trusted source of case data for malaria and other febrile illnesses that can be used for decision-making. Data systems for community-based management of febrile illness need to be able to connect to national case-reporting systems for malaria and other illnesses so that the community data can be integrated with health facility and private-sector data and a complete count of the cases diagnosed and treated within each administrative area can be available to decision-makers.

Foundational functionality	How this functionality is used
Off-line capability Tool functions, at least partially, off-line	Given low and unreliable connectivity, especially in rural areas where many CHWs are stationed, tools need to be usable while off-line. CHWs should be able to enter information about cases they are treating and review their past data, even when connectivity is not available. This functionality allows CHWs to continue to carry out their work and to use the data they have collected in the past to guide real-time decisions. Without this functionality, many CHWs will not be able to use the tool, and information collected using the tool would be incomplete. With this off-line functionality, the tools also need to be able to sync with the relevant databases and avoid creating duplicates within the system.
Stock reporting and analytics Tool collects stock data and has analytic functions in tool or online	To effectively diagnose and treat febrile illness, CHWs must have access to diagnostic tests and treatments, such as antimalarials and amoxicillin. A digital tool that allows CHWs to track and report stock availability can improve stock management and reduce stockouts. It can trigger health facility staff to provide CHWs with additional stock, direct local redistribution of stock toward CHWs who have higher caseloads, support stock forecasting for future purchases and distributions, and help validate case data.
Referral coordination Tool allows client referral and tracking between CHWs and local health facilities	Individuals with febrile illness that do not receive prompt, appropriate treatment are at risk of severe illness or death, particularly children. CHWs often refer patients to higher-level facilities without knowing whether patients sought care. A referral coordination system would allow CHWs to refer at-risk cases to a local health facility and be notified of whether the patient attended the health facility, as well as any outcome. If a CHW finds that the referral was not completed, he or she can then follow up with the patient or caregiver to further encourage and support care seeking. In elimination settings, referral coordination could also include the ability of health facility staff to refer index cases for CHW case investigation follow-up.
Outbreak alerts Tool sends and receives outbreak-related notifications	Outbreak alerts share information about and identify potential outbreaks. They support event-based surveillance, an important use case for detecting and responding to pandemics. These event-based, non-routine notifications can be designed simply and with a high public health impact.

Advanced functionality	How this functionality is used
General notifications Tool sends and receives notifications	Notifications can be used to notify users when outbreaks occur, reports are expected or past due, key tasks have been completed, additional stock is needed, and data quality issues need to be addressed. While not considered foundational to febrile illness management, automated push notifications, based on preset deadlines or thresholds, or manual notifications initiated by CHWs and other staff can dramatically improve program communication and performance in a range of areas.
Teleconsults / Telehealth Tool connects skilled health providers in real time to CHWs and community members	Teleconsults and/or telehealth can help CHWs secure real-time support on case management, data analysis and interpretation, and clinical decision-making. Teleconsults and/or telehealth can also reach communities directly with important health information, counsel, and advice, and support triaging of those seeking in-person care. When in place, teleconsults and/or telehealth can reduce cost of care, minimize non-essential travel to health facilities, improve overall quality of care delivered, and support ongoing learning and training of CHWs.
Digital diagnostics Tool connects to diagnostics to read and/or share diagnostic information	Accurate diagnosis is necessary to appropriate disease management. Digital diagnostics are tools that enable diagnostic tests to be connected to digital tools to support health workers in interpreting and sharing test results. When connected to a network, digital diagnostics can support real-time tracking of case identification and reporting by automatically sending test results to a central database.
Client identification and linkage to health records Tool allows CHWs to uniquely identify each client, connect to health records at other health facilities, and track and coordinate care over time	Client identification and linkage to health records empower CHWs to holistically manage client care through a range of conditions. The tool allows CHWs to register new clients and access and review the longitudinal medical history for each client through a system-wide unique health identification number. When combined with other functionalities, such as scheduling and planning or client communication, the tool can be used to trigger reminders for follow-up care. When combined with decision support, it can be used to integrate client-specific history to improve quality of care. For example, it could notify a CHW of glucose-6-phosphate dehydrogenase deficiency when treating a recurring *Plasmodium vivax* malaria case.
Scheduling and work planning Tool allows CHWs to plan and schedule key activities in the community	In settings with high burdens of malaria and other febrile illnesses, scheduling and work-planning features would support CHWs in meeting community outreach targets and provide reminders for upcoming meetings and reports. In low-burden and elimination settings for malaria and in a pandemic response, these features would help CHWs prioritize case investigations according to timelines and locations.

Advanced functionality	How this functionality is used
Client communication Tool allows two-way communication between CHWs and clients regarding health messages	Key health information can empower clients to have greater control over their health and allow them to become active partners in preventing and managing febrile illnesses. Client communication could include individual or group-based health messages designed to notify specific population groups regarding a health promotion event or disease outbreak, share health education messages that could be targeted to the client's health status, or provide reminders for appointments, adherence, or follow-up services. These could be shared through text messages, videos, or links to scheduling systems, education messages, or other relevant media.

Functionalities: CHW Management and Supervision

Foundational functionality	How this functionality is used
CHW identification Tool uniquely identifies CHWs	Being able to uniquely identify CHWs according to their name and a unique identifier, such as a CHW ID, is essential to tracking the total number of CHWs in the country. By linking this information with febrile illness case data at the community level, managers would be able to assess the proportion of CHWs that are actively treating cases and their reporting completeness. A unique identifier could also support tracking across systems, including payment, training, and commodity tracking.
CHW facility catchment location Tool provides uniquely identified CHWs an associated link to the health system	Knowing which health facility or other organizational unit a specific CHW reports to is essential to knowing the distribution of CHWs in the country. This information also can be used to plan where additional CHWs are needed within the country to meet coverage goals and supports the planning, implementation, and monitoring of supervision activities.
CHW performance analytics Tool has analytic functions (data validation, graphs, charts) that support data quality, quality of care, or other performance areas	In addition to reviewing case data, analytics functions that include review of individual CHW performance will help support program implementation and improvements. Specific analytic functions include review of data quality, including timeliness, completeness, and accuracy; key quality-of-care indicators, such as the proportion of suspected cases tested and proportion of cases appropriately treated based on test results; and performance on completing key work plan activities, such as follow-up of case investigations. These data must be available also at the CHW level to monitor individual CHW performance and provide targeted feedback. Finally, this information can be used to plan future trainings and supervision visits and could be used to identify CHWs for promotion within the health system.
CHW communication Tool allows two-way communication between peer groups, associated health facility staff, and/or supervisors	Two-way communication systems that allow CHWs to communicate with supervisors and peers can improve CHW performance by enabling CHWs to consult with health facility staff regarding case management (i.e., teleconsultations), share information on referrals, submit stock requests, and follow up on payments or other administrative issues. They also allow supervisors to reach out to CHWs as a group to send updates on treatment guidelines and reminders for upcoming meetings. Communication systems can provide a sense of connection and motivation to this cadre of last-mile health workers who are often stationed in rural locations and who may therefore feel isolated and unappreciated.

Advanced functionality	How this functionality is used
Continuous skill-building resources Tool provides access to training materials, policies, or other useful reference documents	Embedding national guidelines, training materials, videos, short interactive cases or quizzes, and other resources within digital tools provides CHWs with easy access to key information required for their work. As updates are made to these documents, they can be pushed out through the digital tool, reducing printing and transportation costs and ensuring that CHWs have access to the most up-to-date information.
CHW geolocation Tool allows collection or use of CHW geolocation data for monitoring and planning distribution	Beyond CHW assignment to a local health facility or other organizational unit, knowing the precise geolocation of CHWs can further inform monitoring of CHWs and planning their distribution. For example, there may be multiple CHWs within a health facility catchment whose locations should be distributed within the area to maximize access to services at the local level.
Digitally enabled supervision Tool can be used by supervisors to assess CHW skills and capacity	A standardized supervision system—whether in the form of supervisor observation, self-administered case-based written scenarios, or other techniques—can help CHWs and their supervisors identify areas of strength and weakness for future support. It can be used to identify CHWs who could benefit from retraining or from promotion to a mentoring role. Without this component, it may be difficult for supervisors and program managers to know which key skills should be emphasized and which CHWs to target for retraining.
Interoperability with other national health systems Tool sends information to other national systems (e.g., iHRIS, LMIS)	This tool connects to other information systems like human resource management, finance/payment systems, or commodity and stock management. For example, integration with a national logistics management information system (LMIS) could inform the stock availability from the national to the local level and support redirecting of resources. Linking CHW data systems with an integrated human resources information system (iHRIS) and financial systems can help managers to know which CHWs are trained, actively treating cases, and receiving appropriate payment for the services provided. It also can help in planning future training and support sessions.
Digital payments Tool facilitates payment of salary, stipends, and/or performance incentives to CHWs	Electronic transmission of salaries and incentives can reduce transaction costs and increase the transparency and efficiency of payment systems, as well as improve CHW satisfaction. Digital payments through mobile phones allow CHWs to store the payments they receive in an electronic account associated with their mobile phone's SIM card and conduct transactions from their account using their mobile phone. Users can deposit and withdraw cash to/from their mobile money account through a mobile money agent, such as a shopkeeper, bank branch, or other formal entity authorized to conduct mobile money transactions. When connected with CHW registers and supervision systems, digital payments can help address the issue of "ghost" CHWs and activities reported in the system. When linked with CHW case management and service data, it can also be used as partial payment for performance programs (i.e., for specific services provided or service goals met).

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