

COMMUNITY HEALTH INFORMATION SYSTEM ROAD MAP



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ABBREVIATIONS

CHIS	community health information system
CHT	Community Health Toolkit
CHW	community health worker
CHWAIM	Community Health Worker Assessment and Improvement Matrix
DHIS2	District Health Information Software
DIIG	Digital Implementation Investment Guide
HIS	health information system
HMIS	health management information system
HMN	Health Metrics Network
iCCM	integrated community case management
ICT	information and communications technology
NGO	non-governmental organization
OECD	Organisation for Economic Co-operation and Development
OpenSRP	Open Smart Register Platform
PAHO	Pan American Health Organization
RD4C	Responsible Data for Children
UHC	universal health coverage
WHO	World Health Organization



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EXECUTIVE SUMMARY

This guidance document serves as a road map and practical guide for national and local decision makers to successfully plan for and implement a community health information system (CHIS). It redirects users to useful resources for each stage of implementation of a CHIS. The guide is designed both for use at the beginning of the CHIS development process and for strengthening or scaling up an existing CHIS.

This guide covers the six milestones to be reached for CHIS implementation. While there may be other milestones during CHIS implementation, these six are the most important to be considered:

1. Assessing the extent of development of the community (health) programmes – understanding the programmatic context within which the CHIS is situated.
2. Understanding the CHIS ecosystem – the broader information system context within which the CHIS is situated.
3. Setting up/strengthening the CHIS data governance mechanism – ensuring effectiveness, ethics and equity.
4. Identifying programmes, modules and indicators to include in the CHIS – determining key information components to be produced by the CHIS.
5. Identifying the right platform (aggregate/ individual) for data collection, aggregation and visualization.
6. Monitoring data quality and feedback loops for CHIS data – ensuring data use through quality of and access to information.

The Health Metrics Network (HMN) Framework and Standards for Country Health Information Systems provides the skeleton for the road map. They outline six components relevant for all health information systems (HIS), whether these are facility or community based. By the time all the milestones for CHIS implementation have been reached, most of the following six components of the HMN Framework will have been addressed:

1. **HIS resources:** Policy, legislature, management and financial environment that must be in place, and the infrastructure and resources required, to ensure a fully functional HIS.
2. **Indicators:** Definition of the core indicators covering the domains of health information.
3. **Data sources:** Key data sources, standards for their use, their role in generating health information and potential linkages between them.
4. **Data management:** Optimal processes for collecting, sharing and storing data; processes for data flow and feedback loops.
5. **Information products:** Criteria for assessing the quality of available data.
6. **Dissemination and use:** Norms for presenting, disseminating data and sharing information among stakeholders, and creation of incentives for evidence-based decision making.

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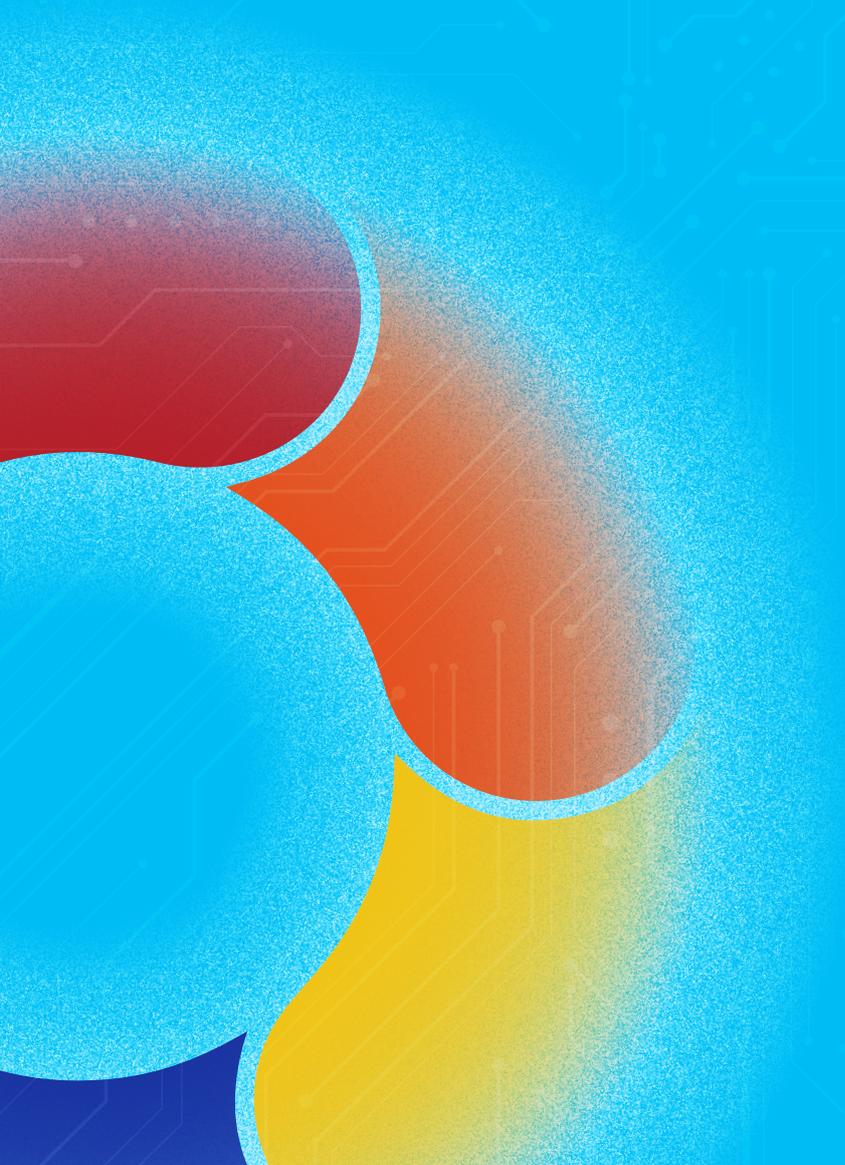
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Note on the document: This document will be reviewed and updated periodically to ensure that it remains aligned with the most recent guidelines and evidence. Feedback on the document will contribute to its evolution and improvement over time.

Disclaimer: This guidance document reflects the activities of individual agencies around an issue of common concern. The principles and policies of each agency are governed by the relevant decisions of its governing body. Each agency implements the interventions described in this document in accordance with these principles and policies, and within the scope of its mandate.

Introduction



This guidance document serves as a road map and practical guide for national and local decision makers to successfully plan for and implement a community health information system (CHIS). The guide is designed both for use at the beginning of the CHIS development process and for strengthening or scaling up an existing CHIS. The Digital Implementation Investment Guide (DIIG)¹ is referenced multiple times in this document as it provides a broader approach to implementation of digital interventions into health programmes.

The guide covers both 'traditional' paper-based and digital health aspects of a CHIS.²

Working CHIS definition:³

A CHIS is a combination of paper, software, hardware, people and processes, which seeks to support informed decision making and action by community health workers and related actors. This includes:

- **Recording of basic data such as population events, health programme transactions, case-based data, commodities stock and resource availability.**
- **Tracking and triggering action on individual programme-based needs such as disease surveillance, routine care provision, follow-up visits, and referrals to facilities.**
- **Reporting and feedback, including routine upward reports, feedback reports, ad hoc reports and specific reports for different stakeholders.**

The key audience for this CHIS road map includes: Ministry of health programme managers and health information system (HIS) managers and implementers engaged in the design, planning, deployment, governance and scale-up of successful CHIS. A secondary target audience includes the development agencies and donors who provide technical assistance, governance oversight, or financing to community health programmes and CHIS.

This guide covers six of the most important milestones:⁴

1. **Assessing the extent of development of the community (health) programmes – understanding the programmatic context within which the CHIS is situated.**
2. **Understanding the CHIS ecosystem – understanding the broader information system context within which the CHIS operates.**
3. **Setting up/strengthening the CHIS data governance mechanism – ensuring effectiveness, ethics and equity.**
4. **Identifying programmes, modules and indicators to include in the CHIS – determining key information components to be produced by the CHIS.**
5. **Identifying the right platform (aggregate/ individual) for data collection, aggregation and visualization.**
6. **Monitoring data quality and feedback loops for CHIS data – ensuring data use through quality of and access to information.**

¹ World Health Organization, *Digital Implementation Investment Guide: Integrating digital interventions into health programmes*, WHO, Geneva, 2020.

² The widespread use of digital health solutions (e-health or mhealth) in recent years provides an excellent opportunity to tackle health system challenges and assist front-line health workers in their daily routine. Digitalization of CHIS is occurring in many countries. Good governance, national ownership and government leadership – through a digital health or e-health strategy – are instrumental to ensure standardization and interoperability of CHIS.

³ UNICEF, World Health Organization, The Global Fund to Fight AIDS, Tuberculosis and Malaria, UN Women, Joint United Nations Programme on HIV/AIDS, Stop TB Partnership, Rockefeller Foundation, Gavi, the Vaccine Alliance, and Health Data Collaborative, *Guidance for Community Health Worker Strategic Information and Service Monitoring*, <www.healthdatacollaborative.org/working-groups/community-data/guidance-for-community-health-worker-strategic-information-and-service-monitoring/>, accessed 16 September 2022.

⁴ Costing is not explicitly included as a separate milestone; however, some of the suggested tools and guidance have a costing component.

How to use the guide:

Each milestone along the road map contains an introduction with a description of the ‘what’ and the ‘why’ of this milestone and a list of decisions the user has to make. The guide also references existing tools, job aids, guidance and applications that users can access to reach these milestone.

While a user – particularly those who want to strengthen or scale their existing CHIS – may be tempted to look at just one or two steps/ milestones they find most relevant to their context, we suggest that *all* of the milestones be reviewed, however briefly. This is because a revision to one aspect of a CHIS could affect its other components – that is, there may be potential ‘side effects’ that occur with any changes made. Identifying and knowing how to address these consequences could help to mitigate any future problems.

While the milestones are listed as sequential, it may be possible to combine implementation of assessments across milestones for efficiency. Whether this is advisable will depend on where you are in the CHIS development and implementation process (for example, whether you are just starting out or have a more mature system).

The tools and guidance suggested in the road map are best implemented by multidisciplinary teams, and many will involve at least a desk review, if not field visits.

The framework

Although there are many HIS frameworks, the Health Metrics Network (HMN) Framework and Standards for Country Health Information Systems⁵ provides the skeleton for this road map. The six components of the Framework are relevant for all HIS, whether they are facility or community based. By the time all the milestones have been achieved, the following six components of the Framework will have been addressed. Table 1 shows the linkages between the components of the HMN Framework and the CHIS Road Map milestones.

1. **HIS resources:** The policy, legislature, management, human resources and financial environment that must be in place, and the infrastructure and resources required, to ensure a fully functional HIS.
2. **Indicators:** Definition of the core indicators covering the domains of health information.
3. **Data sources:** Key data sources, standards for their use, their role in generating health information and potential linkages between them.
4. **Data management:** Optimal processes for collecting, sharing and storing data; processes for data flow and feedback loops.
5. **Information products:** Criteria for assessing the quality of available data.
6. **Dissemination and use:** Norms for presenting, disseminating data and sharing information among stakeholders, and creation of incentives for evidence-based decision making.

⁵ Health Metrics Network, *Framework and Standards for Country Health Information Systems*, 2nd ed., World Health Organization, Geneva, 2012.

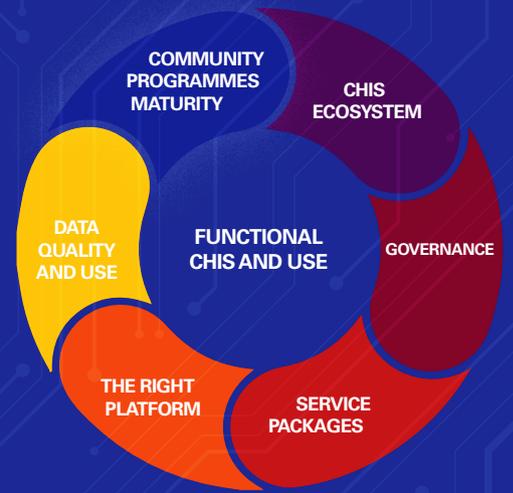
TABLE 1: Mapping the CHIS Road Map to the HMN Framework

HMN Framework	CHIS Road Map Milestones
HIS resources	Assessing the extent of development of community health workers programmes; CHIS ecosystem; CHIS governance
Indicators	Identifying programmes, modules and indicators
Data sources	Understanding the CHIS ecosystem
Data management	Identifying the right platform; monitoring data quality and feedback loops
Information products	Monitoring data quality and feedback loops
Dissemination and use	Monitoring data quality and feedback loops



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01



Assessing the extent of development of the community health worker programmes

A central building block of the community health programme is the frontline workers – the community health workers (CHWs), whose role and activities are vital for both the implementation of a community health programme and the CHIS. In order to have a CHIS that fulfills its mandate to provide quality data for decision making, it is vital to have a solid CHW programme within which one can embed a CHIS. This milestone deals with assessing the different domains of a CHW programme.

Why is this important?

Prior to taking an in-depth look at the CHIS, it is essential to assess the level of operationality of the CHW programme because it is key to the functionality of the CHIS, which is supposed to measure, monitor and assess the components of the community health programme.

There are some useful tools for assessing CHW functionality. However, for the purpose of CHIS design and implementation, not all components of the CHW functionality are equally relevant, and some components – such as data – can be assessed using other more CHIS-focused tools. This means you will need to decide where to focus your assessment of the community health programme and how deeply you want delve in your assessment.

What decisions will you have to make?

Some questions you will need to ask and decisions you will have to make are:

- Has an assessment of the community health programme been conducted recently which you can build on? Or do you need to undertake a focused assessment to gather the information you need for the design or redesign of the CHIS?
- Which components are most relevant to your CHIS design needs?
- What will you do with information that relates more to CHW functionality than to CHIS design?

- How will this assessment impact the remaining milestones?
- How are you going to define the methodology for assessing each component?
- Who will be carrying out these assessment activities?

Recommended tools to use

To obtain a good picture of the functionality of a CHW programme, the CHW Assessment and Improvement Matrix (AIM) tool is a good option. The CHW AIM tool⁶ intends to support the operationalization of quality CHW programme design and implementation. It can assist the assessment, improvement and planning of CHW programmes by deepening your understanding of the elements of successful programmes and the use of best practices as an evidence-based approach to improvement.

CHW AIM – Updated Programme Functionality Matrix for Optimizing Community Health Programmes

The CHW AIM Program Functionality Matrix was updated by the United States Agency for International Development (USAID), UNICEF, the Community Health Impact Coalition, and Initiatives Inc., to assess implementation gaps in the design of CHW programmes and to support their improvement. The Matrix is organized around 10 programmatic areas which are assessed using a scale ranging from Nonfunctional, Partially Functional, Functional, to Highly Functional.

⁶ CHW Central, Community Health Impact Coalition, Initiatives Inc., USAID and UNICEF, *Community Health Worker Assessment and Improvement Matrix (CHW AIM): Updated program functionality matrix for optimizing community health programs*, USAID, Washington, D.C., 2018.

INTENDED AUDIENCE:

Policymakers, ministries of health, non-governmental organizations (NGOs), or other organizations that implement and manage CHW programmes.

DOMAINS ASSESSED:

Ten components to institutionalize CHW programmes are assessed:

1. **Role and recruitment:** How CHW recruitment, their role and scope of work are designed and clarified by the health system design.
2. **Training:** How pre-service training is provided to prepare CHWs for their role and ensure they have the necessary skills to provide safe and quality care.
3. **Accreditation:** How health knowledge and competencies are assessed and certified prior to practising, and recertified at regular intervals while practising.
4. **Equipment and supplies:** How the requisite equipment and supplies are made available when needed to deliver expected services.
5. **Supervision:** How supportive supervision is carried out such that regular skill development, problem solving, performance review and data auditing are provided.
6. **Incentives:** How a balanced incentive package reflecting job expectations – including financial compensation in the form of a salary as well as non-financial incentives – is provided.
7. **Community involvement:** How a community supports the creation and maintenance of the CHW programme.
8. **Opportunity for advancement:** How CHWs are provided career pathways.
9. **Data:** How community-level data flow to the health system and back to the community and how they are used for quality improvement.
10. **Linkages to the national health system:** The extent to which the ministry of health has policies that integrate and include CHWs in health system planning and budgeting and provides logistical support to sustain CHW programmes.

Approach towards the assessment: The assessment approach allows governments and stakeholders to quickly and efficiently map and assess programmes using a rating scale based on best practices. The assessment can be moderated by a facilitator. The scoring involves four levels (Nonfunctional, Partially Functional, Functional, Highly Functional). However, ratings alone may not be enough to convey a full understanding of what the challenges are. The assessment can be deepened by identifying the root causes of each underperforming component. A root analysis, by asking simple questions such as why, could help you gain a better understanding of the bottlenecks or reasons for low scores, which can be used to address root causes.

For more information, see:

- [Community Health Worker Assessment & Improvement Matrix](#)
- [Updated Program Functionality Matrix for Optimizing Community Health Programs](#)

Supervision

How supportive supervision is carried out such that regular skill development, problem solving, performance review, and data auditing are provided.

1 NON-FUNCTIONAL <input type="checkbox"/>	2 PARTIALLY FUNCTIONAL <input type="checkbox"/>	3 FUNCTIONAL <input type="checkbox"/>	4 HIGHLY FUNCTIONAL <input type="checkbox"/>
<p>No supervision or regular evaluation occurs outside of occasional visits to CHWs by nurses or supervisors when possible (once a year or less frequently),</p>	<p>Supervision visits or group meetings at the health facility occur between 2 and 3 times per year for data collection,</p> <p>Supervisors are not assigned to CHWs or communities or are unknown to CHWs and communities.</p> <p>Supervisors are not trained.</p> <p>No individual performance support is offered (e.g., problem-solving, coaching).</p>	<p>A dedicated supervisor conducts supervision visits at least every 3 months that include reviewing reports and providing problem-solving support to the CHW.</p> <p>Supervisors are trained and have basic supervision tools (checklists) to aid them.</p> <p>The supervisor provides summary statistics of CHW performance to CHW to identify areas for improved service delivery.</p> <p>The supervisor does not consistently meet with the community and does not make home visits with the CHW or provide on-the-job skill building.</p>	<p>A dedicated supervisor conducts monthly supervision visits that include reviewing reports and providing problem-solving support to the CHW.</p> <p>Supervisors are trained, have the technical skills to do service delivery observations¹ and have basic supervision tools checklists to aid them.</p> <p>The supervisor provides summary statistics of CHW performance (e.g. number of home visits¹ number of protocol errors) to CHW to identify areas for improved service delivery.</p> <p>The supervisor directly observes CHW practice with patients and provides targeted feedback after patient encounter on areas for continued improvement.</p> <p>The supervisor audits data/ assesses patient experience (without the CHW present).</p> <p>Program directors have considered how else supervisors can serve CHWs and the community (e.g. restocking supplies, referral support, higher level care, etc.) and have implemented services as applicable.</p>

02



Understanding the CHIS ecosystem

Designing and strengthening your CHIS well requires a strong understanding of the health information ecosystem and an exploration of the findings from other HIS and CHIS assessments. With this milestone, we suggest some tools you can use to assess the strengths and weaknesses of the CHIS (at whatever level of complexity it currently has), with the aim of better targeting of improvements, prioritizing resources, and garnering support and agreement among stakeholders for a way forward.

Why is this important?

There are many components to a CHIS, and it has to 'fit' within a broader digital health architecture, including integration with the health management information system (HMIS). CHIS should not operate in a silo, but rather in an integrated/interoperable manner benefiting from investments within the HIS. Any changes you propose will impact or be impacted by other parts of the ecosystem. Thus, understanding the CHW programme, the current digitalization state and the enabling environment are critical towards developing/strengthening a CHIS.

Assessing the current state of the CHIS and enabling environment can help identify weaknesses and gaps in various domains of CHIS/HIS improvements. This may also include assessing programme operations, information flows across different levels of the health system, and roles and responsibilities of different players and health workers.⁷ This gap analysis using a maturity model assessment approach can be essential when making decisions about the future state of the CHIS.

What decisions will you have to make?

- What are your goals and how are you going to define the methodology for assessment?
- Who will be engaged in these assessment activities?
- Have other CHIS assessments or broad HIS assessments been conducted? If so, which

portions or sections of these assessments might be useful for your understanding of the CHIS ecosystem?

- Will you need to assess both a traditional paper-based system, the digital components, and the hybrid of both?
- What are the community system challenges that the CHIS wanted to address?
- What information do you already have about the HIS and CHIS? What are your information gaps?
- How will you prioritize where you will want to invest resources for the CHIS? Link these with the World Health Organization (WHO) classification of digital health interventions.^{8,9}
- How will this assessment impact the remaining milestones?

There are several different tools that provide templates for examining and assessing these various components.

Recommended tools to use

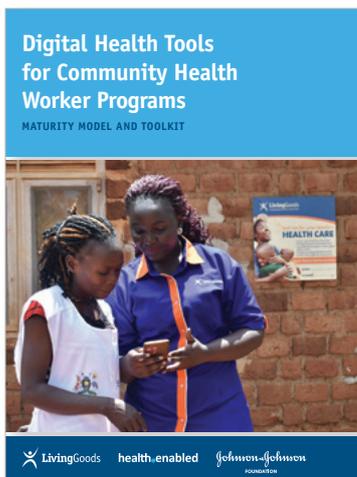
Digital Health Tools for Community Health Worker Programs – Maturity Model and Toolkit

The *Digital Health Tools for Community Health Worker Programs* is one of the tools to consider at this stage. It allows for an evaluation of the maturity of the digitalization of CHW programmes and can inform a national or subnational digital process as well as targeted initiatives of implementing partners.

⁷ *Digital Implementation Investment Guide*.

⁸ World Health Organization, *WHO Guideline: Recommendations on digital interventions for health system strengthening*, WHO, Geneva, 2019.

⁹ World Health Organization, *Classification of Digital Health Interventions v1.0: A shared language to describe the uses of digital technology for health*, WHO, Geneva, 2018.



This tool focuses on the assessment of 12 components in three major domains, and each component has an indicator scored from 1 to 5, with the greatest score reflecting the highest level of maturity.

INTENDED AUDIENCE:

Policymakers, programme managers, NGOs, or other organizations that implement and manage CHW programmes; and donors.

DOMAINS AND COMPONENTS ASSESSED:

- **CHW programme:** Stage of CHW implement, standardized CHW package of care, CHW skills, CHW data.
- **Enabling environment:** Leadership and governance, legislation and policy, funding for CHW digital health, capacity to implement digital health and standards, infrastructure for CHW digital health.
- **CHW digital systems:** Scale and scope of CHW digital health, integration with other information systems, appropriateness of digital health for the management and quality of CHWs, operational logistics.

APPROACH TOWARDS THE ASSESSMENT:

The assessment can be completed during a one- or two-day workshop with 10–15 participants representing different stakeholders involved in the development of the CHIS. One or two facilitators can guide the discussion by introducing the objective of the assessment, presenting the maturity model and consolidating the assessment scores. The facilitator(s) would also summarize the findings and an action plan and way forward.

For more information, see:

- [Digital Health Tools for Community Health Worker Programs: Maturity Model and Toolkit](#)

District Health Information Software (DHIS2) CHIS Guidelines

The DHIS2 CHIS guidelines outline two approaches to CHIS assessment: macro and micro assessments. This section will focus on the macro assessment of the CHIS. Although it was developed as part of the DHIS2 CHIS design guidelines, the assessment is platform and system agnostic. The macro assessment tool contributes to assessing the current state of a country's CHIS and predominant issues in their CHIS. It aims to strengthen the design, development and deployment of both paper- and digital-based CHIS. The tool was applied in 17 West and Central African countries to assess the status of centralized nationally owned CHIS.¹⁰

INTENDED AUDIENCE:

Policymakers, programme managers, CHWs, NGOs, or other organizations that implement and manage CHW programmes; and donors.

Domains assessed: The DHIS2 CHIS assessment tool consists of 58 questions with four possible scores: Highly Adequate, Adequate, Present but Not Adequate, and Not Adequate at all. The questions are grouped across six domains:

- Governance and ownership
- Community engagement
- Reporting structure
- Standard operating procedures
- System design and development
- Feedback.

¹⁰ Russpatrick, Scott, Johan Sæbe, Magali Romedenne and Leslie Dubent, 'The State of Community Health Information Systems in West and Central Africa', *Journal of Global Health Reports*, vol. 3, e2019047, 1 September 2019.

APPROACH TOWARDS THE ASSESSMENT:

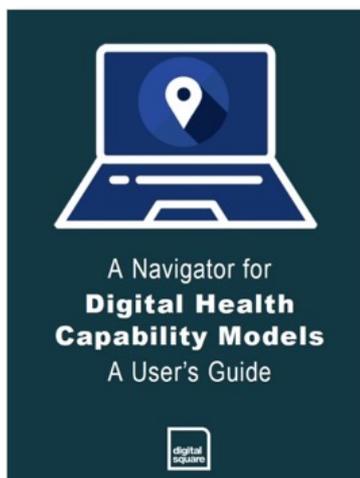
The DHIS2 CHIS guideline outlines two processes:

- A macro-level assessment that provides an overview at the policy level, carried out through a one-day national workshop. The workshop engages stakeholders at various levels from the community to the national level.
- A micro-level assessment that is much more in-depth and covers areas such as workflows, work routines, CHWs' experiences, and burden of reporting versus service delivery. It may include field visits and focus group discussions.

For more information, see:

- [DHIS2 Community Health Information System Guidelines](#)
- [The State of Community Health Information Systems in West and Central Africa](#)

The Navigator for Digital Health Capability Models



When an assessment of the national digital health system is required, the Navigator for Digital Health Capacity Models provides guidance on how to identify the most appropriate

maturity model (or combination of models) for assessing digital health information capabilities.¹¹

INTENDED AUDIENCE:

Policymakers, HIS managers, programme managers, NGOs, or other organizations that implement and manage CHW programmes; and donors.

Domains assessed: The Navigator includes assessment tools that meet the following criteria:

- Focus on national-level capabilities
- Available to the public (global content goods)
- Tools have been tested in a real-world environment
- Accompanied by user's guidance and an assessment tool/workbook.

APPROACH TOWARDS THE ASSESSMENT:

The following steps are suggested to identify the most appropriate assessment tool(s):

- Step 1: Digital health leadership identifies the need for application of a maturity model-based tool.
- Step 2: Identify the main goal(s) for conducting an assessment.
- Step 3: Determine what (if any) digital health assessments have been conducted in the past.
- Step 4: Determine additional criteria for selecting a maturity model tool (if needed).
- Step 5: Review the recommended maturity tool(s) to make a final determination.

For more information, see:

- [Navigator for Digital Health Capability Models](#)

¹¹ Note that this Navigator tool is designed for the broad spectrum of HIS. It includes community-based health information, but does not have it as a main focus.

03



Strengthening the data governance mechanism

This milestone deals with recognition of the need to strengthen health system efficiency and improve data systems, including how they are governed and how data are handled across the data life cycle: planning, data collection, processing, storage, analysis, use, and sharing. Clear policies and legislation should be in place to govern data management. Data governance principles are clustered around three interconnected objectives to: protect people – as individuals, as groups, and as communities; promote health value – through data sharing and innovative uses of data; and prioritize equity – by ensuring equitable distribution of benefits that arise from the use of data in health systems.¹

¹. Health Data Governance Principles, <www.healthdataprinciples.org/community>, accessed 16 September 2022.

Data governance refers to people, processes, policies, technologies and standards to ensure effective and efficient collection, storage and use of information in an enabling environment. It helps to establish accountability and roles in data access, management and sharing to ensure data security, privacy and confidentiality. It is critical for countries to establish governance mechanisms with the vision to provide improved visibility, coordination, funding, and control of data and CHIS activities across the country.

Health data should be recognized as a global public good and include activities to manage and share health data that are:

- **Effective:** The use of health data should have a clear and transparent aim to improve public health.
- **Ethical:** The use of health data and any data governance solution must uphold the highest standards of data protection and respect for human rights.
- **Equitable:** The use of health data should recognize and balance the needs of all stakeholders. This requires equitable and inclusive approaches to support data collection, generation, access, use and a fair sharing of the benefits that arise from the use of data.¹²

Among other vulnerable groups, special attention needs to be paid to data on children. Children today are the first generation growing up at a time of rapid datafication where almost all aspects of their lives are turned into data points. Children and other vulnerable populations do not have full power to make decisions about their participation in programmes. The mishandling of data can cause people to lose trust in institutions that deliver essential services, including vaccines, medicines and nutrition supplies; therefore,

data governance needs to focus on this aspect as well.

Why is this important?

Data-driven approaches are increasingly either the norm or the aspiration in the operation of health systems and provision of health services. As the user decides to start CHIS from scratch or reinforce an ongoing CHIS, it is good practice to look at the different aspects of a CHIS to make sure that it has built-in mechanisms to ensure effective, ethical and equitable practice across the data life cycle, which consists of collection, processing, storage, analysis, use, sharing and disposal of health data.

What decisions will you have to make?

- Is there a steering committee or a decision-making panel composed of health professionals (including those in vertical disease programmes), monitoring and evaluation (M&E) personnel, and information and communications technology (ICT) staff responsible for governance of the CHIS implementation?
- What kind of mechanisms will you put in place to ensure greater data governance such that health data are effective, ethical and equitable?
- How will data governance principles play out across the various stages of the data life cycle?

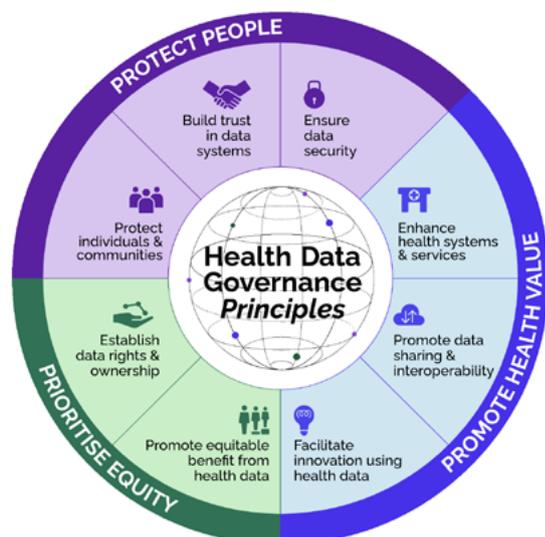
¹² World Health Organization, 'Health Data as a global public good – a call for Health Data Governance 30 September', WHO, Geneva, 29 September 2021, <www.who.int/news-room/articles-detail/health-data-as-a-global-public-good-a-call-for-health-data-governance-30-september>, accessed 16 September 2022.

Job aids and guidance to use

There are two job aids or guidance that can help with this milestone: (1) the Health Data Governance Principles recently developed by Transform Health along with the Health Data Collaborative; (2) the Responsible Data for Children principles that UNICEF and GovLab have put together.

Health Data Governance Principles

The Health Data Governance Principles build on existing norms, principles, guidelines and frameworks enacted by WHO, the Organisation for Economic Co-operation and Development (OECD) and the Pan American Health Organization (PAHO), based on the Universal Declaration of Human Rights. These principles, presented here, apply a human rights and equity lens to the use of data within and across health systems. They are oriented towards supporting sustainable and resilient public health systems that can deliver universal health coverage. The principles are also intended to be incorporated into national policies, legislation and standards.



INTENDED AUDIENCE:

Governments; policymakers; international organizations; the private sector; non-profit organizations and NGOs; research and academic institutions; donors and foundations; civil society.

The Health Data Governance Principles outline eight principles to guide development of data governance:

1. Protect individuals and communities
2. Build trust in data systems
3. Ensure data security
4. Enhance health systems and services
5. Promote data sharing and interoperability
6. Facilitate innovation
7. Promote equitable benefit
8. Establish data rights and ownership.

These principles aim to rally stakeholders around core elements to advance equitable governance of health data by creating a common vision and an environment where all people and communities can share, use and benefit from health data.¹³

These principles should be applied to the various stages of the data life cycle:

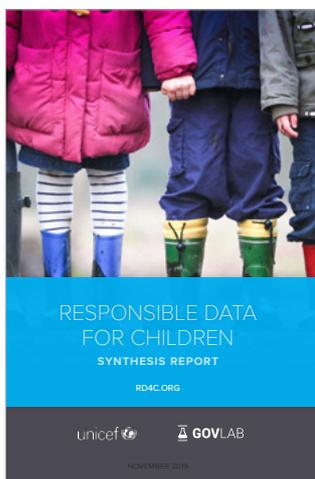
1. Planning: How a data system will be developed, what type(s) of data will be collected, and for what intended uses.
2. Collecting: The process by which data are generated or extracted.
3. Storing and preparing: Holding and cleaning processes to enable data sharing, analysis and use.
4. Sharing: The transfer of data between different systems and/or stakeholders.

¹³. Transform Health Coalition, *Health Data Governance Principles: Universalising the benefits of health digitalisation*, 2022, <<https://transformhealthcoalition.org/wp-content/uploads/2022/03/Health-Data-Governance-Principles-Embargoed-Copy.pdf>>, accessed 16 September 2022.

5. **Analysing:** The interpretation of data, whether through algorithmic or human analysis, to inform some type of decision.
6. **Using:** The ultimate action taken (if any), as well as any eventual archiving or destruction of the data.

For more information, see:

- [Health Data Governance Principles](#)



Responsible Data for Children (RD4C)

RD4C refers to a set of principles, practices and tools that, when applied, can enable the responsible handling of data for and about children across the data life cycle. It is a responsible data approach that involves both data protection and effective

use of data when they can provide value and be used to help improve the lives of beneficiaries.

INTENDED AUDIENCE:

Policymakers; programme managers; private sector; non-profit organizations and NGOs; research and academic institutions; donors and foundations.

RD4C invites actors – specifically those focused on upholding child rights, including humanitarian and development institutions, government agencies and NGOs providing services to children – to use the data life cycle framework to structure their consideration of risks and opportunities of data on children.

RD4C proposes seven principles to guide responsible data handling towards safeguarding of children’s lives. These principles provide a lens through which to assess how well data governance protects the rights of children. Although RD4C focuses on children, its principles can be applied in various contexts. The seven principles are:

1. **Participatory**, engaging with a wide variety of stakeholders affected by the use of the data by seeking their inputs.
2. **Professionally accountable**, by establishing institutional processes, roles and responsibilities that reinforce safer handling of data.
3. **People-centric**, by ensuring the needs and expectations of people and their communities are prioritized by actors handling data for and about them.
4. **Prevention of harms across the data cycle**, by assessing risks during collection, processing and analysis to safeguard privacy and confidentiality.
5. **Proportional**, by ensuring proportionality in the breadth of data to collect – collecting only data that can be used.
6. **Protective of children’s rights**, by recognizing the distinct rights and requirements for helping children and other vulnerable populations.
7. **Purpose-driven**, specifying why the data are needed to fill a specific gap.

For more information, see:

- [Responsible Data for Children](#)
- [Responsible Data for Children Synthesis Report](#)

04



Service Packages

This milestone deals with the process of selecting appropriate indicators for the CHIS, based on both the community health programme and the CHIS ecosystem. This milestone relates to the HMN Framework components of 'Indicators' and 'Data Sources'.

Why is this important?

In order to develop a programmatically sound CHIS, it is vital that the content matches national programme strategies (for example, HIV/AIDS, maternal health, integrated community case management [iCCM], etc.), and that there is a government body that oversees this process and owns it, along with the different stakeholders.

What decisions will you have to make?

1. Will you set up a task force? If so, who needs to be in the task force in charge of this activity?
2. Which are the factors that will help you decide the module/programme selection?
3. Which modules/programmes are most relevant for your CHW programme?
4. Which indicators within a module/programme are most appropriate for your country, given the level of CHIS maturity?
5. How would you use the indicator score for the selection?

As the community health system must be integrated into the overall national health system, the CHIS must also be integrated with the national HIS, ensuring alignment with existing **national strategies**, policies and action plans. You will need to pull together and review the following (if they exist):

- National health strategy
- Community health strategy
- HIS and/or M&E strategy and the logistics management information system (LMIS)
- Digital health or e-health strategy
- Programme-specific strategies (e.g., reproductive, maternal, newborn, child and adolescent health [RMNCAH] and nutrition [RMNCAH+N]; malaria elimination; elimination of mother-to-child transmission [EMTCT] of HIV and syphilis; HIV prevention and treatment delivery through differentiated care; 'reach every district/child' immunization approach; tuberculosis [TB] control strategy; gender equality and strategies addressing violence against women; control/elimination/eradication of neglected tropical diseases [NTDs]; etc.).

These national strategies will inform which modules should be prioritized in developing CHW indicators.

Recommended guidance to use

CHW Guidance for Strategic Information and Service Monitoring

The CHW Guidance offers 20 modules¹⁴ that encompass the whole gamut of global health, from which you should be able to select the ones that concern your country. For instance, if the community health strategy plans to deliver only iCCM, then only modules relevant to iCCM need to be reviewed.

For each module, CHW tasks are listed and the corresponding indicators should be considered only if these tasks are performed or planned in the country. Note that the same indicators can appear in more than one module as they may be critical for different modules (for example, child health and nutrition).

Some indicators will require the ability to follow the same individual over time – for example, whether a pregnant woman received four prenatal visits. This would require a longitudinal tracking system with unique IDs at the CHW level. A given indicator should be considered only if the **CHIS has the maturity necessary for the kind of indicator to be reported**. In addition, tracking of individuals in the CHIS needs to consider the various issues related to data governance, as mentioned in Milestone 3.

The CHIS guidance provides a simplified maturity score from A to D that has been assigned to each indicator, which determines the maturity of a CHIS that would be needed to use such an indicator. For instance, the indicator *Number of insecticide-treated bed nets distributed by CHWs* can be reported with a basic tally sheet (A score). Another example, *Proportion of children 6–59 months with mid-upper arm circumference (MUAC) < 115 millimetres (severe acute malnutrition)*, requires longitudinal tracking of the child (B score), to avoid double counting the child in case there is another consultation at another time with the CHW during the reporting period.

Training materials to support capacity-building have been developed and can be found at:

- [Guidance for Community Health Worker Strategic Information and Service Monitoring.](#)



¹⁴ *Guidance for Community Health Worker Strategic Information and Service Monitoring.*



05



Identifying the right platform for data collection, aggregation and visualization

A strong system design is essential for the development of a CHIS to ensure it generates quality information based on health interventions provided and is flexible enough to evolve with changing information needs. A CHIS must be able to effectively share information with the HMIS; therefore, an architectural consideration that enables interoperability is important.

Digital health applications are the vehicles through which digital health interventions are delivered.¹⁶ Digitalization can improve service delivery of front-line workers by providing them with the tools for decision support, data collection and analysis, alleviating the burden of tallying and reporting. This milestone deals with platforms that can support delivering digital health interventions.

Why is this important?

It is important to leverage Milestone 4 to gather data requirements for the CHIS. As outlined in the section on CHW guidance for strategic information and service monitoring,¹⁶ programmes and indicators selected should align with national strategies or policies, respond to CHW tasks, consider whether the intervention requires a one-time action or follow-up (indicator maturity), and consider CHW reporting burden. It is equally important to define how the data will flow through the system (workflows), including the roles and responsibilities of the various players. Understanding data flow at the community level is critical as multiple entities could come into play and the logic of aggregation may be altered (e.g., when CHWs report on services that are not provided at the facility or when similar services are provide at both levels).

The system should be designed to ensure interoperability with the HMIS by using the same platform or standards and technologies data to allow interoperability. When the system design is properly outlined, digitalization can considerably increase the efficiency of the CHIS by automating many process steps such as

compiling data and calculating indicators; it can also reduce the workload and risk of making mistakes by applying quality checks and skip logics. Digitalization can also improve clients' identification and registration, front-line health provider decision support, and communication between CHWs and other health-care providers/supervisors; enable targeted supervision; allow referral coordination; and automate data aggregation and the generation of reports.¹⁷ Digital platforms/software are essential for developing applications to support the delivery of digital health interventions.

What decisions will you have to make?

Processes engaged in the previous milestone ideally provide elements for consideration to inform decision making about the platform to use.

1. What community health system challenges do you need to address? (Examples include data capture, reporting burden, insufficient CHW competence, CHW adherence to guidelines, lost to follow-up of clients, inadequate supplies stock monitoring, supervision, etc.)
2. Which kinds of digital health information^{18,19} should be prioritized against the identified challenge? Would the digital platform help for data collection, decision support, stock management, supervision, training, etc.?
3. Which design would be appropriate given the country context? Will digital health interventions be delivered through an aggregate data approach or case-based (individual) approach?

¹⁶ *Guidance for Community Health Worker Strategic Information and Service Monitoring.*

¹⁷ World Health Organization, *Classification of Digital Health Interventions v1.0*, WHO, Geneva, 2018.

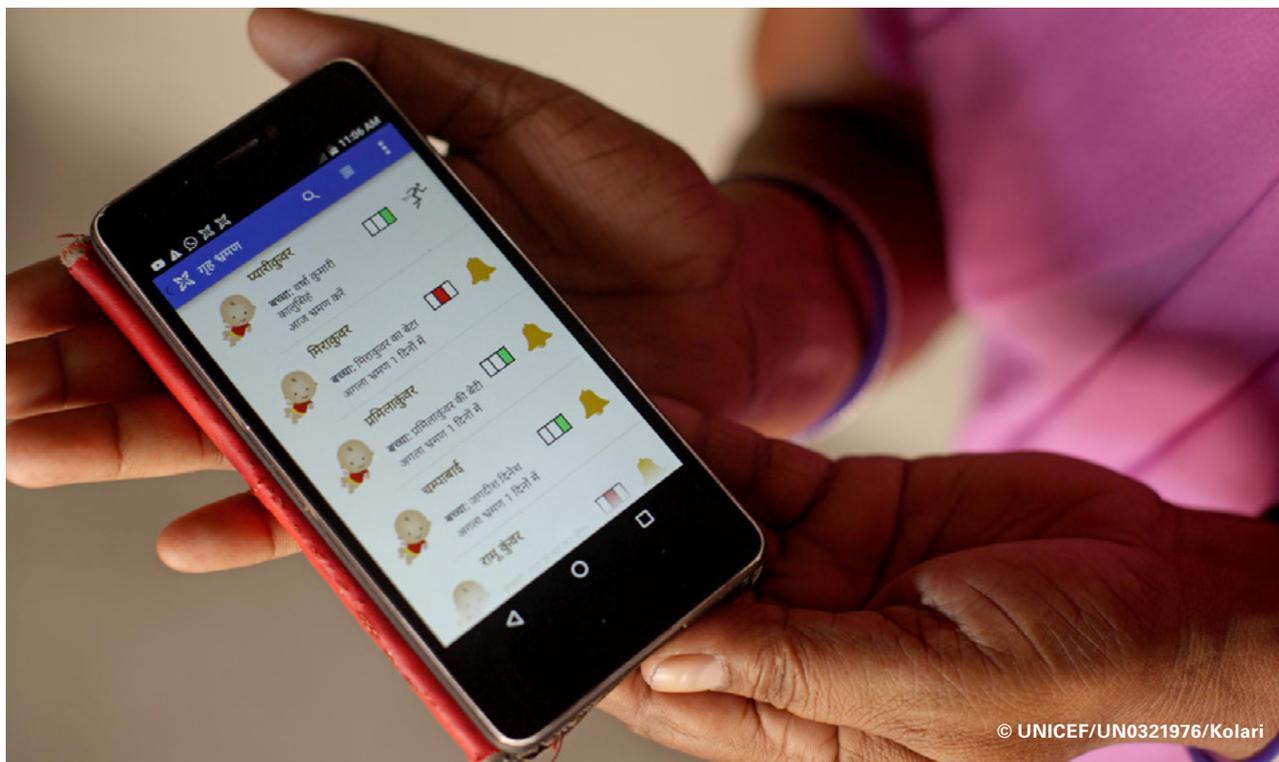
¹⁸ *Ibid.*

¹⁹ World Health Organization, *WHO Guideline: Recommendations on digital interventions for health system strengthening*, WHO, Geneva, 2019.

4. Does the current level of infrastructure (e.g., internet penetration and electricity) allow for implementation of an online or offline approach?
5. What kind of digital platform will you use? Will it be open source or not open source?
6. Would it be better to build on existing national platforms for compatibility with solutions used in the country (e.g., HMIS)?
7. Where will the data be hosted and how are they going to flow into the HMIS?
8. How will data security and governance be assured?
9. What factors drive cost (licensing, customization, technical support, cost of ownership and ongoing replacement of devices, in-service and continuous training) and what funding streams will be used to cover them?

10. What strategies will you use to address change management, digital literacy, and other behaviour change and capacity improvement that may apply with the introduction of new processes or digital health?
11. What are the implications for maintenance and scalability?

The WHO classification of digital health interventions and the DIIG²⁰ provide a straightforward process to link health system challenges with digital health interventions. It could be used to help make the decision about which digital health interventions to be prioritized for community health programmes. A system architecture design and clear functional and non-functional requirements are necessary to drive the development of an application. The DIIG provides insights for linking digital health interventions, applications and platforms to achieve system requirements.

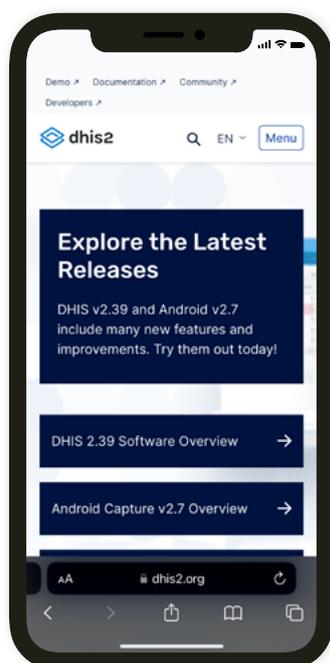


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²⁰ Digital Implementation Investment Guide.

Recommended applications to use

DHIS2



Description

DHIS2 is the largest open-source HMIS platform and was developed through a global collaboration led by the University of Oslo. It is estimated that over 70 low- and middle-income countries have adopted DHIS2 as their preferred HMIS platform. The DHIS2 data model includes aggregate data management, individual-level data, analytics and dashboards, mobile data capture (Android), integration and interoperability, security and privacy.

DHIS2 is a flexible and fully customizable platform; country applications include facility data management, community data management, deployment of the WHO aggregate Health Data Toolkit, coronavirus

disease 2019 (COVID-19) surveillance toolkit, immunization toolkit, case-based programmes using a tracker, and the Education Management Information System. As a primary data warehouse in most countries, DHIS2 brings together a variety of data sources in one central system to strengthen decision making.

The University of Oslo has developed a capacity-building programme through DHIS2 academies in various areas of HMIS and CHIS. The academies are designed to strengthen the capacity of national and regional professionals in the design, deployment and implementation of DHIS2.

The CHIS metadata package for DHIS2 is a modular tool designed to enhance community-based health programmes, monitor their impact, and make evidence-based policy adjustments according to the real needs of the targeted communities. The system design document is available on the DHIS2 website for rapid deployment.

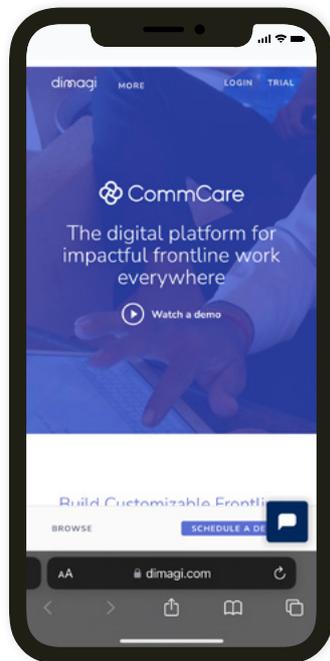
For more information, see:

- [DHIS2](#)
- [DHIS2 Metadata Package Downloads](#)
- [Community Health Information System \(CHIS\) – System Design](#)
- [Global Goods Guidebook](#)

Applications and use cases

Several countries have leveraged DHIS2 to build their aggregate CHIS with the advantage of having both CHIS and HMIS running on the same platform, easing data integration and sharing. Several countries – such as Cameroon, Ethiopia, Ghana, Liberia and Senegal – are using either aggregate or eTracker to build their CHIS, often starting with a small-scale implementation in a few districts. It is worth noting that DHIS2 eTracker does not provide functions such as job aids, audio or video content.

CommCare



Description

CommCare is a digital platform provided by Dimagi for collecting data – including health-care information – using mobile devices. Commcare can either be used online or offline. It builds smart apps to collect data and track patients longitudinally. It also encompasses decision support and SMS messaging. CommCare is known for its case management capabilities, which have been proven to be effective at scale. The CommCare platform allows the integration of aggregate data with DHIS2 to feed a community-level data system, allowing for data analysis from one single data repository.

For more information, see:

- [CommCare](#)
- [CommCare + DHIS2 Digital Health Systems](#)

Applications and use cases

More than 2000 projects across 80 countries are using CommCare for mobile data collection and reporting. The upSCALE²¹ project in Mozambique is a remarkable application of CommCare at community level. It was designed to support CHWs in Mozambique to deliver iCCM in the communities they serve. In Ethiopia, as part of its national information revolution strategy, the country has adopted CommCare to digitalize its paper CHIS to improve quality care, referrals and greater access to data.²² The eCHIS digitalizes the family folder and CHIS content (e.g., RMNCAH, malaria, HIV, TB, etc.) to allow health extension workers to use technology data to enhance community-level provision of health promotion, as well as preventive and basic curative health services.²³

For more information, see:

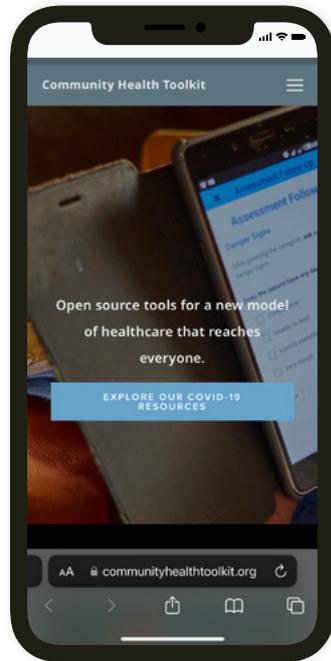
- [Malaria Consortium upSCALE: iCCM for Improving Child Health](#)
- [Global Goods Guidebook](#)

²¹ Malaria Consortium, 'About upSCALE', <www.malariaconsortium.org/upscale/pages/about-upscale>, accessed 16 September 2022.

²² Ministry of Health – Ethiopia, 'eCHIS', <www.moh.gov.et/site/projects-3-col/echis>, accessed 16 September 2022.

²³ JSI, 'Digitizing Community Health Information Systems: What's next to improve health service delivery at the community level in Ethiopia?', 22 September 2021, <www.jsi.com/digitizing-community-health-information-systems-whats-next-to-improve-health-service-delivery-at-the-community-level-in-ethiopia/>, accessed 16 September 2022.

CHT



For more information, see:

- [Community Health Toolkit](#)
- [Digital Public Goods](#)

Applications and use cases

The largest CHW networks supported by the CHT are in Uganda for iCCM, as well as in Kenya (SmartHealth application, interoperable with DHIS2) and Nepal. The CHT also supports community health networks and health systems in several countries, including Burundi, Ghana, India, Indonesia, Malawi, Mali, the Niger, Togo, United Republic of Tanzania and Zimbabwe.

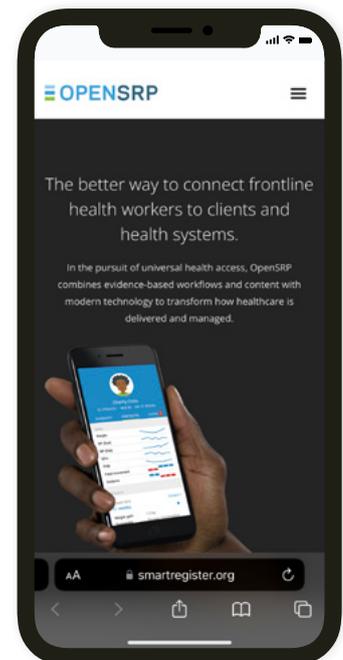
For more information, see:

- [Global Goods Guidebook](#)

Description

Stewarded by Medic Mobile, the Community Health Toolkit (CHT) platform includes a collection of open-source software frameworks to help design and deploy digital tools with the support of an active community for collaboration and support. The CHT platform uses open-source technology to build applications that empower and enable front-line health workers to provide health care and promote the well-being of the community in which they live. CHT applications support five configurable areas of functionality: messaging, task and schedule management, decision support and care guides, longitudinal person profiles, and analytics.²⁴

Open Smart Register Platform



²⁴ Digital Square, *Global Goods Guidebook*, version 3.0, PATH, Seattle, 10 June 2021.

Description

Open Smart Register Platform (OpenSRP) is an open-source mobile health platform that allows front-line workers to register clients and track their health status using basic android devices.

In various settings, OpenSRP helped to build localized applications for RMNCAH, immunization, early childhood development, malaria rapid diagnosis and management, as well as TB treatment management. OpenSRP works either online or offline and supports various workflows, including client registration, client management, decision support, reporting, workflow planning, inventory management and performance management.

OpenSRP seamlessly integrates data with OpenMRS (an electronic medical records system) and DHIS2 to enhance reporting and visualization of consolidated analytics, and with RapidPro for client messaging.

For more information, see:

- [OpenSRP](#)
- [OpenSRP Enterprise](#)

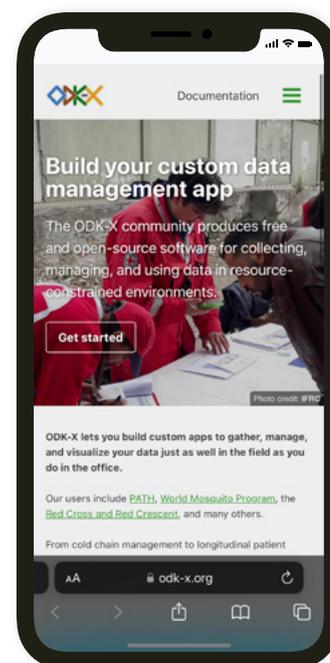
Applications and use cases

OpenSRP has been implemented in Bangladesh (mCARE study, BRAC, UNICEF); Eswatini and Zambia (NTD work, based on Reveal); Indonesia (RDT Study, COVID CTS App); Kenya (Malaria RDT Study); Namibia, Thailand and Zambia (Malaria work and Indoor Residual Spraying, based on Reveal); Viet Nam (RMNCAH and Early Childhood Development work); and Zambia (Electronic Immunization Registry – ZEIR). Recently, OpenSRP supported the Child-Friendly Community initiative launched by UNICEF in the Democratic Republic of the Congo, Liberia and Togo. With near real-time data, corrective actions can be taken rapidly by supervisors to address unmet patient needs.

For more information, see:

- [Global Goods Guidebook](#)

ODK-X



Description

The ODK-X suite is a free and open-source software that allows users to build custom applications, including survey forms and Java script-based applications to collect, manage and visualize data on Android devices. ODK-X is usually optimized to run surveys on a smartphone and can also be used for data management. It supports offline features and can be deployed in low-resource settings with limited internet services.

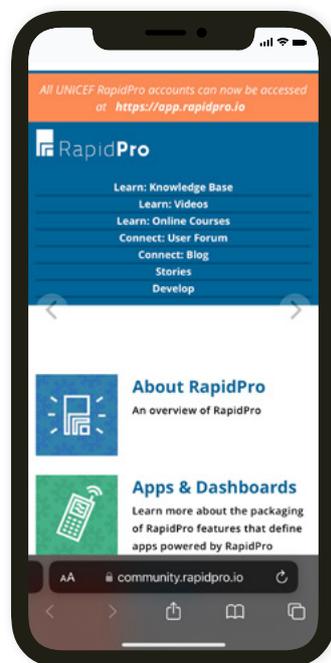
Applications and use cases

ODK-X is a free open-source suite of tools that allows data collection using Android mobile devices and data submission to an online server, without an internet connection or mobile carrier service at the time of data collection. ODK-X's strength lies in its global community

of developers and ease of adaptation and installation. Although it is being used for longitudinal client follow-up, it is primarily optimized for use cases that involve cross-sectional point-in-time data collection. Nafundi is the primary steward for ODK-X and supports its ongoing development.

users' contacts dynamically, with the ability to analyse the data received and connect to multiple communication channels (such as SMS, voice, unstructured supplementary service data, and social media), send messages in multiple languages and interoperate with external systems.

RapidPro



Description

RapidPro is an open-source software that allows users to easily design, test and scale mobile-based services without the need for software developer skills or expensive consulting fees. It enables users to visually build the workflow logic for running mobile-based services. RapidPro includes features for managing

Applications and use cases

In Uganda, RapidPro (mTrac) is used by village health teams to strengthen the national surveillance system by reporting weekly data-notifiable diseases and stocks of tracer medicines and commodities.²⁵ The members of the Health District Management Team are notified via an SMS alert when the threshold is reached for a specific disease during a given time period. In Rwanda, RapidSMS, the precursor of RapidPro, has been used since 2013 by CHWs to track women's antenatal care visits, identify those at risk, and refer them to health facilities.²⁶ Multiple other applications of RapidPro include increasing the demand for service utilization. In Pakistan in 2018, families of 37 million children in 163 districts were reached through real-time information to increase demand for routine immunization. RapidPro supports digital health interventions in over 18 countries to connect communities with health systems using targeted messages to parents about actions to keep their newborns healthy in the first 1,000 days of life, to improve coordination during vaccination campaigns and to monitor the availability of life-saving commodities.²⁷ RapidPro also powers U-Report,²⁸ which enhances youth and citizen engagement to speak out about issues that matter to them the most. U-Report is active in over 90 countries and partners with over 23 million U-reporters.

²⁵ World Health Organization, 'Strengthening accountability chains for maternal, newborn and child health in Uganda – mTrac', WHO, Geneva, 2014.

²⁶ RapidSMS Rwanda, 'Tracking the First 1000 Days of Life, Preventing Unnecessary Mother and Newborn Deaths', *mHealth Compendium Special Edition*, 2016, pp. 62–27, <https://lib.digitalsquare.io/bitstream/handle/123456789/77609/rapidSMS_rwanda_se.pdf>, accessed 16 September 16, 2022.

²⁷ World Health Organization, 'Digital health initiatives', <<https://www.unicef.org/innovation/digitalhealth>>, accessed 16 September 16, 2022.

²⁸ U Report, <<https://ureport.in/>>, accessed 16 September 16, 2022.

06



Monitoring of data quality, data analysis, and reporting and feedback loops

As with any other data system, CHIS is only as good as the quality of its data. Regular data use is an important factor to enhance data quality. Undertaking regular data quality checks can help you understand the strengths and weaknesses of the data system and how much confidence can be placed on the data for monitoring and decision making.

Why is this important?

The rationale for the CHIS is to provide data to decision makers (at various levels) about community-level services and outcomes that are timely and useful. This means that it is crucial to have systems in place to monitor data quality (timeliness, completeness, consistency), to analyse the data in ways that provide results which can be used to produce user-friendly, meaningful reports and feedback loops.

The data quality review (DQR) system should be established for your country-specific set of community health indicators and include both a desk review of the data (can be done at national or subnational level) and a community-level assessment (field visits).

What decisions will you have to make?

1. Are you going to examine data quality holistically across all the indicators or do an in-depth assessment of particular selected 'tracer' indicators?
2. How often will you conduct the desk review and community-level verification?
3. Who will be doing these activities?

A number of 'tracer' indicators (i.e., with the ability to trace results from the source to the national level, and indicative of data quality of the CHIS) will be selected across programme areas. Assessments are often conducted annually but can also be carried out more frequently (e.g., quarterly, especially at subnational level).

Recommended 'tracer' indicators should cover the different programmes the CHIS encompasses.²⁹

Recommended guidance to use

Data Quality Assurance

There is not an endorsed specific tool per se for data quality improvement at the community level. However, some tools and approaches used for facility data quality assessment can be used and applied at the community level, such as Data Quality Assurance, developed by WHO.³⁰

The methodology of Data Quality Assurance towards data quality verification involves two steps:

1. A desk review is conducted as a discrete or cross-sectional assessment to review existing aggregate reports at health facilities (or districts).
2. A site assessment takes place during which district or health facility offices can conduct verification of data consistent in primary data collection tools (i.e., CHW register and aggregate report).

²⁹ It is important to note that the greater the number of indicators that are selected, the more time-consuming and costly the exercise will be. This is particularly relevant to the selection of indicators for the data verification component. A guiding principle is that a team of data collectors should not spend more than one day at each site. Thus, it is recommended that no more than four to five indicators be included for any given survey for the data verification exercise.

³⁰ World Health Organization, *Data Quality Review: Module 1: framework and metrics*, WHO, Geneva, 2017.

Desk review

The desk review will use the following dimensions of quality:

- Reporting completeness and timeliness
- Internal consistency of reported data.

Completeness is expressed as the percentage of expected reports submitted to a higher level of the reporting system, and is an aggregate across indicators. For example, 12 monthly reports are expected from each CHW per year. It is important to assess completeness of reporting for each form (e.g., iCCM, family planning, nutrition, Expanded Programme on Immunization), since the expected frequency may vary.

Internal consistency relates to the coherence between different data elements and whether data values follow expected patterns over time and in relation to each other. Data entry error is an important cause of inconsistency, as well as when data are added up or transcribed. A key step for assessing internal consistency includes looking for outliers – values that are unusually high or low in comparison with historical trends. Outliers often reflect poor data quality, but they can also be the result of true changes in events. Data may be compared with that from population-based surveys, parallel data systems (e.g., vertical, programme-specific systems), or sentinel sites.

Field visit and community-level verification

The objective of data verification is to measure the extent to which the information in the source documents has been transmitted accurately to the next level of reporting. The verification applies to each level of the reporting hierarchy (from community level to national level), and provides an estimate of the degree of over-reporting or under-reporting in the system at national level. To conduct community-level verification, you need to go to the source of the data – the CHW (including CHW registers, tally sheets and monthly reports). This will help you assess how well individual data in the registers have been collated and compiled in the monthly aggregate report.

Data analysis

Data analysis is the process of transforming data into information. For a CHIS, this would need to be done routinely to produce regular reports and feedback, using dashboards and data visualization. The data analysis process should also give weight to the users of the CHIS. The CHIS provides useful information for different levels (with different aggregations): community; subnational levels, such as districts or regions; and national level. Each level will have different interests in the data and different analysis needs from inferential, descriptive, or very simple data presentations.

To develop a data analysis system, you will need to make a few decisions:

1. Who are the key audiences for the analysed data?
2. What actions would you like them to take based on the data?
3. What data literacy skills does your audience have?
4. For each of your CHIS indicators, what kind of statistics are needed to help decision makers interpret and use the results?
5. For each of your CHIS indicators, what disaggregation will be important for decision makers to understand key factors of performance? For which variables will you perform disaggregation?
6. How often will you conduct the data analysis?
7. Who will be conducting the analyses?

Note that special attention should be paid to the issues around the denominators. When the community health system is not inclusive of the entire population in its catchment area, then denominators should not be considered sufficient for calculating population-based values. Instead, these values would reflect the values only in the population reached by CHWs. In this case, denominators should only reflect service delivery (e.g., people seen, people screened, etc.), not coverage.

Disaggregation is the process of examining your data for specific groups, and is very important for understanding equity and reach, such as identifying differences in disease patterns and service utilization. CHIS data could be disaggregated by, for example, age group, sex, and geographic location. However, too many disaggregations can substantially increase the reporting workload, particularly in paper-based systems, and may have a negative impact on quality of the data. Therefore, the purposes for which specific disaggregated data will be used, and the frequencies at which such analyses are needed, warrant careful consideration; be aware that disaggregation is foundational for being able to identify issues around gender and equity, for example.

The frequency of data analysis is usually in line with reporting frequency, but also needs to be aligned with decision-making needs – most CHIS indicators should be analysed on a quarterly basis.

Reporting and feedback

Reporting and feedback are the processes of sharing the analysed results both with those who need to make decisions (district, regional and national), and those who provided the data (health centres and CHWs).

To develop the reporting and feedback system, you will need to make a few decisions:

1. Who are the specific key audiences for reports and for the feedback loops, and what do they use the data for – what types of decisions?
2. What specific types of results and presentation of results are needed for each audience?
3. What kinds of graphics and narratives are needed for each audience to use the data?
4. How often will you do the reports?
5. Who will be responsible for preparing reports and ensuring the feedback loops are achieved? What periodicity is needed for reporting (per indicator and per level of the system)?

Every decision maker should receive data representing their catchment areas, and sometimes with comparisons with similar areas (such as CHWs within a health centre catchment area). Appropriate packaging of information is key to influencing decision makers at all levels. However, data presentation is often aimed at technical experts, with little effort made to ensure that the information is understandable to policymakers, front-line health workers, non-health specialists, or the public. It is important to design packaging of information such that data presentation tools (tables, charts, dashboards, etc.) align with users' needs and preferences, and to be prepared to receive feedback and adjust over time the ways data are displayed.

Tables are useful for displaying large amounts of data (several indicators), particularly when you want to provide an overview of a situation. However, tables are often too detailed for quick interpretation and therefore not well adapted to presentation. They are useful in printed documents and electronic dashboards. A user's understanding of a table can be facilitated by clear labelling, organization of columns or rows into specific sequences, or colour coding of values according to thresholds or categories.

Charts can show a large quantity of data in a way that is quick and easy to understand. Different types of charts are used for different types of indicators and what you are trying to emphasize, such as trends over time, differences between groups, etc. Examples of different kinds of charts are: line charts (used for showing time series of data and for identifying trends); column and bar charts (vertical column or horizontal bar charts used to show comparisons – for example, between different geographic areas or different data elements or indicators); pie charts (used to show parts or percentages of a whole, with the segments totaling 100 per cent); and others.

Feedback loops are important because the motivation to provide quality data is dependent on being able to see the results and be involved in their interpretation. It is vital that the CHIS provide feedback to the different levels of the system, including the CHWs to help them understand their own performance and coverage of their communities.



Reporting and feedback, particularly the presentation of data, would be conducted by data analysts in close collaboration with programmatic staff. Additionally, the CHIS team and programmatic staff should solicit feedback from those receiving and using the reports (at different levels), whether or not the information that has been shared had any impact on the programme and if so how, and what else should be revised.

For more information, see:

- [Data Quality Assurance](#)
- [Data Collection and Analysis Tools](#)

