

# IMPROVEMENT STRATEGIES MODEL: INFORMATION SYSTEMS

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## CORE PRINCIPLES OF INFORMATION SYSTEMS

Information systems is an overarching term that refers to the systems used for collecting, processing, storing, and transferring data and information that is used for planning, managing, and delivering high-quality health services. (1-3) This module specifically addresses information systems for health, sometimes referred to as health information systems.

Well-functioning health information systems yield high-quality and comprehensive data and information that is essential for enabling effective [surveillance](#) and [priority setting](#), [population health management](#), [facility management](#), and the achievement of the core functions of PHC, including [coordination](#), [continuity](#), [comprehensiveness](#), and [person-centeredness](#). The **Relevance to PHC** section provides more detail on the relationship between information systems and PHC performance. As identified by the World Health Organization, health information systems achieve **four core functions**: (4)

- **Data generation** - Data are recorded by health and other relevant sectors.
- **Compilation** - Data are collected and organized from health and other relevant sectors.
- **Analysis and synthesis** - Data are checked for overall quality, relevance, and timeliness and subsequently analyzed as needed.
- **Communication and use** - Data are converted into information for health-related decision making in formats that meet the needs of multiple users (i.e. policymakers, managers, providers, and communities) and used to drive [decision-making and planning](#).

This module focuses specifically on the data generation and compilation functions. The analysis and synthesis function and communication and use function are discussed more fully in other Improvement Strategies modules, including in the sections on using data for decision making in [Priority Setting](#) and [Surveillance](#). Information system use at the facility level is discussed in the [Information Systems Use](#) module.

## ESSENTIAL TYPES OF INFORMATION SYSTEMS

The following six types of information systems are essential for the delivery of high-quality primary health care. As described below, each type of system plays a critical role in ensuring that the right type of data is available to the right stakeholders at the right time to make informed decisions about PHC planning and service delivery.

1. **Civil registration and vital statistics systems:** Civil Registration and Vital Statistics (CRVS) systems are a type of information system that registers all births and deaths, issues birth and death certificates, and compiles and disseminates vital statistics, including cause-of-death information. CRVS systems may also record other events such as marriage, divorce, adoption and legitimation. CRVS systems generate administrative data that are used across multiple sectors and which can be compiled to serve as the basis for databases such as population registers that play a vital role in PHC service delivery. CRVS systems provide routine, up-to-date fertility and mortality data for a population which can be used to establish the foundation for many health policies and provides a meaningful denominator for monitoring and evaluation of the burden of disease data. CRVS systems are particularly critical for ensuring that PHC systems can [Adjust to Population Health Needs](#) and for effective [Population Health Management](#). (5)
2. **Routine Health Management Information Systems:** Health Management Information Systems (HMIS) are facility reporting systems used to collect routine data from public, private, and

community-level health facilities and institutions. Well-designed HMIS provide data on health status, health services, and health resources at the health facility level that can be used to support evidence-informed planning, management, and decision making and the facility and administrative levels. (4,6,7) This goes beyond simple monitoring and evaluation to facilitate the active collection and assessment of service data. HMIS systems should be integrated into a national/sub-national monitoring framework built on a standardized list of service delivery indicators and definitions, called a data dictionary.

3. **Personal care records:** Personal care records are information systems that are used to provide a longitudinal health history of patients to facilitate the provision of [High-Quality Primary Health Care](#) services. Comprehensive personal care records include unique patient identification (ID), problem lists, care history and notes, medication lists and allergies, referrals and results of referrals, and laboratory, radiology and other test results. (8-10) Well-designed personal care record systems continuously collect and coordinate information that is reliable, timely, up-to-date, and comprehensive. Personal care records can be paper-based or electronic, however, the use of electronic health records helps to improve management of patient care. (9) Regardless of the format used, to empower patients and health care providers to ensure the delivery of high-quality person-centered care, personal care records must be sufficiently accessible to both patients and providers. (9)
4. **Logistics Management Information Systems:** Logistic Management Information Systems (LMIS) are records systems that supply chain workers and managers use to collect, organize, present, and use logistics data about the supply and demand for commodities. Logistics data includes information about the quantification, procurement, inventory management, and storage and transportation of [essential drugs and commodities](#). Effective LMIS gather data across all levels of the health system to support informed decision making and supply chain management. (11,12)
5. **Financial management information system:** Financial Management Information Systems (FMIS) are a system used to manage and track the flow of **funds** at the facility level, including expenditure, staff, line-item budgets, internally generated funds, and reimbursed pooled payments. (13) They are a facility-level tool managers use to improve the strategic allocation of resources, minimize waste and align spending for operational efficiency, establish credibility of the budgets, and improve service delivery. (13)
6. **Health surveillance information systems:** Health surveillance information systems generate the information needed for effective [Surveillance](#), including detecting, reporting, and responding to specific notifiable conditions and events. (14) Surveillance systems are multimodal networks that bring together information from facilities and communities with a focus on defining emerging and existing population health needs and providing a basis for timely and appropriate response across the health system. (4,8,15,16)

## CHARACTERISTICS OF STRONG INFORMATION SYSTEMS

The most effective information systems are entirely **interoperable** and **interconnected**: (17-20)

- **Interoperability** is the ability of different information systems, processes, devices, or applications to connect, in a coordinated manner, within and across organizational or geographic boundaries to access, exchange and cooperatively use data amongst stakeholders, with the goal of optimizing the health of individuals and populations. (20)
- **Interconnectedness** refers to the facilitated linkage or connection of all constituent parts of the information system. This refers to the connection of information system components—data

systems, detection, reporting, and investigative activities, and feedback loops—within a sub-national health system network, and the linkage between different sub-national health system networks.

Information systems can be either paper-based or electronic. While much can be accomplished with paper-based systems, it is difficult to achieve interoperability and interconnectedness with exclusively paper-based systems. (21) To promote the development of information systems that are comprehensive, reliable, scaleable, accessible, interoperable, and interconnected, countries should work to move from paper-based to electronic systems. (21,22) (Users can find more information about digital and e-Health strategies in the [National eHealth Strategy Toolkit](#) and the [WHO's Global Strategy on Digital Health](#).)

The transition from paper-based to electronic information systems represents an ambitious goal for many countries. In the interim, there are many important improvements that can be made even to paper-based systems. In particular, there are [five general characteristics common to strong information systems](#) that support the delivery of high-quality PHC that can be achieved regardless of whether the systems are electronic: (23)

1. **Well-defined:** To ensure that information systems capture data that is timely, reliable, comprehensive, and relevant to the needs of the population, information systems should be implemented with standard operating procedures for data collection and analysis. This includes using standard *data sources* and *data dictionaries* that define a standardized list of *health indicators* that are built into national or subnational monitoring frameworks to ensure that all users of the information system are defining and measuring indicators in the same way. (8)
2. **Comprehensive:** To support the core principles of coordination, continuity, comprehensiveness, and patient-centeredness, information systems should comprehensively capture and monitor all health services and functions across all levels of the health system.
3. **Functional:** To ensure that information systems are consistently used to support effective decision-making for health, their design and functionality should:
  1. Be accessible and user-friendly for all levels of the health workforce
  2. Fit efficiently and intuitively into existing workflows
  3. Use technology appropriate for the context
  4. Have plans and systems in place to ensure data quality, appropriate data communication and use, and appropriate training for health workers.
4. **Resilient:** To support the capacity of the health system to adapt and respond to population health needs, information systems should be able to withstand social, political, and biological crises. Mechanisms such as data backup systems and systems for operationalizing learnings from past crises, coordination with other health system functions, and regular performance assessments help to build resilient information systems. (3)
5. **Adaptable and scalable:** A strong information system is adaptable and scalable, or able to be redesigned, reformed, expanded, and rolled out at all levels of the health system. Information systems that are readily adaptable and scalable embody the above four characteristics and are interoperable and integrate with existing in-country platforms. Additionally, adaptability and scalability depend on having clear standards and decision-making structures regarding health information systems and a well-defined sustainability plan for ensuring necessary financing for, training in, and monitoring and evaluation of the system. You can read more about building in-country capacity in the [adaptable and scalable](#) section of MEASURE Evaluation's [what are the characteristics of a strong health information system?](#)

[Strengthening information systems](#) requires [Leadership and good management](#), [governance of policies and procedures](#), [public trust](#), financial support, and a [skilled workforce](#). (23) For this reason, it is important that information systems are aligned with national priorities and local needs with a clear policy direction, financial support, and skills training to ensure their successful implementation and ongoing functionality. (24,25) More information on developing strong information systems can be found in the **tools and resources** section of this module.

## RELEVANCE TO PHC

Information systems are important for effective, high-quality PHC at the policy, management, and service delivery levels:

- At the **policy level**, the information generated from well-functioning information systems supports the capacity of the health system to sense and adapt to emerging and existing population health needs, create effective [health policies](#), [monitor health equity](#), and build health system [resilience](#). (3) [Information systems](#) are essential for collecting indicators and evaluating progress in evidence-based [priority setting](#) and [surveillance](#) systems. In addition to supporting [adjustment to population health needs](#), data captured and transferred in information systems play a role in assessing **health financing** needs and strategies.
- At the **facility and sub-national management levels**, routine use of HMIS, LMIS, and FMIS to establish targets, monitor progress, and implement ongoing improvement initiatives supports effective [facility organization and management](#), including the availability, control, and appropriate management of [drugs and supplies](#), [facility infrastructure](#), [workforce](#), and **funds**.
- At the **service delivery level**, information systems such as personal care records and civil registration and vital statistics systems collect critical information on local population health that supports evidence-informed decision making and the provision of high-quality PHC services. (26) In particular, well-functioning information systems empower and engage patients, improve communication among team members, and improve [continuity](#) and [coordination](#) of care. (19,27,28)

Effective health information systems are comprehensive and capture data about health services at all levels of the health system. However, often health information systems are lacking data about PHC or do not enable data to be disaggregated by type or level of service. In order for health information systems to support PHC as described above, it is critical that they not only embody the characteristics of strong information systems but that they also include PHC-specific indicators--such as those included in the [PHC Vital Signs Profile](#)--and be designed in a way that enables disaggregation of data to track the capacity and performance of PHC specifically. [The Joint Learning Network and PHCPI's guide on measuring the performance of PHC](#) provides practical guidance and tools for countries on how to do so.

## KEY TERMS

**Service data:** “Service data are data generated at the facility level and include key outputs from routine reporting on the services and care offered and the treatments administered.” (4)

**Interoperability:** Interoperability is the ability of different information systems, processes, devices, or applications to connect in a coordinated manner, within and across organizational or geographic boundaries to access, exchange and cooperatively use data amongst stakeholders to respond to disease instances, with the goal of optimizing the health of individuals and populations. (20)

**Interconnectedness:** Interconnectedness refers to the facilitated linkage or connection of all constituent parts of the information system. This refers to the connection of information system components—data systems, detection, reporting, and investigative activities, and feedback loops—within a sub-national health system network, and the linkage between different sub-national health system networks. (8)

**Data dictionary:** A data dictionary is made up of a standardized list of indicators and definitions that are built into a national or sub-national monitoring framework to ensure that all users of an HMIS are defining and measuring indicators in the same way. (8)

**Continuity:** “Continuity is the degree to which a series of discrete healthcare events are experienced as coherent and connected and consistent with the patient’s medical needs and personal context.” Three types of continuity are considered to be important for primary care: relational continuity, informational continuity, and management continuity. (19)

**Coordination:** Coordinated care includes organizing the different elements of patient care throughout the course of treatment and across various sites of care to ensure appropriate follow-up treatment, minimize the risk of error, and prevent complications. Coordination of care happens across levels of care as well as across time, and often requires proactive outreach on the part of health care teams as well as informational continuity. (29)

**Health indicators:** Health indicators are quantifiable characteristics of a population that provide information on the population health situation, such as information related to health status, risk factors, service coverage, and health systems (i.e. quality and safety of care or utilization and access). (30)

**Electronic health (eHealth):** “eHealth involves a broad group of activities that use electronic means to deliver health-related information, resources and services: it is the use of information and communication technologies (ICT) for health.” (31)

## WHAT OTHERS HAVE DONE: WHAT HAS BEEN DONE ELSEWHERE TO IMPROVE INFORMATION SYSTEMS

### IRELAND: PERSON-CENTERED E-HEALTH STRATEGY

#### Why changes were needed

To address challenges such as long wait times, a high burden of chronic disease, and out-of-date information infrastructure, Ireland has taken steps to modernize its health information system through person-centered eHealth reforms.

#### Ireland's approach:

The following components of Ireland's eHealth Strategy are helping to improve the delivery of person-centered, integrated care and health system performance:

- The **Knowledge Information Plan** creates a national unified vision and plan for a health system supported by digital infrastructure
- The **National Electronic Health Record** and **National Individual Health Identifier** link patient data across the continuum of care to ensure the delivery of appropriate and comprehensive care at the right place at the right time

#### Person-centered eHealth reform in Ireland

Like many countries around the world, Ireland's health system is facing many challenges, including insufficient investment in infrastructure, long wait times, and the rising burden of chronic diseases. (32) To meet some of these challenges and improve the quality of care, Ireland launched a national [eHealth strategy](#) in 2013 with the goal of transforming its health information system using patient-centered, information-based eHealth solutions. (32,33) [Electronic health](#), or **eHealth**, is defined as information and communication technology activities that use electronic means to deliver information, resources, and services for health. (31) eHealth can facilitate improved service delivery and better allocation of resources, making it a cost-effective strategy for improving health system performance across many contexts. (32,34,35) Key eHealth initiatives at the core of Ireland's reform seek to leverage the potential of innovative digital technologies to empower patients and healthcare workers by way of greater transparency, access to services, and information. (33,35)

#### Achieving more coordinated person-centered care through interoperable and personalized information infrastructure

In 2014, Health Service Executive (HSE), the provider of all of Ireland's public health and hospital-based services, started the "[Knowledge Information Plan](#)" to create a unified vision and plan for Ireland of a health system supported by a digital infrastructure. (36) The [National Electronic Health Record](#) and [National Individual Health Identifier](#) are two innovative projects at the core of the eHealth Strategy. (32) The Individual Health Identifier bill (approved in 2013) establishes a unique health identifier for health service users and providers. These identifiers are interoperable across the public and private health and social service sectors. The Individual Health Identifier project establishes a system for clearly identifying the person and organization involved at each stage of care to ensure that providers have access to reliable, timely, and effective information needed to provide high-quality care. (33,37,38)

Ireland also established a National Electronic Health Record system to centrally store patient medical data. Critically, the National Individual Health Identifier and National Electronic Health Record are **integrated and interoperable**. (37) This allows health workers to identify and link patient data across the

continuum of care. This coordinated transfer of critical patient information helps to ensure the delivery of appropriate and comprehensive care at the right place at the right time. (33) Successfully scaling this identification system across all sectors and levels of care will rely on structures that underpin effective information systems, including improved and targeted investments, multisectoral stakeholder engagement and coordination, and well-established governance and delivery structures. (32,33)

#### Ways forward: sustaining eHealth reforms through targeted investment and support infrastructure

Ireland has already taken steps to support the longevity and modernization of the National Individual Health Identifier and Electronic Health Record systems alongside other initiatives in its eHealth Strategy, including the development of the [Health Information Bill](#), a policy intended to “facilitate enhanced information management processes relevant to a modern health system” through provisions such as a data matching programs. Additionally, Ireland has launched an innovative “[Cloud First Digital Strategy](#)” with the aim of deploying a robust [cloud infrastructure](#) for all eHealth programs. Maintaining momentum for these ambitious reforms will depend on increased investment in eHealth systems and implementation of supportive infrastructures, such as policies, legal and regulatory frameworks, and a skilled workforce. (32,33) Users can read more about Ireland’s eHealth Strategy and other country’s experiences with eHealth [here](#).

## BANGLADESH: USING DHIS2 TO IMPROVE THE INTEROPERABILITY AND INTEGRATION OF INFORMATION SYSTEMS

### Why changes were needed

Bangladesh's fragmented and disjointed health information system initiatives led to:

- Poor coordination of health data across health providers (public, private, and NGO)
- Poor quality of standardized data reporting and use
- Poor interoperability and interconnectedness across the different types of health information system initiatives

### Bangladesh’s approach:

Bangladesh is using the health information management system DHIS2 to:

- Support the development of an interoperable, integrated information system
- Support reliable data aggregation, analysis, and reporting for better information systems use and decision making at all levels of the health system

### Strengthening health information systems through DHIS2

Untimely, incomplete, and inaccurate data are common challenges to effective health information management in many health systems worldwide, especially those that are under-resourced and/or reliant on paper-based information systems. (39,40) In 2006, a web-based **Health Management Information System** platform called District Health Information Software 2 (DHIS2) was developed by the [Health Systems Information Programme](#) at the University of Oslo, in Norway to improve data collection and use. Since that time, over 100 countries have adapted and implemented DHIS2 to meet their information system needs and support better decision making for health at all levels. (41,42) DHIS2 is a free and open-source health management data platform that provides a comprehensive system for capturing timely, accurate, and complete data at all levels and across different sectors. (41-45) Its key features include data warehousing and data visualization, including real-time analysis. (42) The DHIS2 platform can host health data from multiple sources (both public and private and health and non-health sectors) to support **interoperable**, integrated, and comprehensive information systems. (43) The platform can be customized

for a variety of different health information management purposes and integrated into existing in-country health information platforms, (43) making it a cost-effective and flexible solution for countries looking to improve the effectiveness of their health information system.

#### **Bangladesh’s approach: creating an interoperable digital health system using DHIS2**

In recent years, Bangladesh has used DHIS2 to strengthen its health information system as a part of a broader push to transform its healthcare system using digital technologies. Introduced in 2009 by the Ministry of Health and Family Welfare (MOHFW), DHIS2 has been used nationwide since 2011. (40) The introduction of DHIS2 led some vertical programs--for example, the National Tuberculosis Control Program--to transition to using DHIS2 for health information management purposes. (40,46) However, not all existing digital health initiatives and data systems were compatible to link with DHIS2 and therefore remained unintegrated, for example, the [e-TB Manager](#). (40,46) This led to a situation in which fragmented and disjointed health information system initiatives across different health programs--combined with poor coordination between users of these systems--produced poor quality and non-standardized data that limited the use of data for decision-making. (46)

In 2015, the Systems for Improved Access to Pharmaceuticals and Services (SIAPS) program conducted a [comprehensive mapping](#) of existing health information system tools to assess their scopes and performances and to identify opportunities to streamline the tools and better coordinate siloed health information system initiatives. (40) This scoping included an assessment of the DHIS2 platform’s capacity, robustness, data security, and interoperability. It was determined that the adaptability and security of DHIS2 and its ability to be integrated into existing information systems made it a powerful way forward for strengthening the interoperability of information systems. As a result, it was recommended that Bangladesh continue using DHIS2 for data aggregation, analysis, and reporting and that stronger action be taken to integrate the platform with other data systems, such as the e-TB Manager tool, to improve the integration and *coordination* of health data for better decision making. (40)

#### **Supporting the sustainable implementation of DHIS2**

Since 2015, SIAPS has worked to develop DHIS2 as an overarching platform to aggregate information from various health information system initiatives and make this data accessible by both data producers and users throughout Bangladesh. (40) For example, a set of dashboards is being built in the DHIS2 systems with integrated tools for managers and planners at different levels of the health system to monitor and evaluate their programs and improve service delivery. (40) In the case of the e-TB Manager, SIAPS collaborated with the non-profit [HiSP Bangladesh](#) to link the e-TB Manager and DHIS2 tools using a master facility and data structure mapping system, then added an interoperability feature using a standard web application programming interface.

[DHIS2 implementation at the national scale](#) (within the MOHFW) in Bangladesh has resulted in more timely, comprehensive, and higher quality data. To support the ongoing management and maintenance of this system, the MOHFW has allocated a budget and worked to create the necessary IT infrastructure to sustain the system without donor support. However, to avoid fragmentation and ensure data quality in the long-term, it will be important for Bangladesh to continue to make different data systems compatible with DHIS2 through an [interoperability framework](#) that facilitates effective coordination and collaboration among MOHFW and its partners. (46)

When used effectively, DHIS2 is a powerful tool for improving the capacity of information systems to provide timely, accurate and complete information needed to improve population health outcomes. The effectiveness of this platform in the Bangladeshi context, and worldwide, is dependent on the existence of factors that underpin supportive and organization information systems, such as strong governance, supportive policies, and local capacity building, for example, skills training on DHIS2 use for health

workforce at the facility level. (43,44,56) Users can interact with communities of DHIS2 users and experts, including their experience with deployment and strategies for implementation in the [DHIS2 Online Academies](#) and more information on DHIS2 can be found [here](#).

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## WHAT TO ASK: WHAT QUESTIONS SHOULD BE CONSIDERED TO BEGIN IMPROVEMENTS?

The questions below may be a useful starting place for assessing information systems in your context and determining whether it is an appropriate area of focus and how one might begin to plan and enact reforms.

### HOW COMPREHENSIVE ARE YOUR HEALTH INFORMATION SYSTEMS?

Comprehensive information systems report and use a broad spectrum of health-related data from both the public and private sectors, and other relevant non-health sectors. Comprehensive information systems integrate data from the following types of systems across different levels of the health system and different types of facilities: HMIS, surveillance information systems, patient medical records, FMIS, LMIS, and CRVS.

To get started, you might consider:

- How are the different types of information systems used?
- If not all types of information systems are being fully utilized, are there plans in place to develop or enhance these systems?
- What types of data sources are used (i.e. facility-based or informal)?
- Are these systems interoperable and interconnected?

### DO YOUR INFORMATION SYSTEMS CAPTURE ESSENTIAL PHC INDICATORS AND ENABLE TRACKING OF PHC CAPACITY AND PERFORMANCE?

In order for information systems to support strong PHC service delivery it is critical that they be designed to capture and report on PHC-specific indicators and PHC performance. To determine whether your system does this effectively, you might consider:

- Do your country's information systems capture key PHC indicators, such as those included in the [PHC Vital Signs Profile](#)?
- Do your country's information systems allow users to track PHC capacity and performance specifically? For example, can you track the availability of key inputs--such as [facility infrastructure](#), [drugs and supplies](#), [funds](#), and [workforce](#)--at PHC facilities compared to hospitals? Can you specifically track and assess the [competence of the PHC workforce](#) and [PHC service quality](#) compared to competence and quality in secondary or tertiary care levels?

### HOW INTEROPERABLE AND INTERCONNECTED IS YOUR HEALTH INFORMATION SYSTEM?

Information systems are considered interoperable when the same information is captured in the same or similar format and channels are established such that information can be exchanged, triangulated across data sources, and used across multiple sectors. To assess the interoperability and interconnectedness of information systems in your country, you might consider:

- Is there a platform in place to integrate and manage the different types of information systems in your country? (i.e. DHIS2) Is this cost-effective, secure, and easy to use? Is this platform fully digitized?
- Are there data quality standards in place that are appropriately regulated and enforced to ensure standardized quality and use?
- Does information follow patients as they move geographically or between different levels of the system?
- Does your country track the proportion of primary health care facilities with all of the identified standard safety precautions and equipment in place?

### **IS THE FORMAT OF YOUR INFORMATION SYSTEM ELECTRONIC-BASED, PAPER-BASED, OR SOMEWHERE IN BETWEEN?**

While much can be accomplished with paper-based systems, the most effective information systems are fully digitized and interoperable across all levels of care. To get started on the transition from paper-based to fully electronic in your country, you might consider:

- What elements of information systems in your country are electronic vs. paper-based?
- Is there variation in the format used, for example by geographic region, level-of-care, type of facility, or type of information system?
- Are there policies and plans in place to support investments in infrastructure that supports electronic information system use, for example skills training, modernized technologies, and necessary facility infrastructure?

### **IS THE DESIGN AND FUNCTIONALITY OF INFORMATION SYSTEMS COMPATIBLE WITH THE NEEDS AND SKILLS OF USERS ACROSS ALL LEVELS OF THE HEALTH SYSTEM?**

In order for information systems to be useful and used, they must be designed to ensure that they are user-friendly and intuitive for all types of health workers and decision makers and that they can be easily and efficiently incorporated into workflows. Additionally, the intended users of information systems need appropriate and ongoing training in how to effectively and efficiently use information systems. To get started in assessing your system's performance, you might consider:

- Do information systems have a user friendly structure and fit efficiently and intuitively into existing workflows with and clearly-defined standards (i.e. standard operating procedures for data collection, analysis, and use) and principles to ensure standardization of data quality and use?
- Are information communication technologies suitable to the local context? If not, are systems in place to train and capacitate health workers to appropriately and effectively use new technologies to perform their duties associated with the collection of health data, data analysis, and data use?
- Is the information produced by the different types of information systems in your country complete, accurate, and accessible to relevant users at the right place at the right time? Is it in a format that users can easily review and use to support quality, continuous, and coordinated care (i.e. identify and follow trends, address gaps in care, etc.)?

## RELEVANT TOOLS & RESOURCES

Tags: Health management information systems; Surveillance systems; Personal care records; Financial management information systems; Civil registration and vital statistics; Logistics management information systems; Principles

### [HEALTH SYSTEMS STRENGTHENING CHAPTER 3: HEALTH INFORMATION SYSTEMS \(WHO, 2010\)](#)

**Overview:** This document provides countries with support to assess and strengthen health information system performance. Specifically, it helps countries develop a monitoring strategy to track progress and performance and ensure accountability and understand the core indicators and methods that can be used to assess health information system performance related to the generation, analysis, synthesis, and validation of health data.

Tags: Health management information systems, Principles

### [PAHO AND WHO IS4H MATURITY MODEL \(PAHO AND WHO, 2018\)](#)

**Overview:** The IS4H Maturity Model was developed by PAHO and WHO to help member states assess the maturity levels of their information system for health and the capability of public health organizations and technology to operate, interact, and benefit from information systems. Specifically, the model analyzes the maturity of information management processes, information governance readiness, open government initiatives, and knowledge management process adoption. This resources includes a standard-assessment and self-assessment tool to help users apply the model.

Tags: Health management information systems, Principles

### [WHO MANAGEMENT OF PATIENT INFORMATION: TRENDS AND CHALLENGES IN MEMBER STATES \(WHO, 2012\)](#)

**Overview:** This report examines the adoption and use of patient information systems and reviews data standards and legal protection for patient data based on the results of a global survey. It provides countries with a list of steps that can be taken to facilitate the implementation of effective patient information systems. Specifically, the guideline prioritizes the adoption of open-source, standards-based software platforms, data exchange standards, clear patient privacy and security legislation, and appropriate training for health informatics professionals.

Tags: Personal care records

### [WHO HEALTH STATISTICS AND INFORMATION SYSTEMS: CRVS PAGE \(WHO\)](#)

**Overview:** This webpage provides information related to health statistics and information systems, with links to relevant tools and resources. It guides users through key topics related to civil registration and vital statistics including statistics, innovation and technology, country monitoring and evaluation, and monitoring universal health coverage.

Tags: Civil registration and vital statistics

### [WHO AND WORLD BANK GROUP GLOBAL CIVIL REGISTRATION AND VITAL STATISTICS SCALING UP INVESTMENT PLAN 2015 - 2024 \(WORLD BANK AND WHO, 2014\)](#)

**Overview:** This Global Scaling Up Investment Plan was prepared by the World Bank Group and the World Health Organization with input from several agencies and countries. It provides users with an overview of civil registration and vital statistics, the current global state, and a scaling-up plan that includes national CRVS strengthening, international support for CRVS, and sharing knowledge and building the evidence base.

**Tags:** Civil registration and vital statistics

### [STRENGTHENING CIVIL REGISTRATION AND VITAL STATISTICS FOR BIRTHS, DEATHS AND CAUSES OF DEATH: RESOURCE KIT \(WHO, 2012\)](#)

**Overview:** This resource kit is designed to support countries in planning and implementing improvements to their civil registration and vital statistics systems. It uses a standards-based and country-driven approach to support countries through the process of assessing the performance of CRVS systems and developing evidence-based improvement plans. In particular, the kit helps to enable users to identify, locate, and make use of the core standards, tools, and materials needed to build stronger and more efficient CRVS systems.

**Tags:** Civil registration and vital statistics

### [IMPROVING THE QUALITY AND USE OF BIRTH, DEATH AND CAUSE-OF-DEATH INFORMATION: GUIDANCE FOR A STANDARDS-BASED REVIEW OF COUNTRY PRACTICES \(WHO, 2010\)](#)

**Overview:** This guidance tool provides users with comprehensive guidance on how to evaluate the quality and functioning of CRVS systems. The resources available here include a detailed assessment and rapid assessment tool, designed to help users obtain a clear and comprehensive understanding of the strengths and weaknesses of their CRVS system and strategic options for improvement.

**Tags:** Civil registration and vital statistics

### [RAPID ASSESSMENT OF NATIONAL CIVIL REGISTRATION AND VITAL STATISTICS SYSTEMS \(WHO, 2010\)](#)

**Overview:** This rapid assessment tool consists of 25 questions that can be used to quickly evaluate the strengths and weaknesses of a country's current CRVS system. This rapid assessment tool has been developed to accompany the comprehensive guide, "Improving the quality and use of birth, death and cause-of-death information: guidance for a standards-based review of country practices."

**Tags:** Civil registration and vital statistics

### [PRINCIPLES AND RECOMMENDATIONS FOR A VITAL STATISTICS SYSTEM: REVISION 3 \(UNITED NATIONS, 2014\)](#)

**Overview:** This resource was developed by the UN Statistics Division to provide guidance on establishing a functioning system for collecting, processing and disseminating vital statistics. In particular, the guide provides users with information related to improving sources of vital statistics and practical recommendations for quality assurance.

Tags: Civil registration and vital statistics

### [IMPROVING MORTALITY STATISTICS THROUGH CIVIL REGISTRATION AND VITAL STATISTICS SYSTEMS \(WHO, 2014\)](#)

**Overview:** This document offers guidance on strategies for strengthening national CRVS plans, with a focus on mortality and cause-of-death statistics. Specifically, the document summarizes key mortality-related indicators, the strengths and limitations of different data sources, and the best options for generating mortality statistics. It concludes with priority actions and recommendations for strengthening CRVS based on country starting points and capacities.

Tags: Civil registration and vital statistics

### [ICD-11 TRAINING TOOL \(WHO, 2016\)](#)

**Overview:** International classification of disease (ICD) is the international standard for reporting diseases and health conditions and is used as the diagnostic classification standard for all clinical and research purposes. This training tool is designed to build country capacity for implementing ICD and is designed for self-learning and classroom use. It describes the structure of the classification and statistical coding according to ICD criteria and comes with a quick reference guide for determining cause of death on the death certificate in line with ICD-11.

Tags: Civil registration and vital statistics

### [WHO APPLICATION OF ICD-10 FOR LOW-RESOURCE SETTINGS INITIAL CAUSE OF DEATH COLLECTION: THE START-UP MORTALITY LIST \(ICD-10-SMOL\) \(WHO, 2014\)](#)

**Overview:** The Start-Up Mortality List (SMoL) was developed in line with the International Classification of Diseases (ICD 10th Revision) to provide a succinct and easy tool that countries can use as a first step towards standardized reporting of causes of death in low-resource settings where capacities to code causes of death to ICD 3- or 4-digits are lacking. It can be used to support public health priority setting and tracking progress toward national and international targets and goals.

Tags: Civil registration and vital statistics

### [A SYSTEM OF HEALTH ACCOUNTS - 2017 REVISED EDITION \(OECD, EUROSTAT, AND WHO, 2017\)](#)

**Overview:** The System of Health Accounts (SHA 2011) is a statistical reference manual giving a comprehensive description of the financial flows in health care. It provides a set of revised classifications of health care functions, providers of health care goods, and services and financing schemes. Specifically, the SHA classifications build on common concepts, boundaries, definitions and accounting rules for measuring consumption of health care goods and services. The SHA can be used as a basis for better data collection on health expenditure to guide the successful implementation of national health accounts.

Tags: Financial management information systems

### [ROUTINE HEALTH INFORMATION SYSTEMS: A CURRICULUM ON BASIC CONCEPTS AND PRACTICE \(USAID, MEASURE EVALUATION, AND WHO, 2017\)](#)

**Overview:** This curriculum offers training for strengthening routine health information systems in low- and middle-income countries. It is intended to be used to build capacity to conceptualize, design,

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develop, govern, and manage a routine health information system that generates information that can be used to improve public health practice and service delivery.

**Tags:** Health management information systems

### [HEALTH MANAGEMENT INFORMATION SYSTEMS \(HMIS\) WEBPAGE \(MEASURE EVALUATION\)](#)

**Overview:** This webpage provides an overview of health management information systems strengthening, facilitation, and use. It offers users practical guidance on the design, management, and implementation of health management information systems paired with training materials to support implementation.

**Tags:** Health management information systems

### [HEALTH INFORMATION SYSTEMS STRENGTHENING STANDARDS AND BEST PRACTICES \(USAID AND MEASURE EVALUATION, 2018\)](#)

**Overview:** USAID and MEASURE Evaluation developed this guide to help stakeholders align their information systems with international standards and best practices. The modules provide a reference guide for 12 different HIS data sources, including individual health records, logistics management information systems, financial management information systems, public health surveillance systems, and civil registration and vital statistics systems.

**Tags:** Principles, Personal care records, Logistics Management Information Systems, Financial Management Information Systems, Surveillance Systems, and Civil Registration and Vital Statistics systems

### [FINANCIAL MANAGEMENT INFORMATION SYSTEMS BRIEF \(THE WORLD BANK, 2019\)](#)

**Overview:** This brief provides users with an overview of financial management information systems and links to relevant tools and resources including an FMIS data mapper, FMIS world map, and an FMIS Community of Practice.

**Tags:** Financial management of information systems

### [FINANCIAL MANAGEMENT INFORMATION SYSTEMS AND OPEN BUDGET DATA: DO GOVERNMENTS REPORT ON WHERE THE MONEY GOES? \(WORLD BANK, 2013\)](#)

**Overview:** This study examines the effects of FMIS on publishing open budget data and provides governments with guidance on the effective use of FMIS platforms to support improvements in the accuracy, timeliness, and reliability of budget reporting.

**Tags:** Financial management of information systems

### [WORLD HEALTH ORGANIZATION JOINT EXTERNAL EVALUATION TOOL: INTERNATIONAL HEALTH REGULATIONS \(2005\) \(WHO, 2016\)](#)

**Overview:** This evaluation tool was designed to assess country capacity to prevent, detect, and rapidly respond to public health threats. It is intended to be used through a joint external evaluation process to measure country-specific status and progress in achieving the targets of effective surveillance and response, including an assessment of health surveillance information systems. The external evaluation allows countries to assess their capacity to detect and rapidly respond to public health threats, facilitate

a transparent multi-partner response to identify the most urgent health needs in the health security system, and prioritize opportunities for preparedness, response, and action.

**Tags:** Surveillance systems

### [FACTORS THAT INFLUENCE THE IMPLEMENTATION OF E-HEALTH: A SYSTEMATIC REVIEW OF SYSTEMATIC REVIEWS \(ROSS ET AL., 2016\)](#)

**Overview:** This review provides a synthesis of the literature on e-health implementation across a diverse array of healthcare settings and introduces readers to an accessible and useful guide for planning implementation of e-health strategies.

**Tags:** Health management information systems

### [MEASURING THE PERFORMANCE OF PRIMARY HEALTH CARE: A PRACTICAL GUIDE FOR TRANSLATING DATA INTO IMPROVEMENT \(JOINT LEARNING NETWORK FOR UNIVERSAL HEALTH COVERAGE, 2018\)](#)

**Overview:** “This toolkit provides practical guidance, tools, and links to other resources to support countries in collecting better, more useful data on PHC system performance and using the data to improve performance. Depending on a country’s measurement capacity and unique priorities, the toolkit can be used routinely or at strategic points” to help with strategies such as understanding PHC performance measurement across program areas and system functions, addressing measurement gaps in important service delivery areas, and communicating data effectively to relevant stakeholders through targeted data analysis and visualization.

**Tags:** Principles

### [HEALTH INFORMATION SYSTEMS STRENGTHENING RESOURCE CENTER \(MEASURE EVALUATION\)](#)

**Overview:** Designed for health professionals and policy makers, this website provides access to tools, resources, and information on health information systems strengthening including country profiles and assessment tools.

**Tags:** Principles

### [JSI SUPPLY CHAIN MANAGER’S HANDBOOK: A PRACTICAL GUIDE TO THE MANAGEMENT OF HEALTH COMMODITIES \(JOHN SNOW, INC., 2017\)](#)

**Overview:** This handbook draws on the lessons and knowledge of experienced global supply chain experts to provide governments and private and public sector partners with a practical, cost-effective guide for supply chain management for essential health commodities. Especially relevant is the chapter on information systems for data visibility and use, which includes information on data selection, collection, visibility, quality, and use for logistics management information systems.

**Tags:** Logistics management information systems

### [INFORMATION SYSTEMS FOR SUPPLY CHAIN MANAGEMENT \(JOHN SNOW, INC., 2017\)](#)

**Overview:** This position paper explores how to combine the applications of separate information systems, namely Routine Health Information Systems and Logistics Management Information Systems, to capture more robust, comprehensive data. Using dedicated, fit-for-purpose software solutions for each system,

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the integration process described in this paper identifies opportunities to make distinct applications interoperable at the point of care and policy level to improve the efficiency and overall management of the health system.

**Tags:** Logistics management information systems

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