Health Information Systems (HIS)
Interoperability Maturity Model Mapping Tool

Description of the HIS Interoperability Maturity Model Mapping Tool

Over the past decade, several tools have been created by implementers in the digital health space to help country governments and other stakeholders implement health information systems (HIS). The purpose of this resource is to map those tools to the domains and subdomains of the Health Information Systems Interoperability Maturity Model in the HIS Interoperbility Maturity Toolkit (web link below). Countries may use and apply these tools to improve their HIS and to advance along the subdomains of the maturity model over time.

Components of the HIS Interoperability Maturity Model Mapping Tool

This tool includes two complementary views of tools mapped to the Health Information Systems Interoperability Maturity Model. The "Mapping to Maturity Model" tab lists all of the subdomains of the maturity model and a definition of each subdomain. Resources, specifically chapters or sections of resources, are then mapped to these subdomains. For example, if an implementer would like to learn how to improve their "Compliance with Data Exchange Standards" (a subdomain under "Leadership and Governance"), the resources listed in this mapping provide information and guidance for better understanding of the standards and how to apply the standards to the implementer's interoperable HIS. The "Tools" tab provides a list of all of the tools referenced in the previous tab. There is a description of each tool, a link to the tool, and a list of the subdomains mapped to this tool.

How to Update the HIS Interoperability Maturity Model Mapping Tool

Just as the Health Information System Maturity Toolkit will be updated over time, it is the view of the digital health community to maintain this mapping tool, especially as new resources are published. To contribute to this mapping tool, please contact dhiwg_cochairs@googlegroups.com.

To access the full HIS Interoperability Maturity Toolkit, please visit:

https://www.measureevaluation.org/resources/tools/health-information-systems-interoperability-toolkit/health-information-systems-interoperability-toolkit

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Domain	Subdomain	Definitions	Applicable Resource Tools	Description of Applicable Tool Sections to Provide More information on Subdomain Topic	Link to Tools
Leadership and governance	Governance Structure for HIS	The exercise of technical, political, and administrative authority to manage the national health information system (HIS) affairs at all levels of a health sector's hierarchy. It comprises the mechanisms, processes, and institutions through which actors and stakeholders articulate their interests, exercise their legal rights, meet their obligations, and mediate their differences.	RHIS Curriculum	Module 7 of the Routine Health Information Systems curriculum focuses on building the enabling policy environment, building a resource pipeline, and creating champions.	https://www.measureevaluation.org/his-strengthening-resource-center/his-strengthening-model/our-work/routine-health-information-systems/rhis-curriculum-modules/module-7-rhis-governance-and-management-of-resources
			How to Set up a Technical Working Group	This resource from the Principles for Digital Development is written as a step-by-step guide to setting up a technical working group (TWG), which can help digital development practitioners realize greater impact by coordinating efforts, systems, and resources to achieve common objectives. This falls under two main principles: "be collaborative" and "understand the existing ecosystem."	https://digitalprinciples.org/resource/omnis-ipsam-consequuntur-enim-ut-aperiam/
			National eHealth Strategy Toolkit	Part 1: Establishing a National eHealth Vision: This section explains how to develop a national eHealth vision that responds to health and development goals. It explains why a national approach to eHealth is needed, what a national eHealth plan will need to achieve, and how it will be done. Part 2: Developing a National eHealth Action Plan lays out an eHealth action plan that reflects country priorities and the eHealth context. It structures activities over the medium term while building a foundation for the long term.	http://www.itu.int/pub/D-STR-E_HEALTH.05-2012
			Planning an Information Systems Project: A Toolkit for Public Health Managers (2013)	Annex 5 of this toolkit includes a helpful list of "Governance and Design Principles." Other areas of the toolkit include helpful references to governance that may inform governance structure for HIS.	http://www.path.org/publications/files/TS_opt_ict_toolkit.pdf
			Health Information Exchange: Navigating and Managing a Network of Health Information Systems (2016)	Chapter 4, "Engaging and Sustaining Stakeholders: Toward Governance," outlines processes such as data sharing agreements as well as the actors engaged in health information exchange.	https://www.elsevier.com/books/health-information-exchange/dixon/978-0-12-803135-3
			PRISM RHIS Overview Tool	This assessment tool, which is one of the PRISM tools, provides a way to systematically document and evaluate the state of routine health information systems. The RHIS Overview Tool includes a checklist of information systems by health program area and the ability to assess the types of information handled by each system. This tool also assesses the specific ways in which data are collected and transmitted across the HIS data collection tools, as well as the data flows.	https://www.measureevaluation.org/resources/tools/health-information-systems/prism

		Interoperability Guidance Documents	Approved documents (policies, strategies, and frameworks) that guide HIS and digital health/eHealth work in a country	HIMSS [Healthcare Information and Management Systems Society] Interoperability Toolkit	The electronic toolkit is organized in three sections: Interoperability 101, Standards 101, and Adoption & Implementation. The section on Interoperability 101 provides an overview of the importance of OpenSRP and standard definitions for semantic, structural, and foundational interoperability. Users can gain a deeper understanding of what standards are and how they are used to facilitate interoperability. The section on standards also lists the types of standards and their purpose, grouped by Vocabulary/Terminology Standards, Transport Messaging Standards, Security Standards, Content Standards, Service Standards, and Technical Standards. Last, the section on interoperability use cases provides 6 scenarios that rely heavily on interoperability for improved service delivery and care processes.	http://www.himss.org/library/interoperability-standards/toolkit
		Compliance with Data Exchange Standards	Adherence to procedures and policies related to system security, technical standards, and data management in order to be able to participate in the broader system	National eHealth Strategy Toolkit	Section 9.6 in Part 1 of the toolkit identifies the eHealth legislation, policy, and compliance components that are required to support the development and operation of the national eHealth environment. These compliance components are similar to what would need to be considered to strengthen interoperability of HIS.	http://www.itu.int/pub/D-STR-E_HEALTH.05-2012
				Patient Safety: Achieving a New Standard for Care	Chapter 4 provides an overview of health data standards. It has sections on "What Are Data Standards" and "Technical Review of Health Care Data Standards" and a thorough list of references. This is an ideal resource for someone who is on the lower end of the maturity model and seeks an overview of health data exchange standards. Compliance is highlighted in the "Implementation of Data Standards" section.	https://www.ncbi.nlm.nih.gov/books/NBK216088/
		Data Ethics	Moral dimensions of data (including generation, recording, curation, processing, dissemination, sharing, and use), algorithms (including artificial intelligence, artificial agents, machine learning, and robots), and corresponding practices (including responsible innovation, programming, hacking, and professional codes), to formulate and support morally good solutions (e.g., right conduct or right values) in the digital age	Responsible Data Management Training Pack (Oxfam)	This interactive training pack helps organziations discuss and plan for responsible data management. The training pack introduces the concepts of responsible data practices and guides organizations to discuss how they would handle data ethics issues.	https://policy-practice.oxfam.org.uk/publications/responsible-data-management-training-pack-620235
				How to Secure Private Data Stored and Accessed in the Cloud	This resource, from the Principles for Digital Development, is written as a multistep guide to securing private data that are stored/accessed in the cloud, complete with safeguards, outcomes, and common missteps. The guide falls under two main principles: "address privacy & security" and "understand the existing ecosystem."	https://digitalprinciples.org/resource/howto-secure-private-data-cloud/
				mHealth data security, privacy, and confidentiality guidelines and companion checklist	These guidelines help ministry of health policymakers and mHealth program implementers plan to incorporate data security in mHealth programs. Countries can use the accompanying checklist to assess which security features their mHealth program has and where they would like to add more functions or policies to protect data in mHealth programs.	https://www.measureevaluation.org/resources/publications/ms-17-125a

	HIS Interoperability Monitoring and Evaluation	Use of message and content standards to facilitate tracking inputs, investments, and processes against desired outcomes and impacts	PRISM Organizational Behavioral Assessment Tool (OBAT)	The OBAT is part of "PRISM Tools," one of a series of PRISM documents that can be accessed from the link given here. The OBAT consists of a self-administered questionnaire for facility staff to assess their confidence and capacity to undertake tasks related to managing routine health information system. This questionnaire includes questions that highlight organizational issues, such as quality of data and use of information, which are key to internal improvements in HIS.	https://www.measureevaluation.org/prism
			Monitoring and evaluating digital health interventions: A practical guide to conducting research and assessment (2016)	This handbook is divided across six sections ranging from defining your monitoring and evaluation (M&E) needs to knowing how to report on your data for research purposes. Chapter 3 on monitoring digital health deployments and Chapter 5 on assessing data quality are most relevant to work on interoperability. Chapter 3 identifies key inputs for monitoring the implementation of digital health activities, focusing on the incremental requirements from first ensuring basic functionality, then checking for stability, and eventually assessing the quality and performance of the digital system. Chapter 5 provides a worksheet for M&E teams to verify data sources and document the quality of the data being generated by digital and paper-based systems.	http://www.who.int/reproductivehealth/publications/mhealth/digital-health-interventions/en/
	Business Continuity	The capability of the organization to continue delivery of products or services at acceptable, defined levels following a disruptive incident. It is about devising plans and strategies that will enable you to continue your business operations and enable you to recover quickly and effectively from any type of disruption, whatever its size or cause.	Interoperability for Public Health Agencies: A Self-Assessment Tool	Components of the self-assessment address the following topics: policies (the procedures and practices that enable systems to exchange information, capabilities, and services); infrastructure and shared services (the hardware, networking, and staffing that enable system interaction; levels of automation (the levels at which systems communicate automatically, using information technolog; and data standards (the data formats and technical specifications that enable information exchange)).	https://www.phii.org/sites/default/files/resource/files/IOP%20Self-Assessment%202016.pdf
	Financial Management	The legal and administrative systems and procedures put in place to permit a government ministry, agencies, and organizations to conduct their activities so as to ensure correct usage of public funds that meets defined standards of probity and regularity	RHIS Rapid Assessment Tool (RAT)	The RHIS Rapid Assessment Tool has a section on management and governance (page 21), which includes guidance regarding planning, oversight. and regulatory standards.	https://www.measureevaluation.org/resources/tools/rhis-rat/routine-health-information-system-rapid-assessment-tool
	Financial Resource Mobilization	All activities involved in securing new and additional resources for an organization. It also involves making better use of, and maximizing, existing resources. These activities include the raising of revenue, the management and control of public expenditure and financial accounting and reporting, and, in some cases, asset management.	The mHealth Assessment and Planning for Scale (MAPS) toolkit	Axis 3 on financial health provides tools including self-assessment questions on financial management, financial health scorecards, and related financial guidance and resources.	http://apps.who.int/iris/bitstream/handle/10665/185238/9789241509510_eng.pdf;jsessionid=C7D0076FB28318E8F7863C8E2159A45F?sequence=1
resources	**Human Resources Policy**	A set of principles, guidelines, and norms that an organization adopts to help manage it employees	Planning an Information Systems Project: A Toolkit for Public Health Managers (2013)	This toolkit can help public health managers plan the implementation of information and communications technology (ICT) in HIS. It draws on lessons learned during Project Optimize, a five-year partnership between the World Health Organization (WHO) and PATH for the vaccine supply chain. Step 2 and Annex 2 both provide information about building a team for information systems projects.	https://path.azureedge.net/media/documents/TS_opt_ict_toolkit.pdf

Human Resources Capacity (Skill Set and Numbers)	Availability of enough people with characteristics, attributes, and capabilities to perform a task/set of tasks to achieve clearly defined results	RHIS Rapid Assessment Tool (RAT)	The RHIS Rapid Assessment Tool asks questions about RHIS workforce planning and training (see section 1.3 of each assessment tab); other human resources questions are scattered in the assessment, as well. This assessment can be applied at all levels of the RHIS, from national to subnational to service delivery point.	https://www.measureevaluation.org/resources/tools/rhis-rat/routine-health-information-system-rapid-assessment-tool
		Performance of Routine Information Systems Management (PRISM) Tools	The Performance of Routine Information Systems Management (PRISM) Tools includes an organizational and behavioral assessment tool (OBAT). This questionnaire assesses organizational support and supervision for health management information system (HMIS) tasks, staff perceptions of their work on HIS, and their ability to analyze data. This questionnaire assesses the culture around RHIS performance.	https://www.measureevaluation.org/prism
Human Resource Capacity Development	An organized activity with clear learning outcomes that aims to impart knowledge and skills, shape attitudes, and develop specific competencies and capabilities in people	Digital Intervention Guide	Chapter 7 highlights key considerations for adaptive management when introducing digital health systems. This chapter focuses on fostering a culture of data use and the behavioral motivations for acting on data.	Forthcoming
		How to Select Digital Tools to Support Training and Capacity Building	This guide from the Principles for Digital Development details the process of selecting appropriate digital tools to support training and capacity building, noting that using digital platforms, such as online learning and mobile learning technologies, can increase the efficiency and effectiveness of capacity building and training activities. This falls under four main principles: "understand the existing ecosystem," "design for scale," "build for sustainability," and "reuse and improve."	https://digitalprinciples.org/resource/howto-select-tools-training-capacity/
		The mHealth Assessment and Planning for Scale (MAPS) toolkit	Domain 12 in Axis 5 (page 72) details training and support—specifically, the importance of user training, supervisor training, and user and technical support. Some of the self assessment questions may be useful to determine your gaps for HR development.	http://apps.who.int/iris/bitstream/handle/10665/185238/9789241509510_eng.pdf;jsessionid=C7D0076FB28318E8F7863C8E2159A45F?sequence=1
		Building an Informatics-Savvy Health Department	The resource says that an informatics-savvy health department is one that has three core elements: an overall vision and strategy for how it uses information and information technology as strategic assets; a skilled workforce; and a well-designed and effectively used information system. Focusing on these three core elements, the self-assessment tool was developed to enable planning and priority setting to identify where your agency falls on a continuum.	https://www.phii.org/infosavvy
		Health Informatics in Low- and Middle-Income Countries: Short Course for Health Information System Professionals	This short course is designed to be used as in-service training for digital health staff in HIS.	https://www.measureevaluation.org/resources/health-informatics-for-low-and-middle-income-countries-short-course-for-health-information-system-professionals/health-informatics-for-low-and-middle-income-countries-short-course-for-health-information-system-professionals

			Guide to a Team Approach to Building Capacity for Health Information Management	Guide to help health managers and administrators at subnational levels identify staff with potential; build their capacity in the production, management, and use of information for effective action planning and other decision making; and mobilize them to take on HIS responsibilities.	https://www.measureevaluation.org/resources/publications/wp-17-199
Technology	National HIS Enterprise Architecture	Enterprise architecture (EA) is a method and an organizing principle that aligns functional business objectives and strategies with an IT strategy and execution plan. When a country uses an enterprise architecture to organize its HIS, it is a national enterprise architecture.	Performance of Routine Information Systems Management (PRISM) Tools	The questionnaires featured in the Performance Diagnostic Tool section assess the functioning of facility information systems, using categories such as data accuracy, reporting, and use of information. This may be relevant to enterprise architecture if users want to first assess the performance of facility-based systems that would be contributing to the larger architecture.	https://www.measureevaluation.org/prism
			OpenHIE	The web section on architecture provides an overview of registries and reusable components that can facilitate data sharing across external systems. Users can click on the different components (e.g., facility registry) to learn more and join relevant communities working in that area.	https://wiki.ohie.org/display/documents/OpenHIE+Architecture
	Technical Standards	An established norm based on a set of requirements, specifications, guidelines, or characteristics that can be used consistently to ensure that digital health systems, health information services, and processes are fit for their purpose	4 Basics to Know about the Role of FHIR in Interoperability	Article that defines the Fast Healthcare Interoperability Resource (FHIR) and descibes how it works to make systems interoperable.	https://healthitanalytics.com/news/4-basics-to-know-about-the-role-of-fhir-in-interoperability
			HL-7/FHIR	Section of HL-7 FHIR that defines FHIR. FHIR Specification is a standard for exchanging healthcare information electronically. This page provides an overview of the standard and serves as a road map for first-time readers of the specification to help find their way around FHIR quickly.	https://www.hl7.org/fhir/overview.html
			Health Information Exchange: Navigating and Managing a Network of Health Information Systems (2016)	Chapter 8, "Syntactic Interoperability and the Role of Standards," is an excellent reference chapter.	https://www.elsevier.com/books/health-information-exchange/dixon/978-0-12-803135-3
			OpenHIE Standards Profiles	List and description of "Integrating the Healthcare Enterprise" (IHE) profiles that OpenHIE is working toward demonstrating or has demonstrated as supported in reference implementations.	https://wiki.ohie.org/display/documents/OpenHIE+Standards+and+Profiles
			Demand and Readiness Tool for Assessing Data Sources in Health Information Systems (HIS DART)	The HIS DART provides an objective appraisal of the alignment of each data source with relevant national and international standards. The HIS DART consists of a set of 12 HIS data source modules, with each module containing a questionnaire accompanied by detailed instructions, question by question, to help the administrator and respondents to elicit, convey, and record valid information.	https://www.measureevaluation.org/resources/publications/tl-18-14

	Data Management	Methods, protocols, and specifications for the collection, storage, transmission, and retrieval of information associated with healthcare applications	PRISM Organizational Behavioral Assessment Tool (OBAT)	The OBAT is part of "PRISM Tools," one of a series of PRISM documents that can be accessed from the link given here. The OBAT evaluates behavioral and organizational factors that affect routine health information system (RHIS) performance, including questions on data use and management.	https://www.measureevaluation.org/prism
			Demand and Readiness Tool for Assessing Data Sources in Health Information Systems (HIS DART)	The HIS DART provides an objective appraisal of the alignment of each data source with relevant national and international standards. The HIS DART consists of a set of 12 HIS data source modules, with each module containing a questionnaire accompanied by detailed instructions, question by question, to help the administrator and respondents to elicit, convey, and record valid information.	https://www.measureevaluation.org/resources/publications/tl-18-14
	HIS Subsystems	A system that collects one or more of the data sources in a national HIS. Examples include RHIS, HMIS, civil registration and vital statistics systems (CRVSS), logistics management information systems (LMIS), and human resource information systems (HRIS).	Master Facility List Resource Package	This package is designed to assist countries in the development and management of their master facility list (MFL). The package contains 10 modules addressing 10 specific aspects of MFL implementation. Each module contains a summary of contents of the module, checklist of activities that should be completed before implementing the module, and key audiences for the module.	http://www.who.int/healthinfo/MFL_Resource_Package_Jan2018.pdf?ua=1
			OpenHIE Health Worker Registry Implementation Guide	This guide provides the steps for developing and implementing a national health worker registry.	https://wiki.ohie.org/display/SUB/Tools+and+Applications
			Good Practices for the Implementation and Management of a National Master Patient Index	This document provides information on best practices of how to set up and implement a Master Patient Index.	https://www.measureevaluation.org/resources/publications/fs-15-147
	Operations and Maintenance (for Computer Technology)	A set of procedures to ensure high up time for computer hardware, software and network resources	The mHealth Assessment and Planning for Scale (MAPS) toolkit	Axis 5—Operations—includes some references to organizational and programmatic measures for supporting implementation, use, and maintenance of the product throughout the scaling-up process. This is a high level overview, not in depth.	http://apps.who.int/iris/bitstream/handle/10665/185238/9789241509510_eng.pdf;jsessionid=C7D0076FB28318E8F7863C8E2159A45F?sequence=1
			Hardware and Software Maintenance Policy	Example of a hardware and software maintenance policy. This document includes the procedures to consider for software and hardware maintenance. A formal policy using a format similar to this is an example of the types of operational procedures to put in place for your systems.	https://www.cde.state.co.us/dataprivacyandsecurity/hardwaresoftwaremaintenancepolicy
	Communication Network: Local Area Network (LAN) and Wide Area Network (WAN) (ABD)	A digital computer and telecommunications network that supports and allows digital nodes to share resources. This is achieved through meaningful exchange of data. A LAN and WAN are typically distinguished by the geographical coverage of the network; a LAN usually covers and offers services to a relatively smaller geographical area than a WAN.	Health Information Exchange: Navigating and Managing a Network of Health Information Systems (2016)	The chapter, "ICT Systems," under the "Fundamental Components of HIE" section, includes information related to ICT specifically. The chapter, "Supporting HIE Infrastructure," also includes useful information on interoperability.	https://www.elsevier.com/books/health-information-exchange/dixon/978-0-12-803135-3

	Hardware	An assembly of tangible physical parts of a system of computers, including servers and virtual private networks (VPN), that provide services to a user in the health information ecosystem.	Information and Communication Technologies for Women's and Children's Health: A Planning Workbook	Themes 5 and 7 relate to the infrastructural and technological capacity of ministries to absorb digital health implementations. These sections include questionaires to assess the selection of hardware and devices that can be supported by the local ICT infrastructure.	http://www.who.int/pmnch/knowledge/publications/ict_mhealth.pdf
			MOTECH Lessons Learned	The section on handsets, starting on page 15, provides important operational considerations regarding the provision of hardware, including mechanisms for preventing loss/misuse of devices.	https://grameenfoundation.org/resource/motech-lessons-learned

Tool	Description	Link	Applicable Sections to Maturity Model
4 Basics to Know about the Role of FHIR in Interoperability	Brief online article about FHIR.	https://healthitanalytics.com/news/4-basics-to-know-about-the-role-of-fhir-in-interoperability	Domain: Technology; Subdomain: Technical Standards
Building an Informatics-Savvy Health Department	The resource articulates that informatics-savvy health department as one which has three core elements: an overall vision and strategy for how it uses information and information technology as strategic assets; a skilled workforce; and well-designed and effectively used information systems. By focusing on these three core elements, the self-assessment tool was developed to enable planning and priority setting to identify where your agency falls on a continuum.	https://www.phii.org/infosavvy	Domain: Human Resources; Subdomain: Human Resource Capacity Development
Demand and Readiness Tool for Assessing Data Sources in Health Information Systems (HIS DART)	The HIS DART provides an objective appraisal of the alignment of each data source with relevant national and international standards. The HIS DART consists of a set of 12 HIS data source modules, with each module containing a questionnaire accompanied by detailed instructions, question by question, to help the administrator and respondents to elicit, convey, and record valid information.	https://www.measureevaluation.org/resources/publications/tl-18-14	Domain: Technology; Subdomain: Technical Standards
			Domain: Technology; Subdomain: Data Management
Digital Intervention Guide	Chapter 7 highlights key considerations for adaptive management when introducing digital health systems. This chapter focuses on fostering a culture of data use and the behavioral motivations for acting on data.	forthcoming	Domain: Human Resources; Subdomain: Human Resources Capacity Development
FHIR Release 3 (STU)	Online resource from HL7 about FHIR.	https://www.hl7.org/fhir/overview.html	Domain: Technology; Subdomain: Technical Standards
Good Practices for the Implementation and Management of a National Master Patient Index	This document provides information on best practices of how to setup and implement an Master Patient Index.	https://www.measureevaluation.org/resources/publications/fs-15-147	Domain: Technology; Subdomain: HIS Subsystems
Guide to a Team Approach to Building Capacity for Health Information Management	This guide to help health managers and administrators at subnational levels identify staff with potential; build their capacity in the production, management, and use of information for effective action planning and other decision making; and mobilize them to take on HIS responsibilities. The guide begins with a discussion of the purpose of an HIS, the desired attributes of a fully functional HIS, and how this compares with the HIS of a typical developing country. It then describes how a facility or a health office can effectively manage and use an HIS. Tools and references with illustrative examples are provided in the appendixes.	https://www.measureevaluation.org/resources/publications/wp-17-199	Domain: Human Resources; Subdomain: Human Resource Capacity Development

Hardware and Software Maintenance Policy	Example of a Hardware and Software Maintenance Policy. This document includes the procedures to consider for software and hardware maintenance. A formalized policy using a format similar to this is an example of the types of operational procedures to put in place for your systems.	https://www.cde.state.co.us/dataprivacyandsecurity/hardwaresoftwaremaintenancepolicy	Domain: Technology; Subdomain: Operations and Maintenance (for Computer Technology)
Health Informatics in Low- and Middle-Income Countries: Short Course for Health Information System Professionals	This short course is designed to be used as in-service training for digital health staff in health information systems.	https://www.measureevaluation.org/resources/health-informatics-for-low-and-middle-income-countries-short-course-for-health-information-system-professionals/health-informatics-for-low-and-middle-income-countries-short-course-for-health-information-system-professionals	Domain: Human Resources; Subdomain: Human Resource Capacity Development
Health Information Exchange: Navigating and Managing a Network of Health Information Systems (2016)	Chapter 4, "Engaging and Sustaining Stakeholders: Toward Governance," is a useful chapter that outlines processes such as data sharing agreements as well as the actors engaged in health information exchange.	https://www.elsevier.com/books/health-information-exchange/dixon/978-0-12-803135-3	Domain: Leadership and Governance; Subdomain: Governance Structure for HIS
			Domain: Technology; Subdomain: Technical Standards
			Domain: Technology; Subdomain: Communication Network
HIMSS Interoperability Toolkit	This toolkit contains policy, practices, and principles to help build interoperable systems, information on how to implement and adopt health information standards, and opportunities to either test standard profiles and certify solutions as interoperable, or to find which products/devices have demonstrated the capabilities of successfully exchanging health information.	http://www.himss.org/library/interoperability-standards/toolkit	Domain: Leadership and Governance; Subdomain: Interoperability Guidance Documents
How to Secure Private Data Stored and Accessed in the Cloud	This resource from the Principles for Digital Development is written as a multi-step guide to securing private data that is stored/accessed in the cloud, complete with safeguards, outcomes, and common missteps. This falls under two main principles: "address privacy & security" and "understand the existing ecosystem".	https://digitalprinciples.org/resource/howto-secure-private-data-cloud/	Domain: Leadership and Governance; Subdomain: Data Ethics
How to Select Digital Tools to Support Training and Capacity Building	This guide from the Principles for Digital Development details the process of selecting appropriate digital tools to support training and capacity building, noting that using digital platforms - such as online learning and mobile learning technologies - can increase the efficiency and effectiveness of capacity building and training activities. This falls under four main principles: "understand the existing ecosystem", "design for scale", "build for sustainability", and "reuse and improve".	https://digitalprinciples.org/resource/howto-select-tools-training-capacity/	Domain: Human Resources; Subdomain: Human Resource Capacity Development

Resource	Description	Link	Domain/Subdomain
How to Set up a Technical Working Group	This resource from the Principles for Digital Development is written as a step-by-step guide to setting up a technical working group (TWG), which can help digital development practitioners realize greater impact by coordinating efforts, systems and resources to achieve common objectives. This falls under two main principles: "be collaborative" and "understand the existing ecosystem".	https://digitalprinciples.org/resource/omnis-ipsam-consequuntur-enim-ut-aperiam/	Domain: Leadership and Governance; Subdomain: Governance Structure for HIS
Information and Communication Technologies for Women's and Children's Health: A Planning Workbook	The workbook addresses the needs of policy-level specialists, programme planners and project managers who are considering scaling up the use of ICTs. Its content can be used in a number of different scenarios, including: in a dedicated workshop devoted to how ICTs can be used for RMNCH essential interventions (such as integrated service delivery for mothers and children from pre-pregnancy to delivery, to the immediate postnatal period, to early childhood); and as a tool supporting wider discussions on RMNCH essential interventions.	http://www.who.int/pmnch/knowledge/publications/ict_mhealth.pdf	Domain: Technology; Subdomain: Hardware
Interoperability for Public Health Agencies: A Self-Assessment Tool	Components of the self-assessment address policies (the procedures and practices that enable systems to exchange information, capabilities, and services); infrastructure and shared services (the hardware, networking, and staffing that enable system interaction; levels of automation (the levels at which systems communicate automatically using information technology; data standards (the data formats and technical specifications that enable information exchange).	https://www.phii.org/sites/default/files/resource/files/IOP%20Self-Assessment%202016.pdf	Domain: Leadership and Governance; Subdomain: Business Continuity
Master Facility List Resource Package	This package is designed to assist countries in the development and management of their master facility list (MFL). The package contains 10 modules addressing 10 specific aspects of MFL implementation. Each module contains a summary of contents of the module, checklist of activities that should be completed before implementing the module, and key audiences for the module.	http://www.who.int/healthinfo/MFL_Resource_Package_Jan2018.pdf?ua=1	Domain: Technology; Subdomain: HIS Subsystems
The mHealth Assessment and planning for Scale (MAPS) toolkit	The MAPS toolkit has two overarching goals – to assist and to plan. The toolkit assists mHealth project teams to critically assess their mHealth project as they move from piloting to planning their next steps for overcoming the challenges inherent in scaling up.	http://apps.who.int/iris/bitstream/handle/10665/185238/9789241509510_eng.pdf;jsessionid=C7D0076FB28318E8F7863C8E2159A45F?sequence=1	Domain: Human Resources; Subdomain: Human Resource Capacity Development Domain: Technology; Subdomain: Operations and Maintenance (for Computer Technology) Domain: Leadership and Governance; Subdomain: Financial Resource Mobilization
mHealth data security, privacy, and confidentiality guidelines and companion checklist	These guidelines as designed for both ministry of health policymakers and mHealth program implementers to plan for data security into their mHealth programs. Countries can use the accompanying checklist to assess which security features their mHealth program has and where they would like to add more functions or policies to protect data in mHealth programs.	https://www.measureevaluation.org/resources/publications/ms-17-125a	Domain: Leadership and Governance; Sub-Domain: Data Ethics

Monitoring and evaluating digital health interventions A practical guide to conducting research and assessment (2016)	This resource on Monitoring and Evaluating Digital Health Interventions provides step-wise guidance to improve the quality and value of monitoring and evaluation (M&E) efforts in the context of digital health interventions, also commonly referred to as "mHealth" or "eHealth" interventions. This guide is intended for implementers and researchers of digital health activities, as well as policy-makers seeking to understand the various stages and opportunities for systematically monitoring implementation fidelity and for evaluating the impact of digital health interventions.	http://www.who.int/reproductivehealth/publications/mhealth/digital-health-interventions/en/	Domain: Leadership and Governance; Subdomain: HIS Interoperability Monitoring and Evaluation
MOTECH Lessons Learned	This document explains the MOTECH project in Ghana and highlights key lessons learned by the project team as the system was being designed, developed, and implemented. Although MOTECH is viewed as a "technology project," the majority of the lessons learned are around operational issues, cultural components, and operating with partners to make the project successful.	https://grameenfoundation.org/resource/motech-lessons-learned	Domain: Technology; Subdomain: Hardware
National eHealth Strategy Toolkit (2012)	This National eHealth Strategy Toolkit depicts the growing impact that eHealth is bringing to the delivery of health care around the world today, and how it is making health systems more efficient and more responsive to people's needs and expectations. The Toolkit provides a framework and method for the development of a national eHealth vision, action plan, and monitoring framework. It is a resource that can be applied by all governments that are developing or revitalizing a national eHealth strategy, whatever their current level of eHealth advancement.	http://www.itu.int/pub/D-STR-E_HEALTH.05-2012	Domain: Leadership and Governance; Subdomain: Governance Structure for HIS
			Domain: Leadership and Governance; Subdomain: Compliance with Data Exchange Standards
OpenHIE Architecture	OpenHIE Architecture section. Numerous resourses including the following helpful childpages: Architecture Road Map, OpenHIE Releases, Architecture Governance and Principles, Architecture Maturity, Architecture Meetings; Specification Documentation, OpenHIE IHE Integration Statements, OpenHIE Standards and Profiles, OpenHIE Privacy and Security, and Reference Technologies.	https://wiki.ohie.org/display/documents/OpenHIE+Architecture	Domain: Technology; Subdomain: National HIS Enterprise Architecture
OpenHIE Health Worker Registry Implementation Guide	This guide provides the steps for developing and implementing a national health worker registry.	https://wiki.ohie.org/display/SUB/Tools+and+Applications	Domain: Technology; Subdomain: HIS Subsystems
OpenHIE Standards Profiles	This lists and describes the "Integrating the Healthcare Enterprise" (IHE) profiles that OpenHIE is working toward demonstrating or has demonstrated as supported in reference implementations.	https://wiki.ohie.org/display/documents/OpenHIE+Standards+and+Profiles	Domain: Technology; Subdomain: Technical Standards
Patient Safety: Achieving a New Standard for Care	Achieving a New Standard for Care (Chapter 4), published in 2004, by Institute of Medicine (US) Committee on Data Standards for Patient Safety. ISBN-10: 0-309-09077-6	https://www.ncbi.nlm.nih.gov/books/NBK216088/	Domain: Leadership and Governance; Subdomain: Compliance with Data Exchange Standards

Performance of Routine Information System Management Tools (PRISM)	PRISM is a set of tools that assess performance of an RHIS through assessing data quality and use of information for decision-making. The tools identify how technical, behavioral, and organizational factors contribute to RHIS performance.	https://www.measureevaluation.org/resources/tools/health-information-systems/prism	Domain: Leadership and Governance; Subdomains: Interoperability Guidance Documents, HIS Interoperability Monitoring and Evaluation
			Domain: Human Resources; Subdomain: Human Resources Capacity (Skillset and Numbers)
			Domain: Technology; Subdomains: Data Management, National HIS Enterprise Architecture
Planning an Information Systems Project: A Toolkit for Public Health Managers (2013)	This toolkit can help public health managers to plan for the implementation of information and communications technology (ICT) in health information systems. It draws on lessons learned during Project Optimize, a five-year partnership between the WHO and PATH for the vaccine supply chain.	http://www.path.org/publications/files/TS_opt_ict_toolkit.pdf	Domain: Leadership and Governance; Subdomain: Governance Structure for HIS
Responsible Data Management Training Pack (Oxfam)	This interactive training pack assists organziations in having discussions about and planning for responsible data management. The training pack introduces the concepts of responsible data practices and assists organizations in discussing how they would handle certain data ethics issues.	https://policy-practice.oxfam.org.uk/publications/responsible-data-management-training-pack-620235	Domain: Leadership and Governance; Subdomain: Data Ethics
RHIS Curriculum	Module 7 of the Routine Health Information Systems curriculum focuses on building the enabling policy environment, building a resource pipeline, and creating champions.	https://www.measureevaluation.org/his-strengthening-resource-center/his-strengthening-model/our-work/routine-health-information-systems/rhis-curriculum-modules/module-7-rhis-governance-and-management-of-resources	Domain: Leadership and Governance; Subdomain: Governance Structure for HIS
RHIS Rapid Assessment Tool	The RHIS Rapid Assessment Tool can be implemented as a stand-alone assessment tool or as part of a larger performance assessment (such as PRISM). As the name suggests, the RHIS RAT provides rapid assessment to identify gaps and facilitate planning. Local information systems are judged against global best practices. Implementation of the tool does not require special skills, ideally it will be administered by RHIS staff with knowledge of the local health system. Results from this tool are not meant to be comparable across regions or countries.	https://www.measureevaluation.org/resources/tools/rhis-rat/routine-health-information-system-rapid-assessment-tool	Domain: Leadership and Governance; Subdomain: Financial Management
			Domain: Human Resources; Subdomain: Human Resources Capacity (Skillset and Numbers)