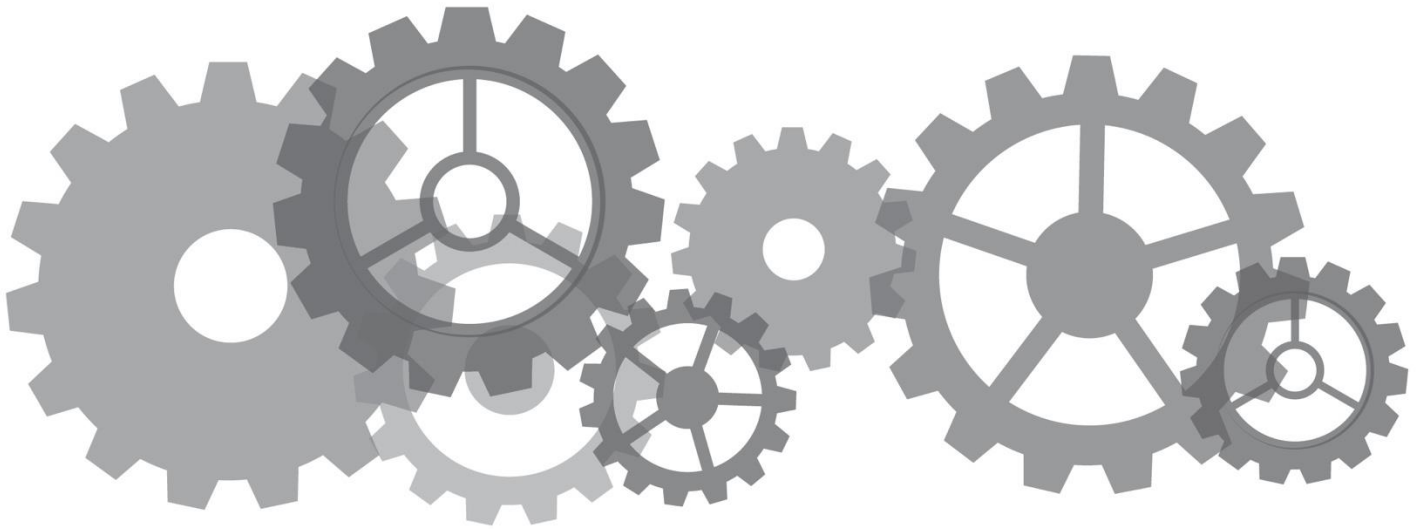




Health Information Systems Interoperability Maturity Toolkit

Assessment Tool





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INTRODUCTION

The objective of this assessment tool is to measure the stage of development of each domain and subdomain for a resilient health information system (HIS) that serves a country's data needs. Countries can use results from this assessment to plan for the implementation of HIS activities to achieve a strong and interoperable national HIS.

The assessment tool is divided into sections for each subdomain in the HIS Interoperability Maturity Model. Each subdomain is defined (see Appendix B for a glossary), followed by a series of statements that are used to evaluate the country's maturity level for that subdomain. First, review the definition to understand the subdomain. Then select all the statements that best describe the status of the HIS in your country. Use the "Evidence" column to note the reasons for selecting the statements and/or list the documents in which supporting information is given. Please see the Users' Guide in the Health Information Systems Interoperability Maturity Toolkit—<https://www.measureevaluation.org/resources/tools/health-information-systems-interoperability-toolkit>—for additional instructions on conducting the assessment, scoring the assessment, and using the results.

DOMAIN: LEADERSHIP AND GOVERNANCE

A. Subdomain: Governance Structure for HIS

Definition: The exercise of technical, political, and administrative authority to manage national HIS affairs at all levels of a country's health system. The governance structure consists of the mechanisms, processes, and institutions through which actors and stakeholders articulate their interests, exercise their rights, meet their obligations, mediate their differences, and oversee the functioning of the HIS.

Statements	Check if applicable	Evidence
A1. Evolving governing body for health information systems (HIS) is constituted on a case-by-case basis OR no governing body exists.	<input type="checkbox"/>	
B1. An HIS governing body is formally constituted.	<input type="checkbox"/>	
B2. The governing body has a scope of work that includes the people responsible for data governance oversight.	<input type="checkbox"/>	
B3. The governing body oversees interoperability directly or through a separate technical working group (TWG).	<input type="checkbox"/>	
C1. The HIS governing body conducts regular meetings with stakeholder participation.	<input type="checkbox"/>	
D1. The HIS governing body uses a work plan (or another tool) to monitor the implementation of HIS interoperability.	<input type="checkbox"/>	
D2. The HIS governing body is government-led. ¹	<input type="checkbox"/>	
D3. The HIS governing body mobilizes resources (financial, human resources, and political) to accomplish its goals.	<input type="checkbox"/>	
E1. The HIS governing body is legally protected from interference or organizational changes.	<input type="checkbox"/>	
E2. The HIS governing body and its TWGs are nationally recognized as the lead for HIS interoperability.	<input type="checkbox"/>	
E3. The governing body works in liaison with other similar working groups regionally and/or around the world.	<input type="checkbox"/>	

¹ Government-led: When one or more government agencies manage the calendar of events, exercise leadership by chairing meetings, maintaining records of meetings, and following up on the implementation of actions.

B. Subdomain: Interoperability Guidance Documents²

Definition: The documents (policies, strategies, and frameworks) that guide decisions, implementation, and the course of action for HIS interoperability. They are important reference materials for stakeholders who are developing the HIS from its current status to a mature status.

Statements	Check if applicable	Evidence
A1. HIS interoperability guidance documents are absent, and HIS interoperability is implemented on a case-by-case basis.	<input type="checkbox"/>	
B1. The country has at least one of the following documents drafted to guide interoperability: interoperability strategy or policy; eHealth/digital health strategy that includes interoperability; or interoperability roadmap.	<input type="checkbox"/>	
C1. The interoperability guidance document(s) have been launched.	<input type="checkbox"/>	
D1. The interoperability guidance document(s) are government-owned.	<input type="checkbox"/>	
D2. The interoperability guidance documents are consistently used and referenced in efforts to guide implementation of HIS interoperability.	<input type="checkbox"/>	
E1. Processes are in place to regularly monitor the implementation of the interoperability guidance documents.	<input type="checkbox"/>	
E2. The interoperability guidance documents are regularly reviewed and updated based on lessons learned from implementation.	<input type="checkbox"/>	

² The approved documents (policies, strategies, and frameworks) that guide HIS, and digital health/eHealth work in a country

C. Subdomain: Compliance with Data Exchange Standards

Definition: Adherence to organizational policies, procedures, and best practices related to HIS, including standards for data exchange, messaging, and security. It also means adherence to applicable laws, relevant industry standards, and internal policies (e.g., codes of conduct).

Statements	Check if applicable	Evidence
A1. No structures (working groups, steering committees, or units), processes, and procedures are in place to guide or enforce compliance with data exchange, messaging, and data security standards.	<input type="checkbox"/>	
B1. Structures (working groups, steering committees, or units) are in place to guide or enforce compliance.	<input type="checkbox"/>	
C1. The HIS has developed or adopted and implemented a regulatory framework for compliance.	<input type="checkbox"/>	
D1. The government enforces the regulatory framework for compliance.	<input type="checkbox"/>	
D2. The subsystems in the national HIS are required to meet compliance and certification criteria.	<input type="checkbox"/>	
E1. Compliance with standards for data exchange, messaging, and security is continuously reviewed.	<input type="checkbox"/>	
E2. The regulatory framework is reviewed and updated to reflect best practices for data exchange, messaging, and data security.	<input type="checkbox"/>	

D. Subdomain: Data Ethics

Definition: Data ethics addresses the moral dimensions of data management. This includes ensuring adherence to ethical principles throughout data generation, recording, curation, processing, dissemination, sharing, and use. Ethical practices should strive to ensure respect for the people behind the data; use of data in accordance with the intentions of the disclosing party; matching privacy and security safeguards to the expectation of individuals and populations from whom data are drawn; and following the law regarding personal health data privacy and security. These practices are also sometimes referred to as responsible data practices.

Statements	Check if applicable	Evidence
A1. The country has no healthcare-specific data laws, regulatory frameworks, or ethics provisions to guide data ethics issues, including data security, privacy, and confidentiality.	<input type="checkbox"/>	
B1. The country has drafted laws, policies, or a regulatory framework for data security for data security and privacy that address issues related to health data.	<input type="checkbox"/>	
C1. The country has an approved health data regulatory framework.	<input type="checkbox"/>	
D1. The health data security and privacy laws have been implemented, and there are guidelines on how to operationalize the laws in the context of HIS.	<input type="checkbox"/>	
D2. HIS users have been sensitized on the data security and privacy laws.	<input type="checkbox"/>	
D3. The government and HIS stakeholders consistently enforce the data security and privacy laws.	<input type="checkbox"/>	
E1. The country has a recognized mechanism (e.g., a committee or working group) in place for reviewing data ethics issues in the national HIS, and for updating policies, procedures, and laws, as needed.	<input type="checkbox"/>	

E. Subdomain: HIS Interoperability Monitoring and Evaluation

Definition: Use of indicators/attributes from the maturity model to facilitate the tracking of inputs, processes, and outputs against desired results of HIS interoperability implementation, and using these data to make decisions.

Statements	Check if applicable	Evidence
A1. No tracking, or ad hoc tracking, is done of HIS interoperability activities related to plans, resources, and budgets for the national HIS.	<input type="checkbox"/>	
B1. The methods and tools to report on HIS interoperability implementation are defined and documented.	<input type="checkbox"/>	
C1. Implementation of HIS interoperability activities is regularly monitored and reviewed.	<input type="checkbox"/>	
C2. Regular reports on HIS interoperability performance are generated and disseminated to stakeholders.	<input type="checkbox"/>	
D1. Mechanisms to track and measure performance of HIS interoperability are government-approved and government-led.	<input type="checkbox"/>	
E1. The regular monitoring of HIS interoperability influences decisions about leadership, governance, resources, and technology.	<input type="checkbox"/>	

F. Subdomain: Business Continuity

Definition: Business continuity is the capability of the organization to continue the delivery of products or services at acceptable predefined levels following a disruptive incident. Business continuity is about devising plans and strategies that enable an organization to continue business operations, and enable it to recover quickly and effectively from any type of disruption, whatever its size or cause. Interoperability will not function as intended if the HIS and all its components do not function correctly. Therefore, business continuity of the national HIS is imperative for continuity of strong interoperability services of HIS. This includes putting in place systems for data recovery, continuity of healthcare, continuous flow of funding, staff transition plans, etc.

Statements	Check if applicable	Evidence
A1. There is no government-approved business continuity plan (BCP) in place for the national or subnational levels of the HIS.	<input type="checkbox"/>	
B1. The HIS has developed a BCP that outlines the processes needed to ensure continuity of critical business processes.	<input type="checkbox"/>	
C1. The BCP implementation has been audited.	<input type="checkbox"/>	
C2. Audit results show that at least 50% of the BCP has been implemented.	<input type="checkbox"/>	
D1. Audit results show that at least 75% of the BCP has been implemented.	<input type="checkbox"/>	
E1. Audit results show that all or most of the BCP has been implemented.	<input type="checkbox"/>	

G. Subdomain: Financial Management

Definition: The legal and administrative systems and procedures put in place permitting a government ministry and its agencies and organizations to conduct activities that ensure the correct use of public funds, and which meet defined standards of probity and regularity. Activities include management and control of public expenditures, financial accounting, reporting, and asset management, in some cases.

Statements	Check if applicable	Comments
A1. No clear plan exists for financial management of HIS, including interoperability activities.	<input type="checkbox"/>	
B1. There are budgets for national HIS, including interoperability, based on HIS workplans.	<input type="checkbox"/>	
C1. There are budgets developed for the subnational HIS, including interoperability, based on workplans.	<input type="checkbox"/>	
C2. HIS expenditures are monitored against HIS budgets.	<input type="checkbox"/>	
D1. The HIS budget is part of the Ministry of Health's budgeting process.	<input type="checkbox"/>	
D2. Regular financial audits are carried out to promote accountability in HIS spending.	<input type="checkbox"/>	
E1. An established, long-term HIS financial management system is owned, reviewed, tracked, and updated by the government, and is supported by stakeholders.	<input type="checkbox"/>	

H. Subdomain: Financial Resource Mobilization

Definition: All activities involved in securing new and additional financial resources for an organization (in this case, the HIS). It also involves making better use of and maximizing existing financial resources.

Statements	Check if applicable	Evidence
A1. There is no documented plan for financial resources for HIS strengthening, including HIS interoperability.	<input type="checkbox"/>	
B1. Financial resources for HIS strengthening, including HIS interoperability, are mostly donor driven.	<input type="checkbox"/>	
C1. A costed work plan ³ at national and subnational levels is in place that covers both the information and communications technology (ICT) infrastructure (network, hardware, and software) and personnel for HIS needed for HIS strengthening, including HIS interoperability.	<input type="checkbox"/>	
D1. The government and implementing partners have sufficient funding to implement the costed work plan.	<input type="checkbox"/>	
D2. The government owns the costed work plan (takes the lead in its review and updating, and leads its implementation).	<input type="checkbox"/>	
E1. The costed work plan for supporting ICT and human resources for HIS strengthening, including HIS interoperability, is long-term (five or more years).	<input type="checkbox"/>	
E2. A mechanism is in place to regularly review and update the costed work plan.	<input type="checkbox"/>	

³ A costed work plan identifies the activities, timeframe, costs, and sources of funding for HIS interoperability, at a minimum.

DOMAIN: HUMAN RESOURCES

A. Subdomain: Human Resources Policy

Definition: A set of principles, guidelines, and norms that an organization adopts to help manage its employees.

Statements	Check if applicable	Evidence
A1. There is no human resources policy that recognizes HIS-related cadres.	<input type="checkbox"/>	
B1. A national needs assessment has been completed showing the number of staff and type of skills needed to support HIS, including digital HIS and interoperability.	<input type="checkbox"/>	
B2. HIS-related cadre roles and responsibilities are mapped to the government's workforce and schemes of work.	<input type="checkbox"/>	
C1. A human resources policy and/or strategic plan exists that identifies the HIS, digital HIS, and interoperability skills and functions needed to support the national digital HIS.	<input type="checkbox"/>	
D1. Implementation plans are in place for growing a cadre of staff at national and subnational levels for digital HIS and interoperability.	<input type="checkbox"/>	
E1. A long-term plan is in place to grow and sustain staff with the skills needed to sustain HIS and digital HIS and interoperability.	<input type="checkbox"/>	
E2. Performance management systems are in place to monitor growth and sustainability of the HIS workforce.	<input type="checkbox"/>	

B. Subdomain: Human Resources Capacity (Skills and Numbers)

Definition: Availability of adequate personnel with characteristics, attributes, and capabilities to perform a task/set of tasks to achieve clearly defined results.

Statements	Check if applicable	Evidence
A1. The country has no dedicated cadre of staff for maintaining digital HIS and interoperability.	<input type="checkbox"/>	
B1. The country depends on technical assistance from external stakeholders to support the national and subnational digital HIS and interoperability.	<input type="checkbox"/>	
C1. The country has sufficient national-level staff with the relevant skills ⁴ to support digital HIS and interoperability activities.	<input type="checkbox"/>	
D1. The country has sufficient subnational level staff with the relevant skills ⁴ to support digital HIS and interoperability activities.	<input type="checkbox"/>	
E1. A "human resources for health" strategic plan is in place to continuously upgrade staff skills continuously to reflect international best practices in digital HIS and interoperability, preferably with locally generated resources.	<input type="checkbox"/>	

⁴Relevant skills: governance and leadership, data collection, data management, data sources, information and communications technology, and managing information products, data exchange, and HIS business continuity

C. Subdomain: Human Resources Capacity Development

Definition: An organized activity with clear learning outcomes that aims to impart knowledge and skills, shape attitudes, and develop specific competencies and capabilities in personnel.

Statements	Check if applicable	Evidence
A1. The country has no training programs to build human resource capacity on digital HIS, including interoperability.	<input type="checkbox"/>	
B1. There is a nationally-recognized pre-service training curriculum outlining competencies for human resources for digital HIS and interoperability for HIS.	<input type="checkbox"/>	
C1. A plan exists for in-service training of HIS staff to build their skills around digital HIS and interoperability, based on a nationally or internationally recognized HIS curriculum.	<input type="checkbox"/>	
D1. The country has the capacity to train enough staff to support digital HIS and interoperability, through in-country pre-service and in-service training institutions or partnerships with other training institutions.	<input type="checkbox"/>	
D2. The government and its stakeholders provide sustainable resources for health ministry staff to receive training on HIS, including digital HIS and interoperability.	<input type="checkbox"/>	
E1. Opportunities and incentives are in place for continuing education in digital HIS and interoperability for HIS-related cadre staff to keep them up-to-date as the HIS field evolves.	<input type="checkbox"/>	

DOMAIN: TECHNOLOGY

A. Subdomain: National HIS Enterprise Architecture

Definition: Enterprise architecture is a method and an organizing principle that aligns functional business objectives and strategies with an information technology (IT) strategy and execution plan. A national enterprise architecture for an HIS defines how HIS subsystems interact and exchange data, and shows the necessary services for that data exchange, such as an interoperability services layer.

Statements	Check if applicable	Evidence
A1. A national HIS enterprise architecture document defining technology requirements and data exchange formats for interoperability does not exist OR there is a draft document, but it has not been validated or shared with the country's HIS community.	<input type="checkbox"/>	
B1. A validated national HIS enterprise architecture exists that defines technology requirements and exchange formats for interoperability.	<input type="checkbox"/>	
B2. Point to point data exchange between some HIS applications exists, but there is no systematic implementation of agreed upon architecture.	<input type="checkbox"/>	
C1. The country has foundational tools and rules for HIS interoperability. They include tools such as a health information management system for routine and surveillance data, and core authoritative registries (Facility Registry, Metadata Dictionary, Master Patient Index, and Health Worker registry).	<input type="checkbox"/>	
C2. The Interoperability Services Layer (ISL) for the HIS is operational and provides core functions, such as data authentication, translation, and interpretation.	<input type="checkbox"/>	
D1. The government owns, enforces, and leads implementation of the national HIS enterprise architecture, including the ISL and core authoritative registries (Facility Registry, Metadata Dictionary, Master Patient index, and Health Worker registry).	<input type="checkbox"/>	
E1. The national HIS architecture and its ISL are fully implemented using industry standards.	<input type="checkbox"/>	
E2. The ISL provides core data exchange functions and is periodically reviewed and updated to meet the changing country data needs.	<input type="checkbox"/>	

B. Subdomain: Technical Standards

Definition: 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 appropriate for their purpose. Standards provide a common language and set of expectations that enable interoperability among systems and/or devices. The technical standards include standards for data exchange, transmission, messaging, security, privacy, and hardware.

Statements	Check if applicable	Evidence
A1. No defined technical standards exist for use in the country's HIS data exchange.	<input type="checkbox"/>	
A2. Applications are hosted by the providers without any control from the government or Ministry of Health.	<input type="checkbox"/>	
B1. An HIS ICT infrastructure assessment ⁵ has been conducted and the needs for a coherent HIS ICT infrastructure architecture have been documented.	<input type="checkbox"/>	
B2. The country has adopted or developed technical standards for health data exchange, messaging, and security.	<input type="checkbox"/>	
C1. An interoperability lab exists for new partners to test technical standards or for onboarding new HIS subsystems.	<input type="checkbox"/>	
C2. A certification mechanism exists for new HIS subsystems to be integrated in the national HIS.	<input type="checkbox"/>	
D1. Technical standards for national data exchange have been published and disseminated in the country under the government's leadership.	<input type="checkbox"/>	
D2. The ISL is orchestrating data exchange between existing HIS applications hosted by the integrated ICT infrastructure supporting the national HIS.	<input type="checkbox"/>	
E1. A routine review of standards and requirements compliance is conducted to ensure continuous integration of the various subsystems.	<input type="checkbox"/>	

⁵ Key components of this assessment should include network, hardware, governance, security, maintenance, power availability, server uptime, and software. The assessment should be conducted at the national, subnational, and facility levels.

C. Subdomain: Data Management

Definition: Data management consists of the development, execution, and supervision of plans, policies, programs, and practices that control, protect, deliver, and enhance the value of data and information assets for decision making. Data management includes procedures on how data are captured, stored, analyzed, transmitted, and packaged for use across the data supply chain.

Statements	Check if applicable	Evidence
A1. No national document for data management procedures exists for the national HIS.	<input type="checkbox"/>	
B1. Electronic data management procedures ⁶ or the HIS are clearly developed and documented in a nationally recognized document.	<input type="checkbox"/>	
C1. A roadmap is in place to migrate data collection and reporting from a paper system to an electronic system, complete with necessary data security safeguards.	<input type="checkbox"/>	
C2. A documented mechanism is in place for maintaining data quality throughout the data supply chain.	<input type="checkbox"/>	
D1. National electronic data management processes are published and disseminated for the HIS.	<input type="checkbox"/>	
D2. A standard operating procedure and/or data use plan is in place to facilitate data use by the country and its stakeholders.	<input type="checkbox"/>	
D3. A data warehouse, integrating data from all HIS subsystems and allowing for data triangulation and quality control, is fully functional and in use.	<input type="checkbox"/>	
E1. Data access and use are constantly monitored, and data management systems are updated accordingly.	<input type="checkbox"/>	
E2. Electronic data transmission is the default method to move data among information systems.	<input type="checkbox"/>	
E3. Dashboards displaying information from multiple sources are available to decision makers.	<input type="checkbox"/>	

⁶Data management procedures are procedures on how data are captured, stored, analyzed, transmitted, and packaged for use across the data supply chain.

D. Subdomain: HIS Subsystems

Definition: A system that collects one or more of the data sources in a national HIS. Examples include routine HIS, health management information systems, civil registration and vital statistics systems, logistics management information systems, and human resource information systems.

Statements	Check if applicable	Evidence
A1. The country's HIS mainly consists of stand-alone program-specific subsystems working in silos addressing only the basic needs (routine HIS, surveillance system, and human resources).	<input type="checkbox"/>	
B1. HIS data exchange is mainly facilitated by a single subsystem directly linked to other subsystems (integration) to enable basic data exchange.	<input type="checkbox"/>	
C1. Guidelines for compliance with technical standards for HIS subsystems interoperability with the national HIS have been disseminated.	<input type="checkbox"/>	
C2. An increasing number of HIS subsystems are web-based and integrated with the ISL following the national standards requirements.	<input type="checkbox"/>	
D1. The government requires all HIS subsystems to comply with the country's interoperability plan, including use of technical standards.	<input type="checkbox"/>	
E1. Most HIS subsystems are exchanging data electronically according to industry standards/ best practices.	<input type="checkbox"/>	

E. Subdomain: Operations and Maintenance (for computer technology)

Definition: A set of procedures to ensure a high uptime for computer hardware, software, and network resources.

Statements	Check if applicable	Evidence
A1. Operations and maintenance services for electronic systems are ad hoc or non-existent.	<input type="checkbox"/>	
B1. Maintenance for network and hardware is a mix of reactive and evolving preventive procedures.	<input type="checkbox"/>	
C1. The country is receiving technical support to build a strong in-country capacity for computer technology maintenance.	<input type="checkbox"/>	
C2. Standard operating procedures exist that detail protocols for routine network and hardware maintenance.	<input type="checkbox"/>	
D1. The country has the capacity for strong in-country computer technology maintenance.	<input type="checkbox"/>	
D2. Computer operations and maintenance services are part of the HIS plan or the country's strategic plan for health.	<input type="checkbox"/>	
D3. A disaster recovery plan for digital HIS is in place and meets best practices.	<input type="checkbox"/>	
E1. The operations and maintenance services plan is continuously reviewed and adapted to evolving HIS interoperability requirements, and follows industry-based standards.	<input type="checkbox"/>	
E2. Simulations are undertaken regularly to increase the ability of technology staff to respond to a disaster.	<input type="checkbox"/>	

F. Subdomain: Communication Network: Local Area Network and Wide Area Network

Definition: A communication network is several computers linked together to allow them to share resources. Networked computers can share hardware, software, and data. Most computer networks have at least one server. A local area network (LAN) and a wide area network (WAN) are typically distinguished by the geographical coverage of the network, with a LAN usually covering and offering services to a relatively small geographical area as compared to a WAN.

Statements	Check if applicable	Evidence
A1. The country has no reliable network connection to support a national HIS.	<input type="checkbox"/>	
B1. An ICT infrastructure assessment has been conducted to determine LAN and WAN requirements for the country's HIS.	<input type="checkbox"/>	
C1. A national implementation plan to meet the LAN and WAN requirements in the country exists.	<input type="checkbox"/>	
C2. A national network maintenance plan exists to ensure high uptime, including clear procedures to recover from network failure.	<input type="checkbox"/>	
C3. The country has begun implementing a technical solution to ensure permanent connectivity to the HIS services.	<input type="checkbox"/>	
D1. All national offices of the Ministry of Health have a strong and reliable network connection to access the various HIS network services.	<input type="checkbox"/>	
D2. At least 50% of the subnational offices of the Ministry of Health and health service providers have a strong and reliable network connection to the various HIS network services.	<input type="checkbox"/>	
D3. An HIS-dedicated ICT and network support team is in place.	<input type="checkbox"/>	
E1. All or almost all (more than 75%) of the Ministry of Health's national and subnational offices and health service providers have a reliable and robust network connection.	<input type="checkbox"/>	
E2. The network support team has adequate financial, human, and technology resources.	<input type="checkbox"/>	

G. Subdomain: Hardware

Definition: An assembly of tangible physical parts of a system of computers, including servers and virtual private networks that provide services to a user in the HIS.

Statements	Check if applicable	Evidence
A1. The country has limited/inadequate hardware (e.g., servers, computers, printers, and supportive accessories) to support a national HIS.	<input type="checkbox"/>	
B1. An ICT infrastructure assessment has been done to identify the hardware required at national and subnational levels.	<input type="checkbox"/>	
B2. Less than 50% of the Ministry of Health's national and subnational offices have the required hardware (computers, printers, connecting devices, etc.).	<input type="checkbox"/>	
C1. Fifty percent (50%) or more of the Ministry of Health's national and subnational offices have required hardware, including back-up hardware.	<input type="checkbox"/>	
D1. Seventy-five percent (75%) of the Ministry of Health's national and subnational offices have the required hardware.	<input type="checkbox"/>	
D2. There is a back-up and recovery plan for the national HIS.	<input type="checkbox"/>	
E1. The hardware meets national and/or international specifications, and a long-term plan (five years or more) is in place that details how to keep hardware up-to-date.	<input type="checkbox"/>	



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