



Pan American
Health
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World Health
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REGIONAL OFFICE FOR THE
Americas

Information Systems for Health (IS4H) TOOLKIT



IS4H Maturity Assessment tool

Department of Evidence and Intelligence for Action in Health

PAHO/WHO



Information Systems for Health Toolkit

IS4H Maturity Assessment tool

IS4H-MM 2.0



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Toolkit metadata

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Acronym	IS4H – MM
Version	2.0
Date	May, 2019
Description	The Information Systems for Health Maturity Assessment Tool (IS4H-MM) describes the method, tool and questions for assessing organizational capacity related to governance, data management, digital transformation, innovation and knowledge management
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Introduction

The Information Systems for Health Maturity Assessment Tool (IS4H-MM) describes the method, tool and questions for assessing organizational capacity related to governance, data management, digital transformation, innovation and knowledge management. The IS4H-MM is part of the **IS4H Blueprint for a successful implementation** (Figure 1), and is organized according to the 4 strategic goals of the [IS4H conceptual Framework](#).

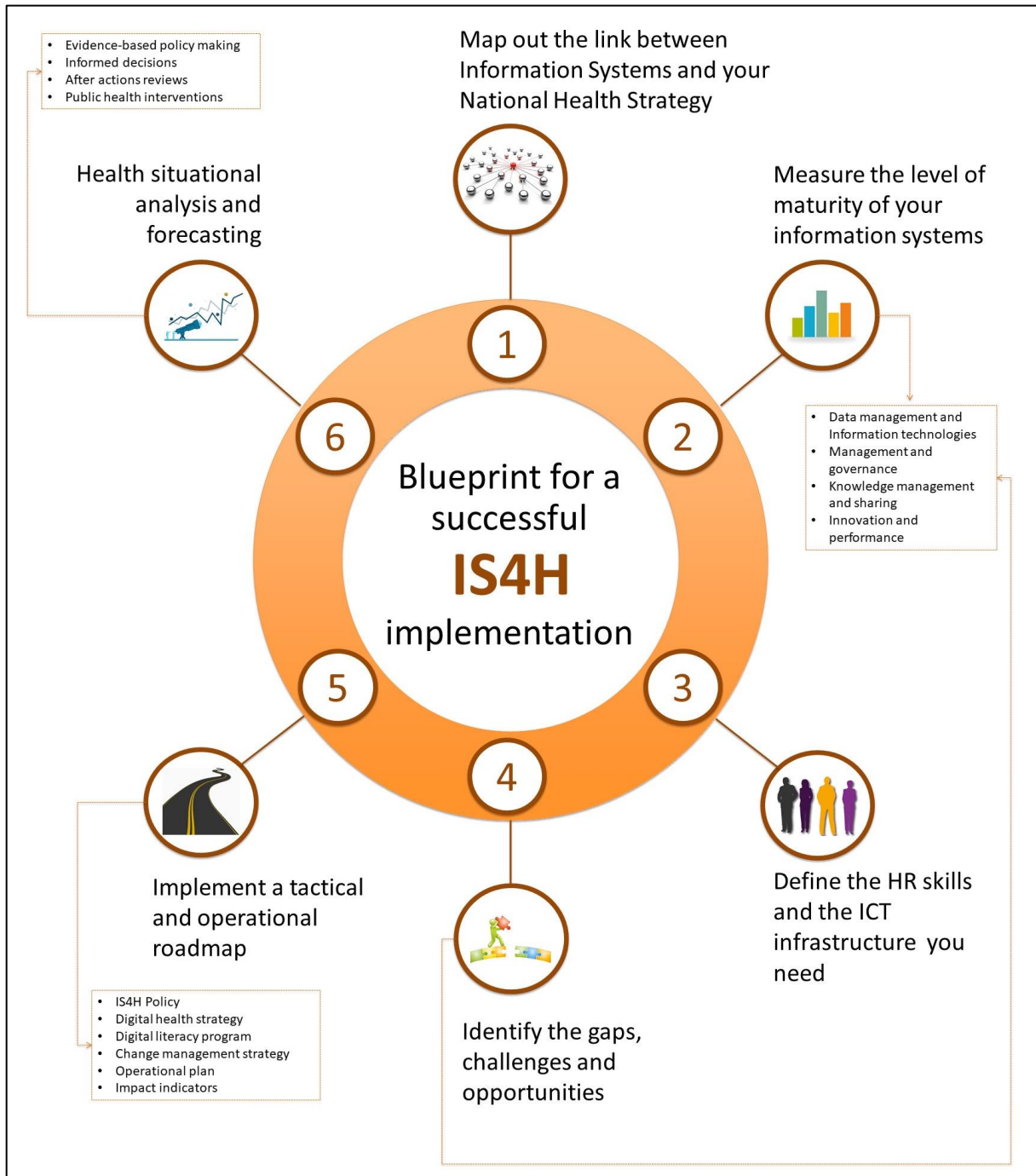


Figure 1. IS4H Blueprint for a successful implementation

IS4H-MM Conceptual framework

The IS4H-MM is also a reference framework guiding Information Systems for Health to keep walking through the changing path of information and knowledge revolution, and how countries and organizations might grow in capabilities to operate, interact and benefit from them. The diagram below illustrates the five levels of maturity (Figure 2).

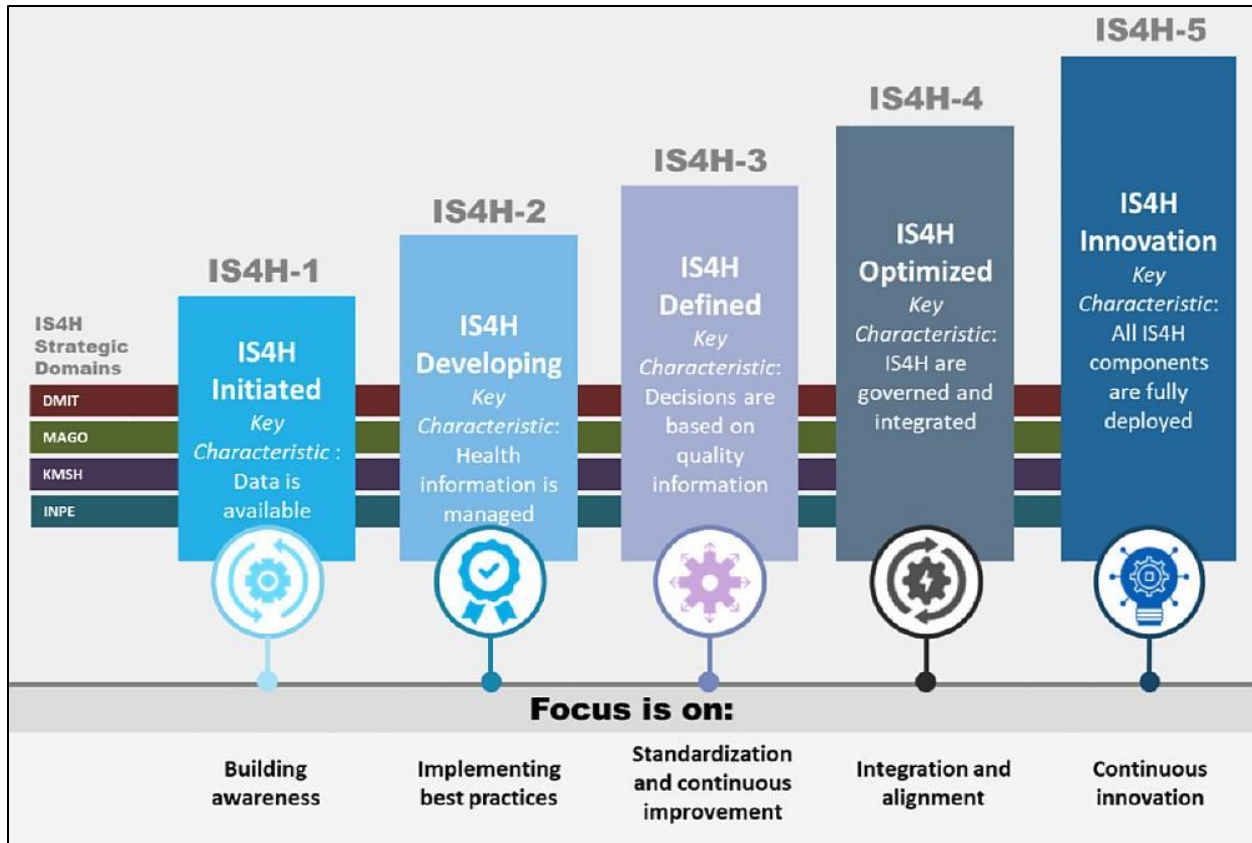


Figure 2. Maturity Assessment Tool (Conceptual framework)

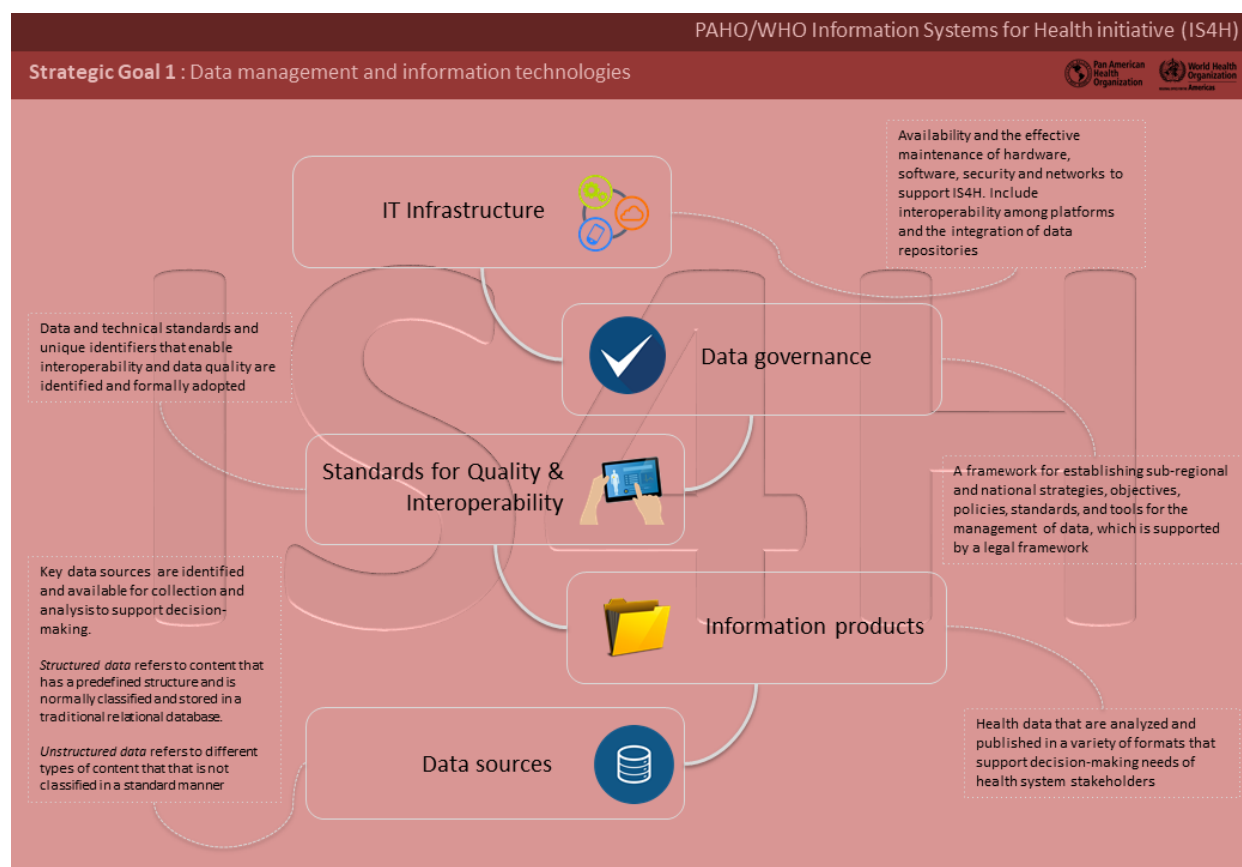
Assessment of the five progressive levels of IS4H-MM provides the awareness for planning where to go by Information Systems plans and roadmaps.

Maturity is assessed against key capability characteristics for each strategic goal at each level of the Maturity Model. It is possible for an organization to demonstrate different maturity levels within each strategic goal.

Maturity Level characteristics and components are detailed below. They are **color coded** according to each strategic goal of the framework that are reflected as DMIT, MAHO, KMSH and INPE in Figure 2).

IS4H-MM Description

Data Management and Information Technologies (DMIT)



DMIT – Components

- **Data Sources:** Data collection mechanisms and technologies. Structured data refers to content that has a predefined structure and is normally classified and stored in a traditional relational database. Unstructured data refers to different types of content that that is not classified in a standard manner
- **Information Products:** Health data that are processed and published openly in a variety of formats that accomplish the different needs of IS4H constituencies.

- **Standards for Quality and Interoperability:** Use and availability of data standards, identifiers, standards for interoperability and a national health information architecture.
- **Data Governances:** Health data governance is the framework for establishing sub-regional and national strategies, objectives, policies, standards, and tools for the management of technical data, which is supported by a legal framework
- **IT Infrastructure:** Availability and maintenance of Tools, Networks, Hardware and Software to support IS4H. Interoperability among platforms and integration of data repositories.

DMIT – Characteristics

Maturity Level characteristics		IS4H Framework Component
LEVEL 1	• Key data sources (e.g., vital statistics, demographics, morbidity and surveillance data) have been identified.	Data Sources
	• Data are routinely collected from key data sources, but data flow may be ad hoc or have challenges that impact quality.	Data Sources
	• Some data are collected electronically, but paper-based data collection is still common.	Data Sources
	• Some information products are generated, but not routinely and require intensive work and use of resources.	Information Products
	• Data is not readily shared across units, with stakeholders or with the public.	Information Products
	• Sharing data frequently requires permission from senior levels.	Information Products
	• There are few formal data standards enforced; evidence of some use of data standards (e.g. ICD-10; standardized indicators, etc.)	Standards for Quality and Interoperability
	• Data is not readily available for other purposes once collected and published in an information product.	Data Governance
	• Basic IT tools are generally available (e.g., hardware, software, internet connectivity available as required by staff), but may be older or not performing well.	IT Infrastructure
LEVEL 2	• Data are routinely collected electronically from all key sources.	Data Sources
	• Information products are efficiently and routinely produced.	Information Products
	• Some identifiers are used in individual data sources, but are not consistent or available across data sources	Standards for Quality and Interoperability

	<ul style="list-style-type: none"> Standards for interoperability have been identified. 	Standards for Quality and Interoperability
	<ul style="list-style-type: none"> Some formally documented health data management processes and best practices are available (e.g., data quality frameworks, data standards, policies, SOPs, etc.). 	Data Governance
	<ul style="list-style-type: none"> Core datasets are readily available. 	Data Governance
	<ul style="list-style-type: none"> Data are rarely integrated for analysis across various sources. 	Data Governance
	<ul style="list-style-type: none"> Some metadata are documented and maintained (e.g. indicator compendiums, data dictionaries). 	Data Governance
	<ul style="list-style-type: none"> Appropriate IT infrastructure (networks, servers, etc.) and tools (hardware, software) are widely available and generally reliable. 	IT Infrastructure
LEVEL 3	<ul style="list-style-type: none"> Information products are routinely produced that meet the specific needs of various stakeholders. 	Information Products
	<ul style="list-style-type: none"> Standards for interoperability have been formally adopted, and the national health information architecture has been formally defined and documented. 	Standards for Quality and Interoperability
	<ul style="list-style-type: none"> Health data management policies, procedures and best practices are consistently applied, resulting in the availability of quality data. 	Data Governance
	<ul style="list-style-type: none"> Formal data governance mechanisms (committees, policies, data quality frameworks, data sharing agreements, etc.) have been established among the national health authorities, and are functioning effectively. 	Data Governance
	<ul style="list-style-type: none"> There are continuous improvement processes established to monitor and invest in data quality. 	Data Governance
	<ul style="list-style-type: none"> There is evidence of interoperability between some health information platforms. 	IT Infrastructure
LEVEL 4	<ul style="list-style-type: none"> Formal health data governance mechanisms have been established at the national level with stakeholders outside the national health authority. 	Data Governance
	<ul style="list-style-type: none"> A national identifier is available for integrating health data from all sources. 	Standards for Quality and Interoperability
	<ul style="list-style-type: none"> There is evidence of significant interoperability across health information platforms. 	IT Infrastructure
	<ul style="list-style-type: none"> Integrated national data repositories from multiple data sources. 	IT infrastructure
LEVEL 5	<ul style="list-style-type: none"> Data from multiple data source types, including unstructured sources such as social media and various types of devices (e.g., Internet of Things – IoT) are used in health analysis. 	Data Sources

	<ul style="list-style-type: none"> • Large data sets integrated from multiple sources are readily available for analysis to support decision-making. 	Data Sources
	<ul style="list-style-type: none"> • Health information systems are interoperable, enabled by a national infrastructure that uses current standards, technologies, and architectures. 	Standards for Quality and Interoperability

DMIT – Assessment (key) questions

DMIT	
DATA MANAGEMENT AND INFORMATION TECHNOLOGIES - QUESTIONS	
DATA SOURCES	
1.	What are the country key data sources: <ul style="list-style-type: none"> • Vital statistics • Mortality • Morbidity • Chronical diseases • NCD • Immunization • HIV • Maternal health • other
2.	For key data sources identified data is collected: : <ul style="list-style-type: none"> • On demand • On a regular basis • Don't collect
3.	For each key data source, identify if data is collected by: <ul style="list-style-type: none"> • Paper Forms • Tally sheets • Microsoft Excel • Database Specify: Access, Oracle, MySQL, etc. • EMR Specify: • Other software Specify:
	A census was carried out in the past: <ul style="list-style-type: none"> • 0-3 years • 3- 5 years • 5-8 years • 8-10 years

DMIT

DATA MANAGEMENT AND INFORMATION TECHNOLOGIES - QUESTIONS

4.	<p>Is there a routine frequency of data collection for the identified key data sources?</p> <ul style="list-style-type: none"> • Real Time • Daily • Weekly • 1 month • 1-6 months • 6-12 months • more than 12 months • On demand
5.	<p>Data is collected in</p> <ul style="list-style-type: none"> • structured format • not in a structured format • Mix of structured and unstructured formats
6.	<p>Data collected include demographic disaggregated units (e.g. age, sex, residence by smallest administrative level).</p> <ul style="list-style-type: none"> • Yes • Some • No • N/A
7.	<p>The health-facility staff have adequate capacity to implement data collection;</p>
STANDARDS FOR QUALITY & INTEROPERABILITY	
8.	<p>Health data standards adopted (classification systems, data standards, Medical terminologies)</p> <ul style="list-style-type: none"> • No • Under implementation • Yes
9.	<p>Common data model implemented</p> <ul style="list-style-type: none"> • No • Under development • Developed but not implemented • Under implementation • Yes – routinely adopted
DATA GOVERNANCE	
10.	<p>The health-facility staff adopts procedures to:</p> <ul style="list-style-type: none"> • select health data collections, • process the data with data quality routines • analyze the data from various sources in health • None of the above?
11.	<p>Health metadata (data about data) documented</p> <ul style="list-style-type: none"> • No • Some documentation • Yes
12.	<p>Metadata best practices have been defined and adopted</p> <ul style="list-style-type: none"> • No

DMIT

DATA MANAGEMENT AND INFORMATION TECHNOLOGIES - QUESTIONS

	<ul style="list-style-type: none"> • Under development • Developed but not implemented • Under implementation • Yes – routinely adopted
13.	<p>Do executives, employees or stakeholders understand the types and value of metadata?</p> <ul style="list-style-type: none"> • Yes • No • Some
14.	<p>There is a written set of procedures for data storage and cleaning</p> <ul style="list-style-type: none"> • no procedures • some procedures • Procedures and policies documented but not fully implemented • Procedures and policies documented and implemented at the region and national levels • Procedures and policies documented and implemented at the facility, region and national levels
15.	<p>There is a written set of procedures for data collection</p> <ul style="list-style-type: none"> • no • some • Developed but not fully implemented • Developed and implemented at the region and national levels • Implemented at the facility, region and national levels
16.	<p>The organization has implemented procedures that define how health data sets are to be used by authorized personnel</p> <ul style="list-style-type: none"> • no • some • Developed but not fully implemented • Developed and implemented at the region and national levels • Implemented at the facility, region and national levels
17.	<p>The organization has implemented a formal Data Governance mechanism?</p> <ul style="list-style-type: none"> • no • some • Developed but not fully implemented • Developed and implemented at the region and national levels • Implemented at the facility, region and national levels
18.	<p>The organization has a set of rules and regulations in support to health data management?</p> <ul style="list-style-type: none"> • no • some • Developed but not fully implemented • Developed and implemented at the region and national levels • Implemented at the facility, region and national levels
19.	<p>Stakeholders are aware of the specific Data Governance capabilities that are available at the organization</p> <ul style="list-style-type: none"> • No • Some • Yes • N/A

DMIT

DATA MANAGEMENT AND INFORMATION TECHNOLOGIES - QUESTIONS

20.	<p>The staff is aware of the purpose or value of the Data Governance program</p> <ul style="list-style-type: none"> • No • Some • Yes • N/A
21.	<p>Datasets from major health data sources are consistent and have data quality measures.</p> <ul style="list-style-type: none"> • Yes • No • In process
22.	<p>Health institutions adopts unique identifier codes to facilitate the merging of multiple databases from different health data sources.</p> <ul style="list-style-type: none"> • Yes • No • In process
23.	<p>Completeness and precision data quality checks on all data may be performed at the point of entry for each mandatory attribute from each source system.</p>
24.	<p>Conformity checks and integrity checks on data are recent and have coverage of major data sources.</p>
25.	<p>Perform health data consistency and health data quality policies are:</p> <ul style="list-style-type: none"> • Non-existent • Under development • Developed but not in place • In place.
26.	<p>There are measurement cycles for health data consistency and quality activities</p> <ul style="list-style-type: none"> • No • In process • Yes, recently adopted • Yes, and it has been done in the past 3 years
27.	<p>Global Positioning System (GPS) coordinates for each health facility are included in the database</p> <ul style="list-style-type: none"> • No • In process • Yes
28.	<p>There is a written set of procedures for data quality control</p> <ul style="list-style-type: none"> • No • some procedures • Procedures and policies documented but not fully implemented • Procedures and policies documented and implemented at the region and national levels • Procedures and policies documented and implemented at the facility, region and national levels
29.	<p>There is a process for measuring health data quality</p> <ul style="list-style-type: none"> • No • Under development • Developed but not implemented • Under implementation • Yes – routinely adopted

DMIT

DATA MANAGEMENT AND INFORMATION TECHNOLOGIES - QUESTIONS

30.	<p>Have data quality best practices been defined and adopted as official organizational data policies?</p> <ul style="list-style-type: none"> • No • Under development • Developed but not implemented • Under implementation • Yes – routinely adopted
31.	<p>Quality checks on all data performed at the point of entry for each mandatory attribute from each source system.</p> <ul style="list-style-type: none"> • No • Under development • Developed but not implemented • Under implementation • Yes – routinely adopted
32.	<p>The national core data set has been defined</p> <ul style="list-style-type: none"> • No • In process • Yes
INFORMATION PRODUCTS	
33.	<p>There is a written set of procedures for data presentation for target audiences.</p> <ul style="list-style-type: none"> • no procedures • some procedures • Procedures and policies documented but not fully implemented • Procedures and policies documented and implemented at the region and national levels • Procedures and policies documented and implemented at the facility, region and national levels
34.	<p>The organization has implemented a catalog of types of Information Product (e.g. databases, reports, graphical material, publications, infographics etc)</p> <ul style="list-style-type: none"> • No • Ad Hoc • Yes • N/A
35.	<p>The organization provides graphs to display information at subnational health administrative offices (e.g., regional/provincial, district) and health facilities</p> <ul style="list-style-type: none"> • No • Ad Hoc • Yes • N/A
36.	<p>The organization has implemented specific rules and procedures for staff to report, explain or justify actions related to the use of health data managed by the institution</p> <ul style="list-style-type: none"> • no procedures • some procedures • Procedures and policies documented but not fully implemented • Procedures and policies documented and implemented at the region and national levels • Procedures and policies documented and implemented at the facility, region and national levels

DMIT

DATA MANAGEMENT AND INFORMATION TECHNOLOGIES - QUESTIONS

37.	Accurate population projections by age and sex are available for small areas (districts or below) for the current year
38.	Published statistics from civil registration system are disaggregated by: (1) sex; (2) age; and (3) geographical or administrative region (or urban/rural)
39.	<p>Lag between the time that data were collected and the time that statistics from civil registration/SRS/DSS were published</p> <ul style="list-style-type: none"> • Real Time • 1 Day • 1 Week • 1 month • 1-6 months • 6-12 months • more than 12 months • On demand
40.	<p>There is a common data presentation format</p> <ul style="list-style-type: none"> • No • In process • Yes • N/A
41.	<p>Information products are developed:</p> <ul style="list-style-type: none"> • Routinely • On demand • Not produced
42.	<p>Production of information products is:</p> <ul style="list-style-type: none"> • Automated (systems delivered) • Mix of automated and manual • Manual
43.	<p>Information products meet the needs of:</p> <ul style="list-style-type: none"> • Central Level • Central and local level • Various stakeholders.
IT INFRASTRUCTURE	
44.	<p>The organization has a formal mechanism for the adoption of ICT standards</p> <ul style="list-style-type: none"> • no • some • Developed but not fully implemented • Developed and implemented at the region and national levels • Implemented at the facility, region and national levels
45.	<p>The technology performs as it was intended</p> <ul style="list-style-type: none"> • No • Some • Yes
46.	The technology follows generally accepted industry standards

DMIT

DATA MANAGEMENT AND INFORMATION TECHNOLOGIES - QUESTIONS

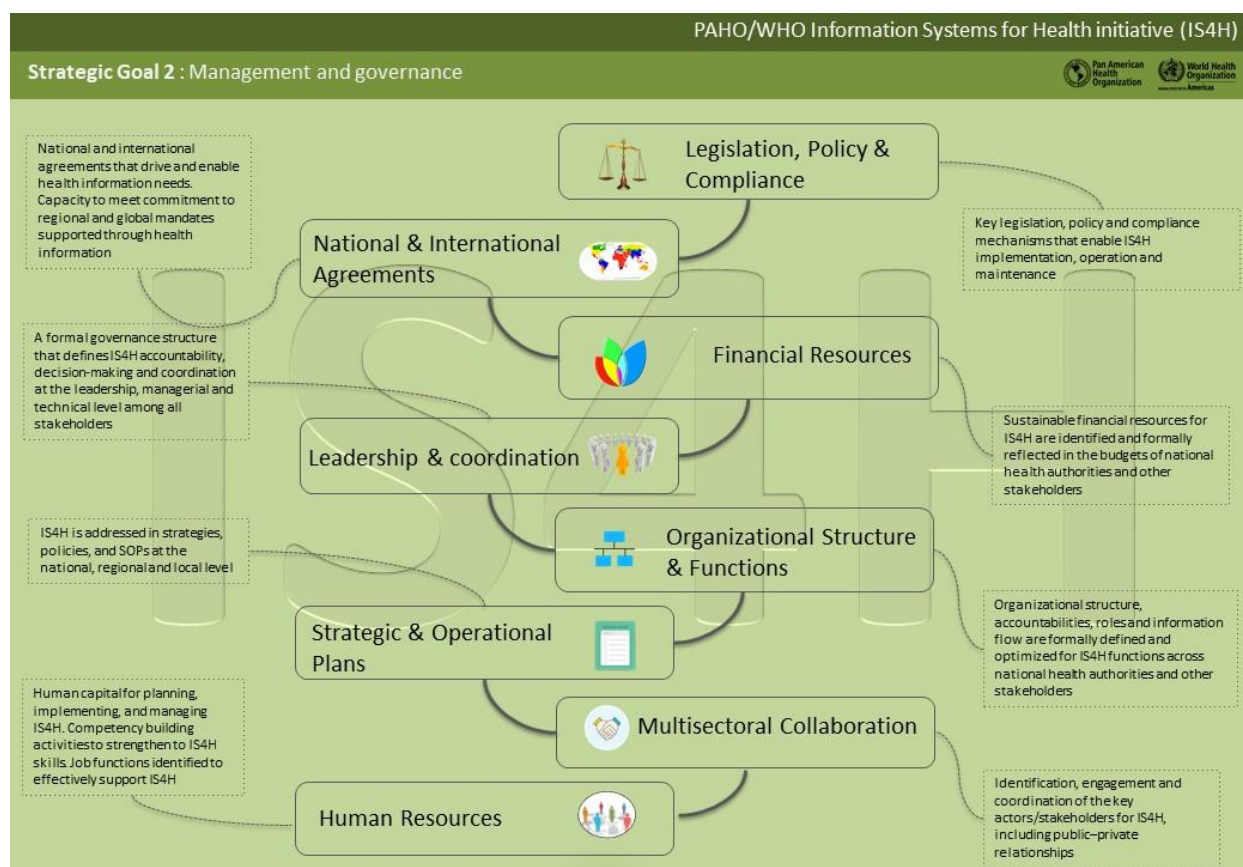
	<ul style="list-style-type: none"> • No • Some • Yes
47.	<p>There is equipment for maintaining and updating the database and maps on health facilities and services:</p> <ul style="list-style-type: none"> • Yes • Some facilities have • No
48.	<p>The MOH/Organization achieved convergence of interconnected and interoperable health information systems.</p> <ul style="list-style-type: none"> • No • Under development • Developed but not implemented • Under implementation • Yes – routinely adopted
49.	<p>Data exchange services implemented</p> <ul style="list-style-type: none"> • No • Under development • Developed but not implemented • Under implementation • Yes – routinely adopted
50.	<p>Directory services in place</p> <ul style="list-style-type: none"> • No • Under development • Developed but not implemented • Under implementation • Yes – routinely adopted
51.	<p>There are norms and standards for software development</p> <ul style="list-style-type: none"> • No • Under development • Developed but not implemented • Under implementation • Yes – routinely adopted
52.	<p>Reporting of security incidents is done:</p> <ul style="list-style-type: none"> • Instantly • 2 to 12 hours delay • 12 hours to 1 day delay • During the week • More than a week later • Not reported
53.	<p>Investigating of security incidents is done:</p> <ul style="list-style-type: none"> • Instantly • 2 to 12 hours delay • 12 hours to 1 day delay • During the week

DMIT

DATA MANAGEMENT AND INFORMATION TECHNOLOGIES - QUESTIONS

	<ul style="list-style-type: none">• More than a week later• Not investigated
54.	The organization has a dedicated budget for ICT Infrastructure (Computers, Network, Internet Connection, etc)

Management and Governance (MAGO)



MAGO – Components

- **Leadership and Coordination:** Coordination and distribution of the governance structure for IS4H accountability and decision-making at the managerial and technical level among all actors.
- **Strategic and Operational Plans:** Addressing IS4H under policies, strategies and SOPs at the national, regional and local level. Mechanisms for developing or adopting an IS4H governance strategy or policy that promotes a better decision- and informed policy-making mechanisms
- **Organizational Structures and Functions:** Organizational Structure & Information flows of health-related institutions. Roles and responsibilities IS4H health system actors.
- **Financial Resources:** Budget for IS4H implementation, sustainability, investment. Resources mobilization plans and ERP systems.

- **Human Resources:** Human capital for planning, implementing, and managing IS4H. Competency building activities to strengthen to IS4H skills. Job functions identified to effectively support IS4H.
- **Multisectoral Collaboration:** identification, engagement and coordination of the key actors/stakeholders for IS4H, including public–private relationship.
- **Legislation, policy and compliance:** Key and core legislation, policy and compliance mechanisms, elements to enable IS4H implementation, operation and maintenance.
- **National and international agreements:** National and International agreements to contextualize national plans and investments. Commitment to regional and global mandates.

MAGO – Characteristics

Maturity Level Characteristics	IS4H Framework Component
LEVEL 1 <ul style="list-style-type: none"> • Accountability and decision-making for IS4H (e.g., data management, health analysis, information technology, etc.) is distributed across different units within national health authorities, and investments and activities are typically not coordinated. 	Leadership and Coordination
<ul style="list-style-type: none"> • Components of IS4H are partially addressed under the national health strategy or related strategic plans, but there is no single integrated strategic or operational plan for IS4H. 	Strategic and Operational Plans
<ul style="list-style-type: none"> • There are gaps in IS4H services or functions, and/or services and functions may be duplicated across units/programs. 	Organizational Structures and Functions
<ul style="list-style-type: none"> • Success depends on knowledgeable individuals within the organization rather than on repeatable processes documented in unit descriptions, job descriptions, policies and SOPs. 	Organizational Structures and Functions
<ul style="list-style-type: none"> • There are identified human resource constraints for planning, implementing, and managing IS4H, but there is no formal plan for addressing human resource needs. 	Human Resources
<ul style="list-style-type: none"> • IS4H activities/resources are not formally identified in program/unit budgets. 	Financial Resources
<ul style="list-style-type: none"> • While it is sometimes possible to secure one-time financial resources for IS4H investments, required investments are difficult to sustain. 	Financial Resources
<ul style="list-style-type: none"> • Key stakeholders within the health sector or closely related sectors (e.g., vital statistics, national statistics, international 	Multisectoral Collaboration

	donors) have been identified, but engagement and coordination are typically ad hoc.	
	<ul style="list-style-type: none"> • There is general awareness that there are gaps in legislation, policy and compliance mechanisms that create barriers to the effective use of IS4H, but specific gaps and needs have not been formally documented. 	Legislation Policy and Compliance
	<ul style="list-style-type: none"> • There is some awareness of obligations under national and international agreements (e.g., IHR, SDGs, PAHO Core Indicators, national statistical reporting requirements, etc.) 	National and International Agreements
LEVEL 2	<ul style="list-style-type: none"> • IS4H investment decisions are coordinated at the management level within individual national health authorities (e.g., MOH, regional health authorities, health facilities, etc.) but not formally coordinated among health authorities or other national actors. 	Leadership and Coordination
	<ul style="list-style-type: none"> • IS4H activities are identified in individual unit/program annual operational plans of national health authorities, but are not integrated or aligned across units/programs. 	Strategic and Operational Plans
	<ul style="list-style-type: none"> • Accountability and responsibility for IS4H functions within national health authorities have been defined, and there are plans in place for organizational restructuring or re-alignment to rationalize functions and decision-making. 	Organizational Structures and Functions
	<ul style="list-style-type: none"> • Skills and job functions required to effectively support IS4H have been identified, although not all resources have yet been secured. 	Human Resources
	<ul style="list-style-type: none"> • There is evidence of competency building activities (training, workshops, conferences) for IS4H domains but these are typically ad hoc. 	Human Resources
	<ul style="list-style-type: none"> • IS4H activities are identified in individual unit/program annual budgets of national health authorities, but are not integrated or aligned across units/programs. 	Financial Resources
	<ul style="list-style-type: none"> • The financial resources requirements to effectively sustain IS4H have been identified, but not fully secured within operational budgets. 	Financial Resources
	<ul style="list-style-type: none"> • The roles and responsibilities of all the actors in the national health system are well documented. 	Multisectoral Collaboration
	<ul style="list-style-type: none"> • Informal relationships have been established with key multisectoral national actors, including private sector organizations. These national actors frequently participate in informal information sharing and planning activities. 	Multisectoral Collaboration
	<ul style="list-style-type: none"> • Requirements for IS4H enabling legislation, policy and compliance mechanism have been identified, but not yet implemented. 	Legislation Policy and Compliance

	<ul style="list-style-type: none"> • There are policies and SOPs that address ethical use and protection of health data (e.g., privacy, security, secondary use), but there may be gaps in regulation or legislation. • Obligations under national and international agreements are frequently met, but with high resource impact. 	<p>Legislation Policy and Compliance</p> <p>National and International Agreements</p>
LEVEL 3	<ul style="list-style-type: none"> • There is a formal governance structure in place for strategic planning and oversight of IS4H among the national health authorities (e.g. MOH, regional health authorities, health facilities, etc.). 	Leadership and Coordination
	<ul style="list-style-type: none"> • There is a formal strategic plan in place among national health authorities for strengthening IS4H that reflects the IS4H Strategic Framework. 	Strategic and Operational Plans
	<ul style="list-style-type: none"> • Operational plans of the units within national health authorities reflect IS4H activities and outcomes based on the IS4H Strategic Plan. 	Strategic and Operational Plans
	<ul style="list-style-type: none"> • An organizational structure that defines clear accountabilities and responsibilities for IS4H has been fully implemented within/among national health authorities, and is reflected in unit/program mandates and job descriptions. 	Organizational Structures and Functions
	<ul style="list-style-type: none"> • Enough human resources with the required skills to effectively implement and sustain IS4H have been secured. 	Human Resources
	<ul style="list-style-type: none"> • Relevant IS4H skills and competency development are integrated into training plans for leadership, management and staff. 	Human Resources
	<ul style="list-style-type: none"> • There is a plan in place for resource mobilization for specific IS4H capital investments, and financial resources required for the sustainable implementation and operations of IS4H have been secured with annual budgets. 	Financial Resources
	<ul style="list-style-type: none"> • Formal relationships have been established with multisectoral actors, including the private sector. There are examples of collaborative initiatives between multisector partners. 	Multisectoral Collaboration
	<ul style="list-style-type: none"> • Legislation/regulation addressing electronic health records, privacy and secondary use of data are in place. 	Legislation Policy and Compliance
	<ul style="list-style-type: none"> • Obligations under national and international agreements are consistently met with an effective use of resources. 	National and International Agreements
LEVEL 4	<ul style="list-style-type: none"> • IS4H governance structures are established at the national level, 	Leadership and Coordination
	<ul style="list-style-type: none"> • IS4H governance includes representation from multi-sectoral partners. 	Multisectoral Collaboration

	<ul style="list-style-type: none"> • IS4H strategic plan is established at the national level. 	Strategic and Operational Plans
	<ul style="list-style-type: none"> • An IS4H investment framework is established at the national level. 	Financial Resources
	<ul style="list-style-type: none"> • IS4H roles, responsibilities and functions are aligned across multisectoral partners. 	Multisectoral Collaboration
	<ul style="list-style-type: none"> • Agreements enable data and information sharing across national and international stakeholders. 	National and International Agreements
	<ul style="list-style-type: none"> • The legislation, policies, and compliance mechanism required to effectively implement and operate IS4H are fully implemented. 	Legislation Policy and Compliance
LEVEL 5	<ul style="list-style-type: none"> • The governance and management of IS4H is fully transparent and integrated across national stakeholder organizations 	Leadership and Coordination
	<ul style="list-style-type: none"> • IS4H is fully sustainable, supported by an investment model that ensures the required human resources, processes, legal-ethical framework, knowledge and technologies are available to deliver ISH effectively, and to continually invest in new capabilities as they emerge. 	Financial Resources
	<ul style="list-style-type: none"> • The legal-ethical framework protects individuals and populations while enabling the use of information and technology to improve health outcomes and the performance of the health system. 	Legislation Policy and Compliance

MAGO – Assessment (key) questions

MAGO	
MANAGEMENT AND GOVERNANCE QUESTIONS	
ORGANIZATIONAL STRUCTURE AND FUNCTIONS	
55.	<p>There are identified responsible staff for:</p> <ul style="list-style-type: none"> • Data Collection • Standards and interoperability issues • Data preservation • Data analysis • Reporting information related to data collected and analyzed • Data quality • Maintaining and updating the database of health facilities and services • Maintaining and updating maps of health facilities and services • Knowledge Management
56.	<p>There is an entity dedicated to:</p> <ul style="list-style-type: none"> • Data Collection • Standards and interoperability issues

MAGO

MANAGEMENT AND GOVERNANCE QUESTIONS

	<ul style="list-style-type: none"> • Data preservation • Data analysis • Reporting information related to data collected and analyzed • Data quality • Maintaining and updating the database health facilities and services • Maintaining and updating maps on health facilities and services • Knowledge Management
57.	<p>IS4H services or functions are:</p> <ul style="list-style-type: none"> • Not identified • Identified but not yet implemented • Identified but duplicated among units, areas or facilities • Defined and assigned across units, areas or facilities
58.	<p>An entity responsible for IS4H is</p> <ul style="list-style-type: none"> • Not yet created • Created but not in place • In place
59.	<p>Accountability procedures relate to the IS4H Framework:</p> <ul style="list-style-type: none"> • no procedures • some procedures • Procedures documented but not fully implemented • Procedures documented and implemented at the region and national levels • Procedures documented and implemented at the facility, region and national levels
LEGISLATION, POLICY AND COMPLIANCE	
1.	<p>The organization has formal polices for the ethical use of data that recognizes the inherent biases in data and analyses.</p> <ul style="list-style-type: none"> • Yes, but not fully implemented • In process • Yes, fully implemented • No
2.	<p>The institution /country has ethical guidelines or policy related to data processing</p> <ul style="list-style-type: none"> • no • some guidelines • Guidelines / policies documented but not fully implemented • Guidelines / policies documented and implemented at the region and national levels • Guidelines / policies documented and implemented at the facility, region and national levels
3.	<p>the institution /country has ethical guidelines or policy related to information collection.</p> <ul style="list-style-type: none"> • no • some guidelines • Guidelines / policies documented but not fully implemented • Guidelines / policies documented and implemented at the region and national levels • Guidelines / policies documented and implemented at the facility, region and national levels
	<p>There are policies for Information Transparency, legislation or compliance that the organization adopts.</p> <ul style="list-style-type: none"> • no

MAGO

MANAGEMENT AND GOVERNANCE QUESTIONS

	<ul style="list-style-type: none"> • some policies • Policies documented but not fully implemented • Policies documented and implemented at the region and national levels • Policies documented and implemented at the facility, region and national levels
60.	Country needs or gaps identified in IS4H enabling legal framework <ul style="list-style-type: none"> • Yes • No
61.	There is Legislation/regulation addressing electronic health records: <ul style="list-style-type: none"> • Yes, but not fully implemented • Yes, fully implemented • No • In process
62.	There is Legislation/regulation addressing health information privacy. <ul style="list-style-type: none"> • Yes, but not fully implemented • Yes, fully implemented • No • In process
63.	There is Legislation/regulation addressing secondary use of data in place. <ul style="list-style-type: none"> • Yes, but not fully implemented • Yes, fully implemented • No • In process
64.	There are effective compliance mechanisms in place for IS4H components (reportable diseases, communicable diseases, data submission) <ul style="list-style-type: none"> • Yes, but not fully implemented • Yes, fully implemented • No • In process
65.	There are policies for the effective implementation and operation of IS4H? <ul style="list-style-type: none"> • Yes, but not fully implemented • Yes, fully implemented • No • In process
Human Resources	
66.	There are identified human resource constraints for IS4H: <ul style="list-style-type: none"> • Planning • Implementation • Management
67.	There is a formal plan for addressing human resource needs <ul style="list-style-type: none"> • Yes • No • In development process
68.	Skills and job functions required to effectively support IS4H are:

MAGO

MANAGEMENT AND GOVERNANCE QUESTIONS

	<ul style="list-style-type: none"> • Not identified • Identified but without sufficient resources • Identified and secured with resources
69.	<p>Human resources with the required skills to effectively implement and sustain IS4H:</p> <ul style="list-style-type: none"> • Not identified • Identified and in the search /selection phase • In place.
70.	<p>There is a national human resources (HR) database that tracks the number of health professionals by major professional category working in either the public or the private sector</p>
71.	<p>There is a national Health professionals' database</p> <ul style="list-style-type: none"> • Yes • Yes, but not actualized • No • In development process
72.	<p>There a HR competencies map</p> <ul style="list-style-type: none"> • Yes • Yes, but not actualized • No • In development process
73.	<p>There is a national database that tracks the annual numbers graduating from all health-training institutions</p> <ul style="list-style-type: none"> • Yes • No • In development process
74.	<p>Competency building activities (training, workshops, conferences) on IS4H domains are:</p> <ul style="list-style-type: none"> • Ad hoc (isolated activities, no plan) • There are isolated plans by facility • There is a national training plan, but not implemented • Yes, National training plan (human development) is implemented
Strategic and Operational Plans	
75.	<p>Are IS4H Strategic Goals embedded within other long-term strategies?</p>
76.	<p>Components of IS4H are addressed under the national health strategy or related strategic plans:</p> <ul style="list-style-type: none"> • No. • Partially, but there is no single integrated strategic or operational plan for IS4H • Yes, IS4H strategic goals are embedded in national health strategy
77.	<p>IS4H activities are identified in individual unit/program annual operational plans of national health authorities</p> <ul style="list-style-type: none"> • No • Yes • Yes, but are not integrated or aligned across units/programs.
78.	<p>There is a formal health strategic plan</p> <ul style="list-style-type: none"> • No • In process

MAGO

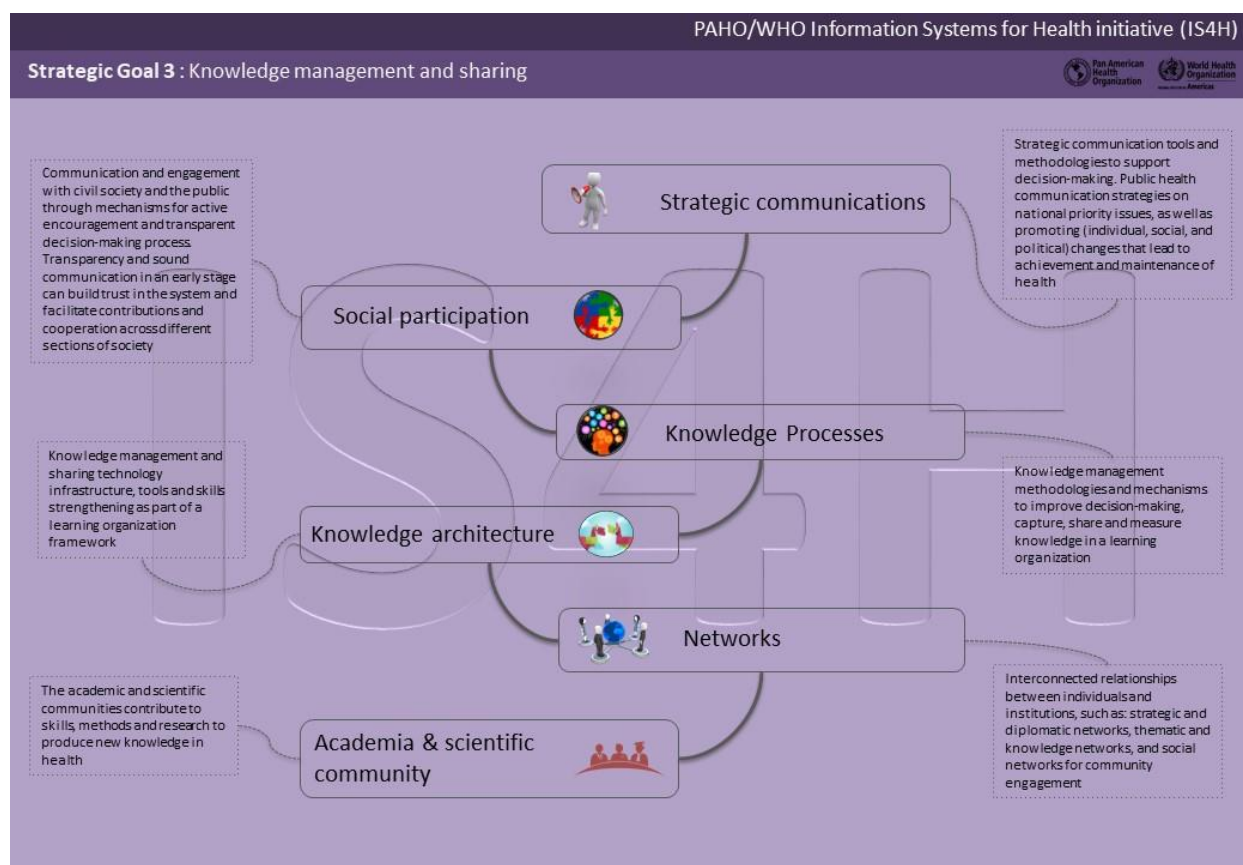
MANAGEMENT AND GOVERNANCE QUESTIONS

	<ul style="list-style-type: none"> • Yes
79.	<p>IS4H Strategic Framework is reflected in the formal health strategic plan</p> <ul style="list-style-type: none"> • No • Partially • Yes
80.	<p>Units operational plan activities and outcomes are based on the IS4H Strategic Plan</p> <ul style="list-style-type: none"> • No • Partially • Yes
81.	<p>IS4H strategic plan is established at the national level</p> <ul style="list-style-type: none"> • No • In process • Yes
Financial Resources	
82.	<p>Does the MOH/Organization have a budget for IS4H resources/activities?</p> <ul style="list-style-type: none"> • No • Yes – but not integrated or aligned across units/programs • Yes – fully integrated or aligned across units/programs
83.	<p>Definitions of expenditure on health</p> <ul style="list-style-type: none"> • NO • Yes, inside MoH • Yes, shared with health institutions and facilities • Yes, shared with stakeholders, other ministries and social security • Yes, shared with extrabudgetary institutions • Under development process
84.	<p>Return on investment measures</p> <ul style="list-style-type: none"> • No • Yes • Yes, in some facilities, units • Under development process
85.	<p>The MoH have an ERP system</p> <ul style="list-style-type: none"> • No • Yes, but not fully implemented • Yes, fully implemented • Under implementation process
86.	<p>Does the MoH has a formal process to plan and spend its budget</p> <ul style="list-style-type: none"> • No • Yes, but not fully implemented • Yes, fully implemented • Under implementation process
87.	<p>There is resource mobilization strategy for IS4H issues</p> <ul style="list-style-type: none"> • No • Yes, but not fully implemented • Yes, fully implemented

MAGO	
MANAGEMENT AND GOVERNANCE QUESTIONS	
	<ul style="list-style-type: none"> • Under implementation process
88.	Financial resources for IS4H investments <ul style="list-style-type: none"> • Not secure – one-time disbursement • Depend on ... • Are secure with annual budgets.
89.	There is an IS4H investment framework at the national level <ul style="list-style-type: none"> • No • Yes, but not fully implemented • Yes, fully implemented • Under implementation process
90.	IS4H fully sustainable <ul style="list-style-type: none"> • No • Partially – no long-term sustainability budgetary and resource plan • Yes: - investment model to maintain IS4H • Yes: - investment model to continually invest in new capabilities as they emerge.
Multisectoral Collaboration	
91.	Key stakeholders within the health sector or closely related sectors (e.g., vital statistics, national statistics, international donors) <ul style="list-style-type: none"> • Not identified • Identified with ad hoc engagement • Identified with formal engagement • Identified and coordinated
92.	The roles and responsibilities of all the actors in the national health system are: <ul style="list-style-type: none"> • Not defined • Defined ad hoc • Organized and well documented.
93.	There is a national database/roster of public and private sector health facilities. <ul style="list-style-type: none"> • No • In process • Yes
94.	Are there relationships with key multisectoral national actors, including private sector organizations? <ul style="list-style-type: none"> • No • Yes with ad hoc engagement • Yes, with formal engagement
Leadership and coordination	
95.	Roster of public and private health facilities <ul style="list-style-type: none"> • No • No, but facilities are well known • Yes, at the local level • Yes, at the national level • Under development process
96.	There is up-to-date chart of the health system <ul style="list-style-type: none"> • Yes • No

MAGO	
MANAGEMENT AND GOVERNANCE QUESTIONS	
	<ul style="list-style-type: none"> • In process
97.	IS4H investment decisions are: <ul style="list-style-type: none"> • Coordinated at the unit/facilities/local level • Coordinated only at the management level • Coordinated at the management level among health authorities or other national actors
98.	There is a formal governance structure in place for strategic planning and oversight of IS4H among the national health authorities <ul style="list-style-type: none"> • Yes • No • In process
99.	IS4H governance structures are established <ul style="list-style-type: none"> • No • Yes, at the local level • Yes, at the national level
100.	The MoH has a change management program <ul style="list-style-type: none"> • Yes • No • In process
National and international agreements	
101.	Obligations under national agreements: <ul style="list-style-type: none"> • Are aware • Are frequently met, but with high resource impact. • Are consistently met with an effective use of resources.
102.	Agreements enable data and information sharing: <ul style="list-style-type: none"> • No • Yes, only at the national level • Yes, with international stakeholders

Knowledge Management and Sharing (KMSH)



KMSH – Components

- **Knowledge Processes:** Knowledge management methodologies and mechanisms to improve decision-making, capture, share and measure organizational knowledge.
- **Knowledge Architecture:** knowledge management and sharing policies, processes, infrastructure, tools and skills strengthening as part of a learning organization framework.
- **Strategic Communications:** Strategic tools and methodologies for supported decision-making. Public health communication strategy on national priority issues, as well as promoting (individual, social, and political) changes that lead to achievement and maintenance of health.
- **Social Participation:** Transparency and sound communication in an early stage can build trust in the system and facilitate contributions and cooperation across different sections of society. Communication and engagement with civil society and the public through mechanisms for active encouragement and transparent decision making process.

- **Academia & Scientific Community:** The academic and scientific communities contribute to research and producing new knowledge in health
- **Networks:** Different types of networks will be implemented, such as: strategic and diplomatic networks of relations, thematic and knowledge networks, and social networks for community engagement

KMSH – Characteristics

Maturity Level Characteristics		IS4H Framework Component
LEVEL 1	• Knowledge sharing in the organization is ad hoc, and organizational knowledge resides with key individuals.	Knowledge Processes
	• Knowledge management is felt as a need, but there is a few knowledge and expertise in this matter	Knowledge Architecture
	• Although some basic knowledge management technologies and tools are available (physical library of internal resources, shared drives), they are not consistently or organized. Accessing organizational knowledge is time-consuming and difficult.	Knowledge Architecture
	• There are routine public health communications on national priority issues (e.g., healthy lifestyle, vector control, etc.).	Strategic Communications
	• Data and information typically flow only from source to the central level.	Strategic Communications
	• Communication with civil society and the public is typically “one-way” (e.g., through websites and advertising).	Social Participation
	• No formal relationships have been established between health authorities and the academic/scientific community.	Academia/Scientific Community
	• Networks for knowledge sharing are typically ad hoc and informal.	Networks
LEVEL 2	• There are some basic knowledge management mechanism and processes (e.g. formal meeting notes, trip reports, etc.) in place, but these are not required in policy or practice.	Knowledge Processes
	• There is an awareness among leadership and staff of the key concepts and importance of knowledge management, but there are no formal Knowledge Management strategies in place.	Knowledge Architecture
	• A formal public health communication strategy in place with targeted messages to specific audiences.	Strategic Communications

Maturity Level Characteristics	IS4H Framework Component	
<ul style="list-style-type: none"> • There is limited engagement with civil society and the public through basic mechanisms such as surveys and focus groups. • Some formal relationships have been established with academia/scientific community focused on specific projects or studies. • Staff participate in national or regional knowledge networks (e.g. communities of practice, conferences, listservs) on ad hoc basis 	<p>Social Participation</p> <p>Academia/Scientific Community</p> <p>Networks</p>	
LEVEL 3	<ul style="list-style-type: none"> • There are numerous knowledge management processes defined (lessons learned, trip reports, mentoring, shadowing, etc.) guided by formal policies and procedures. 	Knowledge Processes
	<ul style="list-style-type: none"> • There is a formal basic KM strategy at the organizational level 	Knowledge Architecture
	<ul style="list-style-type: none"> • Basic KM infrastructure (e.g., share information repositories, content management standards, etc.) is in place. 	Knowledge Architecture
	<ul style="list-style-type: none"> • KM skills strengthening is part of a training program 	Knowledge Architecture
	<ul style="list-style-type: none"> • There is a public health communication strategy with defined messages customized for specific audiences and purposes informed by national evidence. 	Strategic Communications
	<ul style="list-style-type: none"> • The participation of civil society in the health system is actively encouraged through social media and formal roles on governance bodies and advisory groups. 	Social Participation
	<ul style="list-style-type: none"> • Formal relationships with academia have been established to expand organizational knowledge and learning. 	Academia/Scientific Community
	<ul style="list-style-type: none"> • Participation in communities of practice is encouraged and resourced, and staff routinely capture and share knowledge from these forums. 	Networks
LEVEL 4	<ul style="list-style-type: none"> • Knowledge management and sharing is integrated into business processes, job descriptions and organizational functions. 	Knowledge Processes
	<ul style="list-style-type: none"> • Metrics are used to quantitatively measure organizational knowledge management processes and capacities, and continuously improve performance. 	Knowledge Processes
	<ul style="list-style-type: none"> • A formal knowledge management framework has been established within the organizations, with robust policies, 	Knowledge Architecture

LEVEL 5	<ul style="list-style-type: none"> Health authorities and their multisectoral partners are fully learning organizations: The organizational culture encourages the free-flow of knowledge throughout the organization, enabled by KM processes, tools and technology. 	Knowledge Architecture and/or process
	<ul style="list-style-type: none"> Strategic communications are informed by advanced analytics in near real-time. 	Strategic Communications
	<ul style="list-style-type: none"> Decisions by health authorities and other health system actors are transparent, driven by evidence and engagement with civil society and the public. 	Social Participation
	<ul style="list-style-type: none"> Knowledge networks are integrated into organizational structures and practices, which helps the organization to continually identify and adopt emerging knowledge. 	Networks

KMSH – Assessment (key) questions

KMISH	
KNOWLEDGE MANAGEMENT AND SHARING QUESTIONS	
ACADEMIA/SCIENTIFIC COMMUNITY	
103.	Relation with academia and scientific community: <ul style="list-style-type: none"> No relationship Informal – ad hoc relationships formal relationships covered by agreements or MOU highly integrated relationship
104.	The organization formally integrates academic institutions in: <ul style="list-style-type: none"> public health policy making public health programs evaluation public health interventions
105.	The organization has an expert advisory group composed of qualified researchers <ul style="list-style-type: none"> Yes No Under development process
106.	The MOH works with academic institutions <ul style="list-style-type: none"> Never On demand Sometimes Often Always
KNOWLEDGE PROCESSES	
107.	There are established KM institutional methodologies for: <ul style="list-style-type: none"> No methodologies preservation of the Institutional Memory open access/open source, research for health, repositories, information access editorial or publishing

KMISH

KNOWLEDGE MANAGEMENT AND SHARING QUESTIONS

	<ul style="list-style-type: none"> • mentoring • travel reports • meeting reports • communities of practice • lessons learned
108.	<p>There is a KM policy including</p> <ul style="list-style-type: none"> • No policy • preservation of the Institutional Memory • open access/open source, • research for health, • repositories, • information access • editorial or publishing • mentoring • travel reports • meeting reports • communities of practice • lessons learned
109.	<p>There are KM SOPs on:</p> <ul style="list-style-type: none"> • preservation of the Institutional Memory • open access/open source, • research for health, • repositories, • information access • editorial or publishing • mentoring • travel reports • meeting reports • communities of practice • lessons learned
110.	<p>There is an official institutional taxonomy for the classification of documents</p> <ul style="list-style-type: none"> • No • Under implementation process • Yes
111.	<p>Organizational knowledge</p> <ul style="list-style-type: none"> • Is not shared • Is shared by demand and in person • Is documented in processes and/or SOPs
112.	<p>Metrics are used to quantitatively measure organizational knowledge management processes and capacities</p> <ul style="list-style-type: none"> • No • Some facilities/units/teams do but not routinely • Some facilities/units/teams do routinely • In process of implementation through all the institution • Yes

KMISH

KNOWLEDGE MANAGEMENT AND SHARING QUESTIONS

113.	<p>The result of KM metrics:</p> <ul style="list-style-type: none"> • Are used for statistics and diagnosis • Are used to improve performance • Are not used
114.	<p>Knowledge transfer from experienced to new staff is:</p> <ul style="list-style-type: none"> • Ad hoc • Included in their functions, but not practiced • Part of the Institutional policy and fully implemented
115.	<p>There is a coaching and mentoring program:</p> <ul style="list-style-type: none"> • No • Some facilities/units/teams do but not routinely • Some facilities/units/teams do routinely • In process of implementation through all the institution • Yes
KNOWLEDGE ARCHITECTURE	
116.	<p>Organizational Knowledge is accessible through:</p> <ul style="list-style-type: none"> • A central physical repository • Different physical repositories • Electronic repositories, shared drives, intranet • Not accessible • Don't know
117.	<p>Knowledge sharing among areas in the organization is</p> <ul style="list-style-type: none"> • No sharing • ad hoc • documented through lessons learned • documented through best practices • established in a formal process
118.	<p>Knowledge management and sharing is integrated into business processes, job descriptions, and organizational functions.</p> <ul style="list-style-type: none"> • No • Yes, in some specific cases • Yes
119.	<p>Knowledge Management and related topics included HR Competencies</p> <ul style="list-style-type: none"> • Yes • No • In process of implementation
120.	<p>Technical staff KM Skills are</p> <ul style="list-style-type: none"> • Basic • Intermediate • Advance
121.	<p>There is an agenda for training staff on:</p> <ul style="list-style-type: none"> • use of scientific information for health-related decision making • production • management

KMISH

KNOWLEDGE MANAGEMENT AND SHARING QUESTIONS

	<ul style="list-style-type: none"> • access • use and evaluation of information technologies in order to support health priorities
122.	<p>Knowledge Management is believed to be:</p> <ul style="list-style-type: none"> • Not necessary • Necessary but not a priority to implement at the institutional level • Necessary and key to implement at the institutional level • Part of the institution
123.	<p>The institution uses platforms that facilitate communication, knowledge exchange and effective collaboration:</p> <ul style="list-style-type: none"> • Frequently • Sometimes • Some staff do • Never
124.	<p>Tools currently in use include:</p> <ul style="list-style-type: none"> • Virtual forums • Wikis • Moderated List-serv for selective information dissemination • Aggregators (RSS) for media monitoring • Blogs • Twitter • Facebook • LinkedIn
125.	<p>The organization has KM methodologies/process/practices (lessons learned, Communities of practices, After action reviews, etc)</p> <ul style="list-style-type: none"> • How to conduct Communities of Practice • How to document and preserve Lessons Learned • How to manage and share critical information • How to conduct effective virtual meetings (Synchronic communications) • How to implement an effective virtual forum (a-Synchronic communications) • How to preserve and share the Institutional Memory • How to operate in the information society • How to establish “official” accounts for social networking • How to make data extraction from online and off line conversations • How to contribute to a Wiki page • How to write a scientific paper
126.	<p>There is a methodology/process/policy to facilitate public access to contents resulting from research activities financed primarily by public funds:</p> <ul style="list-style-type: none"> • Yes • No • In process
127.	<p>Type of virtual collaboration platform(s) the country/territory has implemented/uses.</p> <ul style="list-style-type: none"> • None • Web Conferences (e.g.: WebEx, Blackboard, Skype, Adobe Connect. etc.) • Video Conference (CISCO) • Websites or blogs

KMISH

KNOWLEDGE MANAGEMENT AND SHARING QUESTIONS

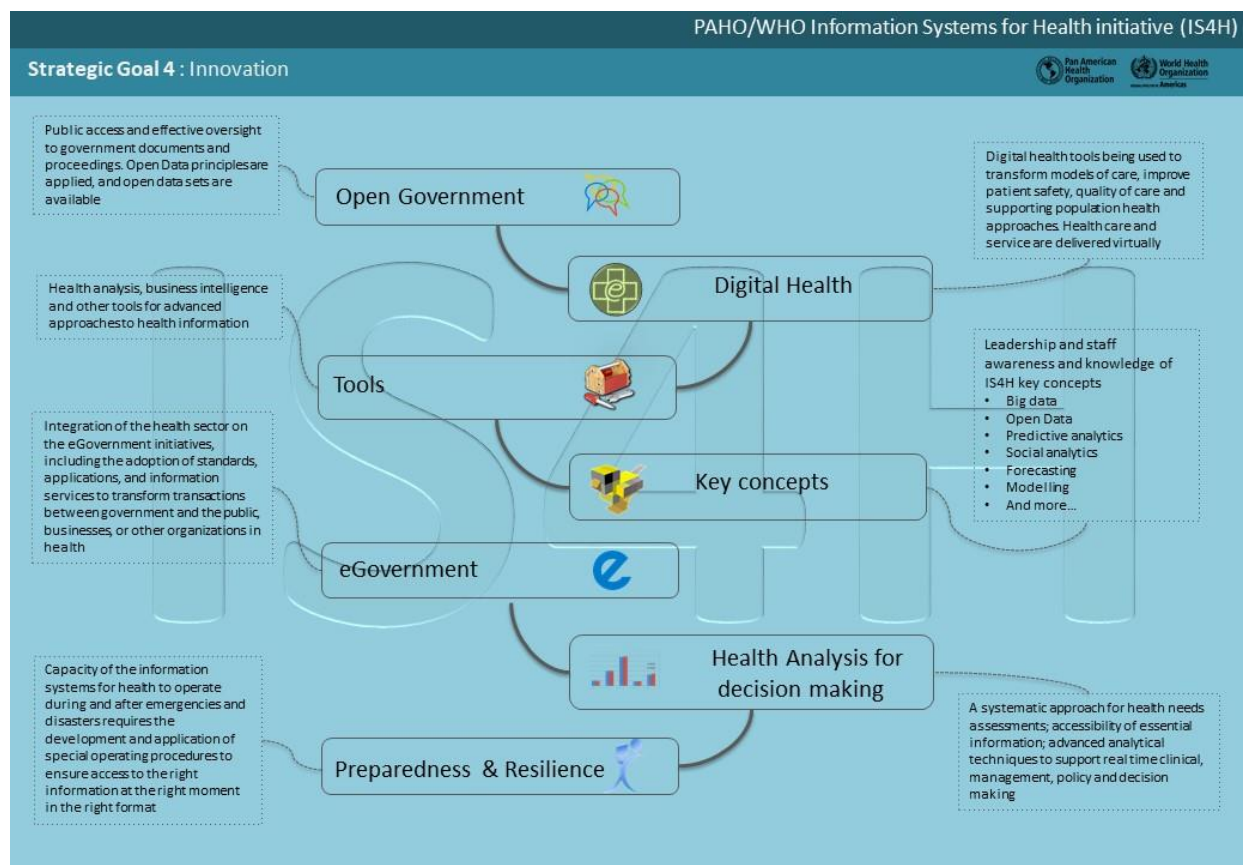
	<ul style="list-style-type: none"> • Communities of Practice • Social Media/Networks - (Facebook, twitter, LinkedIn, etc.)
STRATEGIC COMMUNICATIONS	
128.	<p>Public health communications on national priority issues</p> <ul style="list-style-type: none"> • No • When needed (specific issues, like outbreaks, disasters, etc) • Routinely produced
129.	<p>Data and information flow</p> <ul style="list-style-type: none"> • From sources to the central level • There is some feedback from central to local level • There is feedback from central to local level • Central, local and public are completely integrated in a feedback-based communication
130.	<p>Public health communication strategy</p> <ul style="list-style-type: none"> • no strategy • Documented but not fully implemented} • Documented and implemented at the region and national levels • Documented and implemented at the facility, region and national levels
131.	<p>Impact of strategic communications</p> <ul style="list-style-type: none"> • Not measured • Measured ad hoc • Measured as part of the strategy
132.	<p>Strategic communications are informed</p> <ul style="list-style-type: none"> • National Data, evidence • International Data, evidence • Advanced analytics local and international
133.	<p>Health-related information flows</p> <ul style="list-style-type: none"> • Not known • Mapped ad hoc • Mapped • Mapped and actualized
134.	<p>Health information for health service delivery management is used by:</p> <ul style="list-style-type: none"> • National level • Local level • Institutional level • Not used
SOCIAL PARTICIPATION	
135.	<p>Communication with civil society and the public is:</p> <ul style="list-style-type: none"> • One way (websites, advertising, etc.) • Specific commemorative activities (campaigns) • surveys • focus groups • Social networks and website interaction • Participation in governance bodies

KMISH

KNOWLEDGE MANAGEMENT AND SHARING QUESTIONS

	<ul style="list-style-type: none"> • Participation in advisory groups • No communication
136.	<p>Civil society and/or the public are included in health decisions:</p> <ul style="list-style-type: none"> • Civil society/public is rarely consulted; • Civil society/public is sometimes consulted through surveys or focus groups; • Civil society/public participate in standing advisory or decision-making bodies; • Civil society/public is integrated into decision-making through a variety of mechanisms
NETWORKS	
137.	<p>Internal networks for knowledge sharing</p> <ul style="list-style-type: none"> • Not a regular practice • Ad hoc and informal • Encourage by institution • Part of the organizational culture
138.	<p>Participation in communities of practice is:</p> <ul style="list-style-type: none"> • Not a regular practice • An ad hoc practice • Encourage by institution • Part of the organizational culture

Innovation (INNO)



INNO – Components

- **Key concepts:** Leadership and staff awareness and knowledge of IS4H key concepts:
 - Big data
 - Open Data
 - Predictive analytics
 - Social analytics
 - Forecasting
 - Modelling
 - And more...
- **Health Analysis for Decision-Making:** A systematic approach for health needs assessments; accessibility of essential information; advanced analytical techniques to support real time clinical, management, policy and decision making.
- **Tools:** Health analysis and business intelligence tools are available for advanced approaches to health information.

- **Digital Health:** Digital health tools being used to transform models of care, improve patient safety, quality of care and supporting population health approaches. Health care and service are delivered virtually.
- **E-Government:** Integration of the health sector on the eGovernment initiatives, including the adoption of standards, applications, and information services to transform transactions between government and the public, businesses, or other organizations in health.
- **Open Government:** Public access and effective oversight to government documents and proceedings. Open Data principles application and data sets availability.
- **Preparedness and Resilience:** Capacity of the information systems for health to operate during and after emergencies and disasters requires the development and application of special operating procedures to ensure access to the right information at the right moment in the right format.

INNO – Characteristics

Maturity Level Characteristics		IS4H Framework Component
LEVEL 1	<ul style="list-style-type: none"> • While some IS4H concepts are understood, leadership and staff are not widely aware of all concepts. 	Key Concepts
	<ul style="list-style-type: none"> • Standard statistical analysis is routinely applied to available health data to generate reports on health status and outcomes. 	Health Analysis for Decision-making
	<ul style="list-style-type: none"> • Most health analysis is focused on the generation of indicators, although other types of health analysis are done on an ad hoc basis are required for special presentations and projects. 	Health Analysis for Decision-making
	<ul style="list-style-type: none"> • Information is used to support decision-making in limited circumstances, but evidence-informed decision making is integrated into the policy and management culture. 	Health Analysis for Decision-making
	<ul style="list-style-type: none"> • Basic tools are routinely used for health analysis (e.g., spreadsheets, statistical packages, etc.). 	Tools
	<ul style="list-style-type: none"> • Health care delivery and services are largely manual processes, although basic tools like electronic patient registration or disease registries may be in place. 	Digital Health
	<ul style="list-style-type: none"> • E-government is on the national agenda, but there is no formal strategy or unit in place. 	eGovernment
	<ul style="list-style-type: none"> • The concepts of Open Government are new to leadership. 	Open Government

Maturity Level Characteristics	IS4H Framework Component
<ul style="list-style-type: none"> Manual and electronic health information systems are vulnerable to failure in the event of a natural disaster or other catastrophic event. 	Preparedness and Resilience
<ul style="list-style-type: none"> Limited data available to support disaster response. 	Preparedness and Resilience
LEVEL 2	Key Concepts
<ul style="list-style-type: none"> Most leadership and staff have an understanding IS4H concepts. There are recent assessments that demonstrate strong digital literacy among most leadership and staff. 	Health Analysis for Decision-making
<ul style="list-style-type: none"> Data typically flows from sources to central decision-makers for health analysis, but little health information is available for decision-making at the local level. 	Health Analysis for Decision-making
<ul style="list-style-type: none"> There is evidence that data and information are routinely used to support policy and management decision-making. 	Health Analysis for Decision-making
<ul style="list-style-type: none"> Digital health tools such as electronic records, laboratory/pharmacy information systems and electronic order entry are widely implemented with a focus digitizing manual processes and operational efficiencies. 	Digital Health
<ul style="list-style-type: none"> The government has established an e-government strategy or unit. Currently the focus is on strengthening core IT infrastructure. Health is not a core stakeholder. 	eGovernment
<ul style="list-style-type: none"> There is broad knowledge of open government principles among national health authorities, and leadership support for advancing open government policies and initiatives. 	Open Government
<ul style="list-style-type: none"> There are some examples of open data sets for health. 	Open Government
<ul style="list-style-type: none"> There is evidence of approaches for ensuring business continuity in the case of disaster (e.g., routine off-site backups, downtime manual process SOPs, etc.). 	Preparedness and Reliance
<ul style="list-style-type: none"> Some key data sets are available to support disaster response (e.g., facilities and health human resource databases, database of emergency centres, mortality data, etc.) 	Preparedness and Reliance
LEVEL 3	Key Concepts
<ul style="list-style-type: none"> Knowledge of IS4H Key Concepts and digital literacy is high among leadership and staff, and there is evidence that these concepts are routinely applied in practice at all levels of the organization. 	Health Analysis
<ul style="list-style-type: none"> All essential information to support clinical, management, policy decision-making and is readily accessible, and end-users have on-demand access to information products or health analysis resources. 	Health Analysis

Maturity Level Characteristics	IS4H Framework Component
<ul style="list-style-type: none"> • There is capability among clinicians, administrators, and policy-makers for evidence-informed decision-making, and clinical, management and policy decisions are data-driven. 	Health Analysis for Decision-making
<ul style="list-style-type: none"> • A range of health analysis approaches are routinely applied (e.g., ASIS ARMAR7, Health Inequalities, Multiple Cause of Death, etc.). 	Health Analysis for Decision-making
<ul style="list-style-type: none"> • Online tools and platforms for data dissemination and analysis (e.g., data repositories, dashboards, portals, visualization tools, spatial data, etc.) are appropriately and securely available for different user types, such as policy makers, manager, clinicians, and public stakeholders 	Tools
<ul style="list-style-type: none"> • There is evidence of digital health tools being used to transform models of care, improve patient safety and quality of care, or for supporting population health approaches. 	Digital Health
<ul style="list-style-type: none"> • There is evidence of eGovernment initiatives that are transforming transactions between government and the public, businesses, or other organizations in health (e.g. online appointment booking, patient portals, e-referral, health card registration, etc.) 	eGovernment
<ul style="list-style-type: none"> • Open data principles have been formally adopted in policy. 	Open Government
<ul style="list-style-type: none"> • There is evidence that health information systems would be resilient during disasters and are able to support essential health system functions and disaster response. 	Preparedness and Resilience
LEVEL 4	
<ul style="list-style-type: none"> • There is evidence of capacity building (investment in skills, tools, partnerships) for more advanced approaches of health analysis (e.g., AI, predictive analysis, natural language processing, etc). 	Health Analysis for Decision-making
<ul style="list-style-type: none"> • Digital health tools are used across the health system to improve efficiency, quality, and patient safety. 	Digital Health
<ul style="list-style-type: none"> • Evidence that health care and service are delivered virtually, where appropriate 	Digital Health
<ul style="list-style-type: none"> • Open data principles are fully applied, and key data sets are available for analysis by other national and international stakeholders. 	Open Government
<ul style="list-style-type: none"> • The health sector is fully integrated into e-government initiatives and platforms. 	eGovernment
LEVEL 5	
<ul style="list-style-type: none"> • Advanced analytical techniques (e.g. AI, predictive analysis, natural language processing, etc.) are routinely applied to 	Health Analysis for Decision-making

Maturity Level Characteristics	IS4H Framework Component
support real-time and routine clinical, management and policy decision-making.	

INNO – Assessment (key) questions

INPE	
INNOVATION AND PERFORMANCE QUESTIONS	
HEALTH ANALYSIS FOR DECISION MAKING	
139.	<p>IS4H information is used to advocate for equity and increased resources to disadvantaged groups and communities (e.g., by documenting their disease burden and poor access to services)</p> <ul style="list-style-type: none"> • No • Yes, at the unit/facilities/local level • Yes, implemented at the region and national levels
140.	<p>There is a written set of procedures for data analysis</p> <ul style="list-style-type: none"> • no procedures • some procedures • Procedures and policies documented but not fully implemented} • Procedures and policies documented and implemented at the region and national levels • Procedures and policies documented and implemented at the facility, region and national levels
141.	<p>The health-facility staff have adequate capacity to:</p> <ul style="list-style-type: none"> • process the data • analyze the data • store the data
142.	<p>The data allow disaggregation by age, sex and locality (e.g. urban/rural, major geographical or administrative region)</p> <ul style="list-style-type: none"> • No • Yes, with intervention • Yes
143.	<p>Routine data analysis includes data disaggregation by some form of socioeconomic index like income, health status, employment and enabling environment</p> <ul style="list-style-type: none"> • No; • Yes, for some limited data sets; • Yes, for most relevant data sets
144.	<p>Standard statistical analysis is applied to available health data to generate reports on health status and outcomes:</p> <ul style="list-style-type: none"> • Ad hoc • On demandNot on a regular basis • Routinely • No
145.	<p>Health analysis is done:</p> <ul style="list-style-type: none"> • Ad hoc • On demand

	<ul style="list-style-type: none"> • Not on a regular basis • Routinely • No
146.	<p>Health analysis is focused on:</p> <ul style="list-style-type: none"> • the generation of indicators • to support decision-making • to support policy making • to support clinical decisions
147.	<p>Evidence-informed decision making is integrated into the policy and management culture</p> <ul style="list-style-type: none"> • No, evidence is rarely used to support decision-making; • evidence is sometime used for key decisions; • yes, it is expected that all decisions are supported
148.	<p>Essential information to support clinical, management, policy decision-making</p> <ul style="list-style-type: none"> • Is not accessible • Is accessible on demand • Is readily accessible
149.	<p>Health analysis approaches are applied (e.g., ASIS ARMAR7, Health Inequalities, Multiple Cause of Death, etc.).</p> <ul style="list-style-type: none"> • Ad hoc • On demand • Not on a regular basis • Routinely • No
150.	<p>The organization has a dedicated budget for training on advanced approaches of health analysis</p> <ul style="list-style-type: none"> • Yes; • Partially, dedicated budget for training, but not specific to health analysis; • No
151.	<p>The organization has a formal mechanism for human resources development on information systems for health</p> <ul style="list-style-type: none"> • Yes, but not fully implemented • Yes, fully implemented • In process • No
152.	<p>Advanced analytical techniques (e.g. AI, predictive analysis, natural language processing, etc.) are applied to support real-time and routine clinical, management and policy decision-making.</p> <ul style="list-style-type: none"> • Ad hoc • On demand • Not on a regular basis • Routinely • No
153.	<p>The organization uses non-conventional data sources (e.g. emergency calls, absence in school, veterinary surveillance etc.) to support decision-making</p> <ul style="list-style-type: none"> • Yes, but not fully implemented • Yes, fully implemented • In process • No
154.	<p>The organization use quality health data as the basis for problem solving</p>

	<ul style="list-style-type: none"> • Ad hoc • On demand • Not on a regular basis • Routinely • No
164.	<p>Uses of data collected:</p> <ul style="list-style-type: none"> • reporting to national or international authorities • decision-making • supporting clinical decisions • supporting management • supporting policy or strategic decision-making
155.	<p>The organization formally translates evidence into policy-making</p> <ul style="list-style-type: none"> • Ad hoc • On demand • Not on a regular basis • Routinely • No
TOOLS	
156.	<p>Tools used to support health analysis:</p> <ul style="list-style-type: none"> • Spreadsheets (Excel) • graphing tools and statistical packages (R, SPSS, SAS). • business intelligence tools and dashboards. • GPS data sets, data warehouses, visualization tools and analytical presentation tools available through websites.
157.	<p>Organization disseminates data through:</p> <ul style="list-style-type: none"> • data repositories • dashboards • portals • visualization tools •
158.	<p>Online tools and platforms for data dissemination and analysis are available:</p> <ul style="list-style-type: none"> • For private use of technical team • For decision makers • For stakeholders • For public • Not available
KEY CONCEPTS	
159.	<p>Principles of “openness” integrated into organizational policy</p> <ul style="list-style-type: none"> • Yes, there are policies that reflect the principals of open data and/or open government; • Some aspects of open data/open governance are reflected in policy, but not all; • None
160.	<p>Leadership and staff are aware of IS4H concepts</p> <ul style="list-style-type: none"> • No • Aware of some concepts • Aware and understand some concepts • Aware of all concepts • Widely aware and understand concepts
161.	<p>Leadership Staff is digitally literate:</p>

	<ul style="list-style-type: none"> • No • In a literacy process • Quite literate • Literate • High literacy
162.	<p>Leadership and staff are knowledgeable about open data concepts?</p> <ul style="list-style-type: none"> • No • Some awareness • Aware and understand • Widely aware and understand
163.	<p>The organization has adopted regulations for the use of sensors in health information systems (use of Internet of things - IoT) as well as procedures for regulating IoT data.</p> <ul style="list-style-type: none"> • Yes; • In progress; • No.
E-GOVERNMENT	
164.	<p>E-government is on the national agenda</p> <ul style="list-style-type: none"> • No • Yes, but there is no formal strategy • Yes, but there is no unit in place. • Yes, there is a formal strategy • Yes, there is a formal unit
165.	<p>Current e-government focus is on:</p> <ul style="list-style-type: none"> • strengthening core IT infrastructure • Strengthening management process • Strengthening administrative process • Strengthening transactions and relation with the public
166.	<p>Role of national health authorities in e-government initiatives</p> <ul style="list-style-type: none"> • not a core stakeholder • in process of integrating health • is a core stakeholder- integrated
167.	<p>eGovernment initiatives are transforming transactions:</p> <ul style="list-style-type: none"> • with public, • businesses, • other organizations in health • No transformation evidence
168.	<p>Integration of Health specific public portals or health e-service with the national e-government platform</p> <ul style="list-style-type: none"> • Public health e-services are not available • Public health e-services are available, but separate from e-government platform and services • Public health e-services are fully integrated with national e-government platform (e.g. single point of entry; single sign-on)
169.	<p>Citizens interaction with government:</p> <ul style="list-style-type: none"> • Can access information on websites • Can make some transactions over the web • Can have some interactions or communications • Can fully make transactions over the web • Can fully interact or communicate with the government

OPEN GOVERNMENT	
170.	<p>Leadership and staff knowledge of Open Government concepts and principles</p> <ul style="list-style-type: none"> • No • Aware of some concepts • Aware and understand some concepts • Aware of all concepts • Widely aware and understand concepts
171.	<p>There is leadership support for advancing open government policies and initiatives.</p> <ul style="list-style-type: none"> • No support • Some isolated support • Fully support
172.	<p>Open data sets for health:</p> <ul style="list-style-type: none"> • No • Some availability, isolated initiatives • Fully available for analysis
173.	<p>Open data principles applied</p> <ul style="list-style-type: none"> • No • Formally adopted in policy in process of application • Fully applied
174.	<p>Open data focus is on:</p> <ul style="list-style-type: none"> • The importance of technologies, platforms, and infrastructures used for open data • The manner in which institutions enable and constrain the provision and usage of open data. • The usage of open data and the requirements for using open data.
DIGITAL HEALTH	
175.	<p>Health care delivery and services are:</p> <ul style="list-style-type: none"> • Manual processes • Mix of manual processes and some basic tools (like electronic patient registration or disease registries) • Digital health tools widely implemented with a focus on digitizing manual processes and operational efficiencies.
176.	<p>Digital health tools are being used for:</p> <ul style="list-style-type: none"> • Facilitate administrative and management issues • health system transformation • supporting population health approaches • improve efficiency, quality and patient safety
177.	<p>There is a telemedicine network in place:</p> <ul style="list-style-type: none"> • No • In process of development • Some isolated initiatives • Fully implemented network
PREPAREDNESS AND RESILIENSE	
178.	<p>There is a plan for health information recovery</p> <ul style="list-style-type: none"> • Yes, but not fully implemented • Yes, fully implemented • No • In process
179.	<p>There is a contingency plan to ensure basic IS4H functionality in case of emergency or disasters</p>

	<ul style="list-style-type: none"> • Yes, but not fully implemented • Yes, fully implemented and tested • No • In process
180.	<p>Key data sets are available to support disaster response:</p> <ul style="list-style-type: none"> • No • Some facilities or databases • Yes
181.	<p>There is Data Backup Strategy</p> <ul style="list-style-type: none"> • no • some • Developed but not fully implemented} • Developed and implemented at the region and national levels • Implemented at the facility, region and national levels
182.	<p>Health information systems can support essential health system functions and disaster response.</p> <ul style="list-style-type: none"> • No • Some facilities or databases • Yes • Fully availability through advanced analytical techniques

Assessment methodology

- Desk Review of Key Documents
- Subject Matter Expert meetings (Virtual and/or Face to face) and discussions
- Maturity Assessment tool implementation
- Discussion on complementary assessments such as:
 - ICT readiness assessment
 - IS4H Functional assessment
 - Interoperability maturity assessment
 - Electronic Health Records maturity assessment
 - Open Government maturity assessment
 - Others
- On-site visits for verification and discussions on findings
- Follow-up virtual sessions
- Recommendations and roadmap for projects implementation

Outputs and deliverables

- **Rapid assessment Report:** Findings, Recommendations and High-Level Roadmap: PAHO Assessment Team provided a high-level report on key findings of the review of key documents and on-site visits (when requested) for review and discussion with MOH.
- **Full assessment Report:** PAHO will present a full report on findings, recommendations and proposed roadmap. The report will be circulated (and/or presented) to MOH for feedback to be included in the final version of the Report.
- **Implementation Support Activities and tools:** Based on the findings, recommendations and roadmap, tools and priority activities that will require specific technical cooperation and support will be implemented.