Information Systems for Health Standard Assessment Method

This document describes the Standard Assessment Method for process improvement regarding the Information Systems for Health Framework.

Information Systems for Health and Platforms Unit, Department of Evidence and Intelligence for Action in Health
PAHO/WHO
Information Systems for Health
Standard Assessment Method

IS4H-MM 1.0

Version 1.0 – March 2018
Acknowledgments

This work would not have been possible without the technical and strategic support of the governments of Anguilla, Guyana, Jamaica and Virgin Island.
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1. About this Document

This document can also be referred to as the Standard IS4H Assessment Method (AM) for Maturity Model, Version 1.0 and it describes the Standard IS4H Assessment Method for process improvement regarding the Information Systems for Health Framework. The IS4H-MM can be adopted using different approaches, each with a different level of detail, intended usage and primary audience. The structure, audiences, and suggested use of each part of the document are described below.

1. Verification approach: For health organizations that have already detailed collections of artifacts organized by mappings the IS4H-MM evaluated practices and linked to the reference model, much of the assessment team effort can concentrate on verifying the appropriateness of the data collected. This approach leverages prior data collection and the need to verify the Maturity Level by the organization for its own purpose (such as standardization and process compliance monitoring), and can offer great efficiencies to the assessment team.

2. Discovery approach: At the other end of the spectrum, an organization may have few collections of artifacts already collected and mapped to the IS4H-MM reference model. The assessment team must then work directly with the organization to identify, organize and evaluate these artifacts in order to proceed with the assessment. This approach may be appropriate for some situations, such as health organizations just starting a process improvement initiative.

3. Managed discovery: An incremental approach to data collection can also be used. Initial data collection is focused on a predetermined set of information products that typically provide substantial coverage for the IS4H-MM – for example, epidemiology reports, mortality reports, basic health indicators, and reviews. The assessment team maps these artifacts to the assessment model, and determines the extent to which gaps in model coverage still remain.

1.1 IS4H General Framework Overview

The IS4H general framework is a set of specific body of theories and concept frames and is divided into five major components as follows:

1) Conceptual Framework

An ontology in philosophy has the purpose of “studding the most general features of reality” (Peirce, 1935) and defines different kinds of entities in a given context of complexity. An appropriate theoretical foundation for identifying constructs and relationships among them helps to understand the complexity and general features of reality.

The IS4H conceptual framework is considered a set of constructs and it adopts a holistic view for describing the information systems for health and was based in parts on the adaptation from Mario Bunge’s (1977, 1979) ontology for the
information system field. These constructs were mapped using system theory to help deal with nature of a holistic macro-reductionism model and its intricacy. The conceptual Framework was developed adapting Bunge's systems theory and using his CESM model for information systems. The application of this model considers that constructs can be part of a system map and they can be classified as composition, environment, structure, and mechanisms. These constructs served as pillars for the composition of information systems for health conceptual framework.

This Conceptual Framework was conceived as a conceptual bridge between a group of guiding principles for health information systems and defined strategic goals for public health organizations. The conceptual framework captures fundamental aspects of the guiding principles and helps to apply them to other frameworks within the IS4H.

2) Tactical Framework
The IS4H Tactical framework helps to plan, identify, prioritize, and mitigate risks causes by the adoption of the IS4H for an operational and cultural perceptions to balance activities that increase local support for health information.

3) Strategic Framework
The strategic framework can be used as a roadmap for guiding health organization towards its goals regarding the IS4H program. Health leaders will need to consider some key elements to build that strategy and that is where the IS4H Framework can help benefit public health staff and their organizations. Once the strategic framework is in place, it can be utilized repeatedly to alter or refine your course of the IS4H program.

4) Concepts, process, services and products
The IS4H FW adopts general concepts that are within the information systems for health domain and helps shape understanding among health professionals. These concepts are then put in context with the structures and processes of the IS4H FW. These processes relate to a form of guidance for developing activities like building a plan of action for health organizations. In some cases the framework will refer to process as a means for implementing various activities within the a Strategic Goal. A process can also relate to guidance on creating a policy for resource allocation, regulation, data standardization and governance. The IS4H processes also address the steps needed to perform a service and the benefit it can produce. The action plan can be based on these steps and practices that are part of the IS4H FW. In other cases, a service may not be closely associated with an IS4H product such as the combination of an assessment with the administration of a policy. Examples of services are: consulting with Ministry staff on appropriate products for specific purposes from the IS4H, providing advice on risk assessment and priority setting, working on IS4H standards committees or conducting training and other educational outreach. Also, products from the IS4H are tangible artifacts that are related to any line of action or the IS4H documentation guide. Examples of products can be digital files and reports that the organization gathers during the IS4H Full Assessment sessions.
5) **Trust-based model**

The trust-based framework provides tools and guides for understanding and applying the Maturity Model Level Assessment to generate appraisals on the IS4H Level of Maturity for the organization. This is to support the organization on reducing the gaps needed to enable Information Systems for Health initiatives. It identifies specific IS4H questions that should be asked and gives examples on how the organization can address them and it includes potential impacts. The IS4H trust-based framework objective is to use the framework’s Maturity Model Level Assessment to outline a path that ensures that some process improvement actions are in place and some improvements have been implemented. A Maturity Level improvement between assessments cycles can flag that the organization is addressing the issues regarding Information Systems for Health. **The IS4H Maturity Model is part of the trust-based model.**

6) **Learning framework**

This framework for understanding and practicing learning in the IS4H Framework and its related frameworks. The framework includes the goals, processes, and tools for learning. The learning processes are described using the plan-do-understand-act (PDUA) cycle from quality management. The PDUA cycle is used to define the learning process that occurs within and between IS4H projects.

![IS4H General Framework of Operation](image)

**Figure 1 - IS4H General Framework of Operation**

Revision History
2. Introduction

The IS4H-MM is a tool for assessing the maturity levels of the Information System for Health and the organization capabilities to operate, interact and benefit from it. This document was developed to support Lead Assessor and Core teams that will be involved in conducting Information Systems for Health Maturity Model Assessment (IS4H-MM) and operating, adopting or developing Information Systems Maturity Plans (IMPs) for Member States. This document is intended to be permanently updated document and will be modified constantly as the understanding of PAHO processes evolves within the IS4H-MM program. Member States that wish to adopt this program could use this Guide to assist in the development of their own Process Guides/Manuals tailored to their own particular technologies and processes.

2.1 Purpose and General Definitions and Restrictions

The IS4H-MM Assessment is the process of analyzing maturity on information management processes, information governance readiness, open government initiatives and knowledge management process adoption.

The general purpose of this document is to help assessors understand the model and its application in public health organizations and technology. The purpose of building understating, the constructs used to create the IS4H-MM are as followed:

1) **IS4H-MM Levels and related health business processes:** this construct refers to the maturity model levels and addresses specific processes that can be part of the assessment inputs. The levels are:

   A. **Public Health Information Organized (L1):** Some form of data is collected electronically across health organizations and among stakeholders of that region’s health system. The processes of entering health data are usually ad hoc, and the environment is not stable. Success depends on individuals within the organization, rather than the use of proven processes. *Maturity Level 1 organizations produce health information products and services that require intensive work and use of resources.* Datasets are often not accessible for other purposes.

      **Keywords:** Data collection and datasets. Basic data quality procedures.

      Underlying discussions:

      - Data and information for health defined (What are data and information for health?)

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1 The Lead Assessor has a deep understanding of the constructs of the IS4H Framework and the IS4H Maturity Model components. The Lead Assessor is charged with ensuring the delivery of assessments and the professional judgments made by other Assessors are consistent, of high quality and in line with expected standards of performance for the Information Systems for Health Program. The Lead Assessor will carry out assessments him/herself in order to maintain currency and credibility.
- Health data and information sources (Where does health data originate? How does health data become health information?)
- Health data uses (How does the health organization use data and why is it collected? Is there an impact of not having data on health?)
- Health data quality (What is quality data?)

Examples:
- Electronic datasets
  - Census data
  - Disease and population specific registries
  - Population health surveys
  - Vital records (death certificates)
  - Health records
- Data issues
  - Timeliness
  - Consistency
  - Meaningful values
- Information products
  - Mortality reports
  - Surveillance reports
  - Basic health indicators

B. Public Health Information Managed (L2): There is evidence of health data management processes and best practices (e.g., standards, organizational structures, policies, procedures, and technology). There are legal, ethical and business practices protecting individuals and serving stakeholders to advance the public good. *Maturity Level 2 organizations are focused on using quality data to support decision-making to improve access to health and health outcomes.* Datasets are readily available and information products are efficiently produced.

Keywords: Standards, data quality, data management, information products available.
- Architecture, definitions and relationships, including metadata
- Data accuracy, structured and unstructured data
- Data provenance or lineage
- Error correction/amendments
- Interface and upgrade assurance
- E-Government initiatives adopted
- eHealth and other Standards adopted

Underlying discussions:
- Data and information management processes defined (What data management processes and procedures support improved data quality?)
- Standards identified and applied (What standards enable effective data and information management? Which
standards are implemented, e.g., classification systems, data standards and medical terminologies)?

- Legal-ethical framework and business processes defined (What legal, ethical and business practices protect individuals and meet stakeholder needs?)
- Operational functions defined (How are people, resources and operational functions organized? How are operational decisions made?)
- Interacts with all levels of an organization – public health, clinical, financial, administrative, and information systems that employ patient data in decision-making and everyday operations.

Examples:

- Standards
- Content (add by types – see slide 55)
- ICD-10 or higher (International Classification of Diseases)
- HL7
- ATC (Anatomical, Therapeutic and Chemical)
- Healthcare Common Procedure Coding System (HCPCS)
- Infrastructure
- Basic IT capabilities (backup, virus protection, upgrades, etc.)
- Polices/procedures
- Standard operating procedures
- Some level of policy or legal protection of health information
- Health information policy
- Processes

a. Public Health Decisions Based on Information (L3): All essential information is readily accessible. Organizations have the necessary workforce, capacity, legal and ethical framework, and technology infrastructure. Maturity Level 3 organizations make informed decisions based on information and the ethical use of data.

Keywords: Data integration, interoperability, informed decisions

Underlying discussions:

- Evidence based decisions (What is evidence and when are different types appropriate?)
- Information products defined (What kind of analytical tools and visualizations are available and beneficial?)
- Interoperability (What essential services need to exchange data?)
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- Ethical use of data (How do you recognize the inherent biases in data and analyses? What is secondary use?)

Examples:
- Evidence
  - Literature reviews
  - Expert reports
  - National statistics
  - Information products
- Decision Making
  - Resource allocation
  - Policy
  - Communications
  - Program development
  - Clinical
- Interoperability
  - Services for unique identifiers

b. Information Governance and KM Implemented (L4): There are continuous improvements to information asset by ensuring that data and content are accurate, reliable, up-to-date, consistent and ready to use. Knowledge management (KM) techniques are in place and refer to processes within a public health organization. This maturity level considers policies, procedures, processes and controls implemented to manage information at a health organization level, supporting organization's regulatory, legal, risk, environmental and operational requirements. Maturity Level 4 organizations establish a consistent and logical framework for stakeholders to handle data through their information governance policies and procedures.

Keywords: Information Governance; Knowledge Management
- Transparency of policies, procedures and standards
- A culture of ethical stewardship
- Compliance with applicable laws, regulations, other requirements
- Enhance the value of managed information assets
- E-discovery

Underlying discussions:
- Policies to achieve better health for the population of Americas (What policies are in place or needs to be developed?)
- KM Organization (people, process and technology - What is a knowledge based Organization?)
- Information governance (Are roles and responsibilities clearly defined? Are procedures and mechanisms adopted to share information among Organizations?).
- Internet of things (IoT) (Are regulatory agencies regulating IoT data?)

**Examples:**

- People
  - Digital literacy programs
  - Change management
- Process
  - Roles and responsibilities
  - Risk management
  - Investment framework
- Technology
  - IT infrastructure
  - KM technologies

c. **Information Systems for Health Implemented (L5):** The implementation of Information Systems for Health is a sustained integrated effort to have quality data and strategic information free and publicly available for better policy and decision-making processes in Public Health Systems. *Maturity Level 5 organizations achieve the convergence of interconnected and interoperable systems.*

**Keywords:** Full convergence; interconnected systems

- Transparency of health information
- Managing the culture change
- Community of practice
- Social network analysis
- Storytelling
- Cross-project learning
- Knowledge mapping
- Expert directories
- Competence management
- Collaborative technologies
- Knowledge repositories
- Inter-project knowledge transfer

**Underlying discussions:**

- Sustainability approach defined (Are IS4H embedded within other longer-term strategies? What are the formal mechanism securing funding and investments required to sustain IS4H? What is the approach for evaluating and adopting emerging technologies?)
- Openness and transparency adopted (Are the principles of “openness” integrated into organizational culture and policy?)
How can health be a champion of openness across government?)

Examples
- Sustainability
  - Budget for IS4H resources
  - IS4H and information technology strategies
  - Resource mobilization strategy
- Openness
  - Transparency policies, legislation and compliance
  - Open government initiatives and tools

2) Presence of capabilities on various HISW (Health Information Software) typologies: this is not meant to be an exhaustive list of typologies for HISW. These typologies should help distinguish elements during the assessment of HISW that also address management and business process capability areas for the following typologies of HISW:

- **Financial Health Information Software**: An array of financial systems that address clinical information for patients and various items used for clinical attention and referred cost.

- **The Electronic Health/Patient Record (EHR / EPR)**: Since there are various definitions and standards being developed, the IS4HH-MM will use as reference the concepts from the OpenEHR open specification for an Electronic Health Record (EHR) architecture. Its design purpose is to enable semantic interoperability of health information between, and within, EHR systems – all in a non-proprietary format, avoiding vendor lock-in of data. All clinical knowledge concepts are captured in a structured way - known as archetypes – outside the software.

- **Hospital Information Software**: A hospital information system (HIS) is an element of health informatics that focuses mainly on managerial needs of hospitals. In many implementations, a HIS is a comprehensive, integrated information system designed to manage all the aspects of a hospital's operation, such as medical, administrative, financial, and legal issues and the corresponding processing of services.

- **Knowledge Management Electronic Services and Decision Support Software (KM-DSS)**: 'Decision support' and Knowledge Management Electronic services adopt a variation of AI (Artificial Intelligence) support algorithms. As defined by Keen, Peter² (1980), a decision support system (DSS) is a computer-based information system that supports business or organizational decision-making activities, typically resulting in ranking, sorting or choosing from among alternatives. Basically, getting the computer to attempt to carry out some of the processing that the user does when converting the data ('facts') into information ('clinically relevancy'). While the technical abilities to develop DSS in healthcare has been possible for well over a decade now few have been taken up to any significant extent for 'professional' organizational reasons.

- **Clinical and Administrative Health Information Software**: Also referred to as PAS (Patient Administration System) this type of software system provides data in the form of Hospital Episode Statistics and other various reports. The administrative system is designed to allow retrospective data entry and provides details of each ‘episode’ of care.

- **Telemedicine**: Telematics is the electronic transfer of complex data from one place to another, having data in formats like video or multimedia. Therefore, teleconferencing is considered a type of telematics web based technology.

- **Patient centered information systems**: Different terms are used to refer to these systems including electronic patient record (EPR), electronic medical record (EMR) and computer based patient record (CPR). They hold the electronic version of patients' information and manage in a comprehensive way the patient’s care information in formats like medical records, appointment scheduling and other formats.

- **Administrative information systems**: This type of software manages human resource information for staff, including salaries, benefits, education, and training. The Administrative information system can also manages inventory of supplies, equipment needs and Payroll information about staff salaries, payroll deductions, tax withholding, and pay status.

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3) **Recommendation Architecture**: the possibility to define a roadmap per level and/or a roadmap for overall maturity. The recommendation is based on a list of best practices and known standards and patterns to achieve the intended maturity level. The IS4H-MM also defines the degree of guidance that a maturity assessment gives on your journey towards higher maturity.

4) **Rating scale for the IS4H-MM**: The field of Psychometrics from Psychology provides a scientific method for creating and applying “scales”

A rating scale is a set of categories designed to elicit information about a quantitative or a qualitative attribute. In the social sciences, particularly psychology, common examples are the Likert response scale and 1-10 rating scales in which a person selects the number which is considered to reflect the perceived quality of a product. The rating scales considered for the IS4H-MM assessment are the following types:

- numeric rating scale
- graphic rating scale
- Descriptive graphic rating scale

5) **Data collection technique**: the way information is collected during the assessment. It is the process of gathering on variables in an established systematic fashion, which then enables one to answer relevant questions and evaluate outcomes.

6) **Purpose & Scope**: the purpose for which the maturity model is intended to be used.

7) **Assessment duration**: the maximal duration of a particular assessment.

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3 Smith, 2009
8) **Assessment availability**: whether the assessment items and level calculation are publicly available (instead of only known to the assessors).

9) **Functional role of respondents**: the explicit recognition to include people from outside the assessed organization(s) as respondents. Some of the roles are: lead assessor, sponsors and local assessors. Regarding business versus IT respondents, there is an recommendation to include IT people as respondents in the assessment as well.

10) **Number of assessment items**: the maximal number of questions to be answered during an assessment.

11) **Calculation of maturity levels**: the way the resulting (maturity or capability) levels are calculated.

12) **Assessment process measures**: IS4H-MM assessment process measures the extent to which a given process achieves specific attributes relative to that process—‘process attributes’

13) **Methodology**: the way the maturity model was created.
3. IS4H-MM Assessment Overview

The motivation and drive to self-assessment captivates and engages public servants to enhance their understating of their own operational capacity and process capabilities for Information System Management. However, after the self-assessment the organization could also request a full-assessment that can add different perspectives and can be quite different from various point since it follows a formal appraisal and is an evidence-based approach. This reinforces transparency and technical overview of the assessment process for the IS4H and helps supplement any self-verification. Unlike other motivations over conduction a self-assessment routine, health professionals are interested in the accuracy of their current self-view, and therefore need a broader view and an outside view of this appraisal. Figure 2 shows various aspects of the Full Assessment Process for the IS4H-MM.

![Diagram of IS4H-MM Assessment Overview](image)

The Full Assessment Process has the following structure:

1) **Assessment Process**: Planning, Data Collection, Data Validation, Process Attribute Rating and Reporting

2) **Initial Input**: Purpose & Scope, IS4H-MM Self-Assessment, Constraints, Number of processes, Maturity Model Approach, Assessor, Member State Criteria, Additional Info, Assessment duration

3) **Output**: Assessment Input, Identification of Evidence, Assessment, Process Used, Process Profiles, Additional information, Calculation of maturity levels

4) **Process Reference Model**: Scope, Indicators, Mapping, Translation

5) **Process Assessment Model**: Domain and Scope, Process Purpose, Process Outcomes
6) Measurement Framework: Capability Levels, Process Attributes, Rating Scale

3.1 Planning and Preparing for the IS4H-MM Assessment

This section is intended to assist the assessment team on carry out planning, preparation and assessment activities. Its purpose is to list existing milestones and activities that are part of the IS4H Maturity Model Life Cycle. This should help staff to plan, prepare and reduce time spent the underlying discussion about the life cycle for the IS4H Assessment. It should reduce the overall workload and prevent unrelated discussions during the Maturity Model Assessment cycle.

![IS4H Maturity Model Life Cycle](image)

**Figure 3 - IS4H-MM Life Cycle**

3.2 Assessment General Aspects

The following processes are part of the IS4H General Full Assessment and contain a description of purpose and a list of activities that are part of the assessment procedures. These processes are also described in the IS4H-MM Assessment template sheet that is part of the Maturity Model kit.

3.2.1 Setup Procedures and Preparation for the IS4H MM Assessment

3.2.1.1 Analyze Requirements

Understand the IS4H Strategy needs of the MOH/health organization (e.g. organization interested in IS4H MM evaluation) for which the assessment is being requested. The assessment team (Leader Assessor) will collect information and help
the assessment sponsor understand the IS4H MM Assessment processes. Determine and communicate the strategy for collecting assessment evidence.

Depending on the level, the process can reflect an understanding of the early stages in the IS4H Framework adoption. The assessment team (Leader Assessor) will work with the assessment sponsor to determine the overall strategy for collecting assessment information. This strategy will form the basis for the assessment data collection plan.

Activities

- Determine IS4H MM assessment objectives
- Determine evidence and data collection strategy
- Determine assessment restrictions, rules and regulations (country and regional restrictions)
- Determine assessment scope
- Determine assessment outputs
- Obtain commitment to initial assessment plan

3.2.1.2 Develop Assessment Plan

Document the results of assessment planning including the requirements, level of the IS4H MM, agreements, estimates, risks, method tailoring, and practical considerations (e.g., schedules, logistics, and contextual information about the MOH, regional organization) associated with the assessment. Obtain and record the sponsor’s approval of the assessment plan. Use the IS4H-MM Assessment Sheet to determine what Assessment IS4H-MM Level Template to use. Prepare to setup the IS4H-MM Core team with the Lead Assessor and representatives from the organization/MOH Staff/regional centers etc.

Activities

- Tailor Method (choose level of the IS4H MM and assessment model with related questions)
- Identify needed resources
- Develop data collection plan
- Select the IS4H-MM Level Template
- Determine schedule
- Plan and manage logistics (assessment room and access to facilities)
- Document and manage risks
- Obtain commitment to assessment Plan from regional office or MOH units

3.2.1.3 Select and Prepare Team

Ensure that assessment participants are appropriately informed of the assessment process, purpose, and objectives and are available to participate in the assessment process. This includes also reviewing the IS4H Assessment process with the IS4H-MM Core team.

Activities
✓ Identify assessment
✓ Team Leader (Lead Assessor)
✓ Select Team Members (Core Team members)
✓ Document and Manage Conflicts of Interest
✓ Prepare Team
✓ Review the Assessment Plan with Core Team members.

3.2.1.4 Obtain and inventory initial objective evidence

Obtain information that facilitates site-specific preparation and an understanding of the implementation of model practices across the organizational unit. Identify potential issues, gaps, or risks to aid in refining the plan. Strengthen the assessment team members' understanding of the organization's operations and processes.

Activities
✓ Obtain Initial Objective Evidence
✓ Inventory Objective Evidence

3.2.1.5 Prepare for assessment conduct

Ensure readiness to conduct the IS4H MM assessment, including confirmation of the MOH availability (or other participating organization) of objective evidence, assessment team commitment, logistics arrangements plans. Plan and document data collection strategies.

Activities
✓ Obtain Initial Objective Evidence
✓ Inventory Objective Evidence
3.2.2 Assessment Development

3.2.2.1 Prepare Participants

Ensure that assessment participants are appropriately informed of the assessment process, purpose, and objectives and are available to participate in the assessment process.

Activities
✓ Conduct Participant Briefing

3.2.2.2 Examine Objective Evidence

Examine information / evidence about the process / best practices in place in the health organization and follow the orientation from the IS4H-MM Assessment Template (and additional information from the question database file). Perform the activity in accordance with the evidence and data collected.

Activities
✓ Examine IS4H MM Assessment Template (additional information reviewing the IS4H-MM Question Database)
✓ Examine collected evidences (Artifacts, Reports or Process documentation)

3.2.2.3 Document Objective Evidence

Use the IS4H-MM Assessment Sheet to record any document evidence collected while conducting the assessment. Store the information gathered by identifying and then consolidating notes, transforming the data into records and lists of documents, gaps in practice implementation or exemplary practice implementation.

Activities
✓ Take/review/tag notes
✓ Record presence/absence of objective evidence
✓ Document practice
✓ Implementation
✓ Review and update the Data collection plan

3.2.2.4 Verify Objective Evidence

Verify the sufficiency of objective evidence to determine the implementation of model practices for each instantiation. Describe any strengths and weaknesses in the implementation of IS4H best practices. Each implementation of each practice is verified so that it may be compared to the practices of the reference model.

Activities
✓ Verify objective evidence
✓ Characterize
✓ Implementation of model
3.2.2.5 Validate Preliminary Findings

Validate preliminary findings, including weaknesses (i.e., gaps in practice implementation) and strengths (i.e., exemplary implementation of model practices) with members of the organizational unit.

Activities
- Validate preliminary findings

3.2.2.6 Generate assessment Results

Rate goal satisfaction based on the extent of practice implementation throughout the organization and the scope of the assessment. The extent of practice implementation is judged based on validated data (e.g., artifact and affirmation objective evidence) collected from the entire representative sample of the organizational unit.

Activities
- Derive findings and rate goals
- Determine process area ratings
- Determine process area profile
- Determine maturity level
- Document assessment
- Results

3.2.3 Report Findings

3.2.3.1 Deliver assessment Results

Provide credible assessment results that can be used to guide actions. This report should relate to the strengths and weaknesses of the processes adopted by the organization at the time of the assessment. Provide ratings (if planned for) that accurately reflect the maturity level of the processes in use.

Activities
- Deliver final findings
- Conduct executive sessions
- Plan for next steps

3.2.3.2 Package and Archive Assessment Assets

Preserve important data and records from the assessment, and dispose of sensitive materials in an appropriate manner.

Activities
Collect lessons learned
Generate assessment record
Provide assessment
Archive and/or dispose of key artifacts

4. Internal usage methods for the Information System for Health Maturity Model

Internal Process Improvement for Health Information Systems: Managers and health professionals use appraisals to assess internal processes, generally to either baseline their IS4H capability/maturity level(s), to establish or update a process improvement program related to IS for Health, or to measure progress in implementing such a program. Applications include measuring process improvement progress, focusing on specific domains or IS Health products, appraising specific parts of the health organization, and preparing for external customer-led assessments.

Information System for Health Supplier Selection: Assessment results are used as a high-value discriminator to select IS suppliers for technologies. The results are used in characterizing the process-related risk of awarding a contract to a supplier. The assessment results are typically only one criterion among many used to select suppliers. Results are often used as a baseline in subsequent process monitoring with the selected supplier. In some cases, the IS4H-MM can be used to baseline for the development of a Request for Information (RFI) from vendors.

Information System for Health Process Monitoring: Assessment methods are also used in monitoring processes (e.g., by serving as input for an incentive). The assessment results are used to help the sponsoring organization tailor its contracts or process monitoring efforts by allowing it to prioritize efforts based on the observed strengths and weaknesses of the supplying organization’s processes.
ANNEX I – Assessment Guide for MM Assignments

The assignment for IS4H-MM Level Assessment should consider the evidence based on each level selected for the assessment and also the country’s current level or organizational level.

During the full assessment assignment there are three forms of interaction with MOH/Organization staff. The first is in the form of observation, that is typically used to monitor staff carrying out their duties. For example, observation is frequently used to assess control practices, counseling techniques and performance procedures. Observation is also used to assess the condition of the facilities, the availability of space for performing services efficiently, and the safety of the environment. The second form of interaction (IS4H-MM Questions) are done by one-on-one interviews and can be conducted with managers and staff from the MOH/Organization with the presence of the IS4H-MM Core Team. The discussions are part of the interview and might also be held with groups and should be guided by the set of questions from the IS4H-MM Assessment Template spreadsheet. The last form of interaction is reviewing documents since some information needs to be obtained by analyzing evidence (e.g. patient registers, patient records, personnel files, policies, guidelines and protocols, reports and plans).

The following tables all relate to the IS4H-MM question database and they are part of the IS4H-MM Assessment Template spreadsheet.

<table>
<thead>
<tr>
<th>IS4H-MM Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Could you describe how data-collection methods are used for reporting and if they are recent and up to date (past 3 years)?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How you should evaluate?</th>
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</thead>
<tbody>
<tr>
<td>If the data is coming from a valid data source and if there is any evidence that this data is updated frequently (this can come from various sources). Also try to identify if there are any forms of Health Data Standards of any type (e.g. HL7, OpenEHR, UMLS). Try to collect various data sources samples on different levels (operational, managerial and strategic). Standards are not mandatory.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Listen for</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any comment on completeness and precision of data. Verify if it is possible to have access to a data sample.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Follow-up questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Could you describe how the reports are generated? Is there any additional complexity to generate, access or maintain these reports (data/information products)?</td>
</tr>
</tbody>
</table>

| What is needed as evidence? |
Information Systems for Health Standard Assessment Method

**IS4H-MM Question**

Could you say that the recently published reports use some form of electronic data (past 3 years)?

**How you should evaluate?**

Documents show that the reports are approved and use some form of electronic data (past 3 years).

**Listen for**

Reports use electronic data that was collected during last year. The data source is not old (last 3 years). We collect data once every two years.

**Follow-up questions**

Could you describe how the data is collected or how to ensure that the data is not older than 36 months?

**What is needed as evidence?**

A printed document or digital file that has a recent report and references to dates these were created.
IS4H-MM Question

When reports are generated do they include descriptive statistics (e.g. age, sex, residence by smallest administrative level) from the most recent census and widely distributed?

How you should evaluate?

Using examples of past reports, review the descriptive on statistics. This statistics data could be on a PDF/XLS file or other file formats.

Listen for

Our reports include statistical data and descriptions.

Follow-up questions

Could you give us examples on how you generate these reports?

What is needed as evidence?

A printed document or digital file that has some health statistical information and its format.
IS4H-MM Question

Is there evidence of data in a structured format?

How you should evaluate?

Find if there is a minimum format of data that is used to publish health information online (website) and if they share this as a standard.

Listen for

Our format here at the MOH/Organization is standard and we publish this format using our website.

Follow-up questions

Can you show us how to access this report on the website? Are there more reports that share the presentation format?

What is needed as evidence?

A printed document or digital file that has some form presentation format or publishing format on websites.
IS4H-MM Question

What is the number of times data on health was collected or updated in the past years?

How you should evaluate?

Identify the data collection cycle and how the staff is planning on doing the next cycle.

Listen for

We do not collect data on a regular basis. This is done only at a specific time during the year.

Follow-up questions

Could you show us how you did this the last time health data was collected?

What is needed as evidence?

A printed document or digital file that has some evidence on data collected and its format.
IS4H-MM Question

Does the MOH/Organization collect health data using some form of electronic software?

How you should evaluate?

Identify if the data collected on health information is done on a spreadsheet (e.g. excel), local database management system or other forms of electronic data storing.

Listen for

We usually use a spreadsheet (e.g. excel) and a local database management system to store health data.

Follow-up questions

Do you have any plans on using a HMS or other health information software in the near future?

What is needed as evidence?

A printed document or digital file or a screenshot of the technology used for collecting health data.
**IS4H-MM Question**

How does the MOH/Organization use health data and why is it collected?

**How you should evaluate?**

Identify how data is used and if the same data collected is shared and part of any sort of information product like mortality reports, surveillance reports or basic health indicators.

**Listen for**

Our data has some quality issues and that makes it hard to use it as a source for information products.

**Follow-up questions**

Is there an impact of not having data on health?

**What is needed as evidence?**

A printed document or digital file that has parts of a mortality report, surveillance report or basic health indicator.
<table>
<thead>
<tr>
<th>IS4H-MM Question</th>
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<tbody>
<tr>
<td>Could you describe how you performed health data consistency (times and cycles) and if you have health data quality policies in place? Do you measure these activities, and if so, have you done it in the past years?</td>
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</tbody>
</table>

<table>
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<tr>
<th>How you should evaluate?</th>
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<tbody>
<tr>
<td>A document or set of documents that show how the data consistency is done and that it follows the data quality policy. The data consistency should be part of the data management processes and best practices, with some reference to standards, organizational structures, procedures, and technology. These documents should reference the date that these activities took place.</td>
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<tbody>
<tr>
<td>Could you describe how these activities are done in more details? Do you have a documented process?</td>
</tr>
</tbody>
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<thead>
<tr>
<th>What is needed as evidence?</th>
</tr>
</thead>
<tbody>
<tr>
<td>A printed document or digital file that contains any evidence on the data management process. Documents on the health data consistency routines.</td>
</tr>
</tbody>
</table>
IS4H-MM Question

Does health-facility staff adopt adequate procedures to select health data collections, process the data with data quality routines and analyze these data from various sources in health?

How you should evaluate?

Documents show that the reports are approved and use some form of electronic data (past 3 years).

Listen for

We have these routines and services on this application “application name” and the organization is using it for data to support decision-making. (For the assessor) To help discuss this question, use the IS4H-MM Software typology list for types of health information software that can support decision-making. The software should produce some form of mortality reports, surveillance reports and basic health indicators.

Follow-up questions

Could you describe how the data is collected or how to ensure that the data is not older than 36 months?

What is needed as evidence?

A printed document or digital file that has a recent report and references to date these were created.
IS4H-MM Question

Are you currently adopting some form of health data standards, this includes classification systems, data standards and medical terminologies?

How you should evaluate?

Try to identify any form of health data standards that are in place. The International Statistical Classification of Diseases, Related Health Problems (ICD) are common adopted standards. The adopted standards could also include but not limited to Health Level 7 (HL7): HL7 RIM, HL7 CDA, HL7 CCOW

ISO/HL7 10781 - Electronic Health Record
ISO/HL7 27931 and ISO/HL7 27932 - Data Exchange Standards
ISO/HL7 21731 - Health informatics: The reference information model
ISO/HL7 21090 - Health informatics: Harmonized data types

Listen for

We are currently using ICD-10, HL7 and DICOM and they are all adopted by our Health Information System software.

Follow-up questions

Could you describe how these standards are incorporated in the software in more details?

What is needed as evidence?

A printed document or digital file that contains any evidence that the standard is present and adopted by the IS software.
**IS4H-MM Question**

Is there a data analytic tool that allows data disaggregation by some form of socioeconomic index like income, health status, employment and enabling environment?

**How you should evaluate?**

Try to identify any evidence of data analytic tools that have a structure of multidimensional data extraction services or functions.

**Listen for**

Our format here at the MOH/Organization is standard and we publish this format using our website.

**Follow-up questions**

Could you describe how these features are incorporated in the software in more details?

**What is needed as evidence?**

A printed document or digital file with screenshots with the data analytic tool that shows how data disaggregation is done by a form of data fields.
IS4H-MM Question

Is there a written set of procedures for data management including data collection, storage, cleaning, quality control, analysis and presentation for target audiences, and are these implemented throughout the country?

How you should evaluate?

Identify the data collection cycle and how the staff is planning on doing the next cycle.

Listen for

How they performed these processes for data management.

Follow-up questions

Could you describe the <pick one of the processes to question them about>? Some examples are: Clinical Data Management Plan, Data Validation Process, Data Entry and Data Cleaning Process, Loading Electronic Files Process, Medical Coding Procedures

What is needed as evidence?

A printed document or digital file that describe one or all of the process.
IS4H-MM Question

Does your organization adopt any form of health metadata creation (design, sample implementation)? Is metadata available in documented from on recent health surveys?

How you should evaluate?

Try to identify any evidence of Metadata within reports, documents, surveys and extracted data files. Verify the detail and levels of the Metadata used.

Listen for

How the Metadata is managed and if it is maintained over time.

Follow-up questions

How is the Metadata managed? Is it done by health staff or performed by IT technical group?

What is needed as evidence?

A printed document or digital file that has the Metadata examples from reports, documents or surveys.
IS4H-MM Question

Do managers and analysts at national and district levels commonly evaluate access to health data services?

How you should evaluate?

Is there any evidence that managers or analysts are accessing health data services and are doing evaluation on the data provided?

Listen for

The managers access health data services in one form and they have these results.

Follow-up questions

How do the managers access health data services and do they evaluate it?

What is needed as evidence?

A printed document or digital file that has any procedure of data quality.
IS4H-MM Question

Does the health organization provide graphs to display information at subnational health administrative offices (e.g., regional/provincial, district) and health facilities?

How you should evaluate?

Try to identify any evidence data representation and how it is distributed for various social groups and technical staff.

Listen for

There are different health data representation reports that are used to synthetize health data analysis.

Follow-up questions

Can you show one of these reports or show how the software generates this graphical representation?

What is needed as evidence?

A printed document or digital file that contains a report with a graphical representation.
IS4H-MM Question

Does the health organization adopt any form of legal-ethical framework and are business processes defined (regarding how legal, ethical and business practices protect individuals and how they meet stakeholder needs)?

How you should evaluate?

Try to find processes that relate to legal-ethical framework (ethical and business practices that protect individuals, patients and health professional).

Listen for

There are some legal and ethical guidance regarding patient's data.

Follow-up questions

Are there any legal processes that are defined for health data management activities?

What is needed as evidence?

A printed document or digital file for the processes that defines health data management activities and how it relates to the legal-ethical framework?
**IS4H-MM Question**

Are datasets from major health data sources consistent and have data quality measures?

**How you should evaluate?**

Completeness and precision data quality checks on all data are performed at the point of entry for each mandatory attribute from each source system.

**Listen for**

Our data is checked by a team of health experts. Our IT staff works with data validation routines with epidemiologists.

**Follow-up questions**

Could you describe how these activities are done and what health expert roles are involved?

**What is needed as evidence?**

A printed document or digital file that has any procedure of data quality.
**IS4H-MM Question**

Do you or your team follow conformity checks and integrity checks on data that have recently been used and does this apply to major health data sources?

**How you should evaluate?**

Look for checklists of conformity and integrity routines for the data sources that are maintained.

**Listen for**

We have our conformity routines for data verification.

**Follow-up questions**

Could you give us an example of the activities that you develop during the conformity check?

**What is needed as evidence?**

A printed document or digital file that has any procedure of data quality.
IS4H-MM Question

Can you or your team explain if your organization depends on an entity responsible for health data management and information systems for health?

How you should evaluate?

Look for an explanation or some form of evidence that there is a specific entity that takes care of data/information management.

Listen for

We have a data management area / data management team that is under X department.

Follow-up questions

Could you describe an example on the activities that this area / entity / team executes?

What is needed as evidence?

A printed document or digital file that show the entity responsibilities / activities for data management.
IS4H-MM Question

Could you describe how Health Information System capacity-building activities have taken place over the past year for health-facility staff (data collection, software and database, and/or epidemiology data)?

How you should evaluate?

A document or set of documents that describes the capacity-building activities with purpose and goals, staff and structure of the organization that participated during the activities (including the organizational chart). Also, roles/responsibilities that participated.

Listen for

How the capacity-building took place and what roles were involved for data collection? Evidence of the checklists may reflect activity across many the key action areas.

Follow-up questions

Could you describe how these activities were done? Policies and strategic plans for data collection structures. Information system monitoring and evaluation.

What is needed as evidence?

A printed document or digital file that contains any evidence on data collection.
IS4H-MM Question

Could you describe the Health Information System capacity-building activities that have taken place over the past year for health-facility staff, including examples on data collection, self-assessment, analysis and presentation?

How you should evaluate?

A document or set of documents describing the capacity-building activities related to data collection techniques, Information System assessment. Also, roles/responsibilities that participated.

Listen for

How the capacity-building took place and what roles were involved.

Follow-up questions

Could you describe how these activities are done?

What is needed as evidence?

A printed document or digital file that contains any evidence on information system assessment.
IS4H-MM Question

Does your organization adopt a unique identifier codes to facilitate the merging of multiple databases from different health data sources? Can you describe the use and the creation of this unique identifier?

How you should evaluate?

There is a defined algorithm or a unique identifier service that generates a ID that is used for various purposes like health data integration.

Listen for

Algorithms and techniques that can be shared in different ways to interoperate ID services within Information Systems.

Follow-up questions

Could you describe how these activities are done?

What is needed as evidence?

A printed document or digital file that contains the routines for Unique ID.
### IS4H-MM Question

Are datasets from major health data sources consistent and have data quality measures?

### How you should evaluate?

Completeness and precision data quality checks on all data are performed at the point of entry for each mandatory attribute from each source system.

This question is a crossref with question No. 9

### Listen for

Our data is checked by a team of health experts. Our IT staff works with data validation routines with epidemiologists.

### Follow-up questions

Could you describe how these activities are done and what health expert roles are involved?

### What is needed as evidence?

A printed document or digital file that has any procedure of data quality.
IS4H-MM Question

Do you or your team follow conformity checks and integrity checks on data that have recently been used and does this apply to major health data sources?

How you should evaluate?

Look for checklists of conformity and integrity routines for the data sources that are maintained.

This question is a crossref with question No. 10

Listen for

We have our conformity routines for data verification.

Follow-up questions

Could you give us an example on the activities that you develop during the conformity check?

What is needed as evidence?

A printed document or digital file that has any procedure of data quality.
IS4H-MM Question

In your opinion does the country have adequate capacity to implement health data collection, process the data and analyze the data?

How you should evaluate?

Are staff ready to use data, analyze it and implement database routines.

Listen for

Our team uses databased routines for decision making

Follow-up questions

Could you give us an example on how the country implements health data collection?

What is needed as evidence?

A printed document or digital file that has any procedure of data quality.
### IS4H-MM Question

Is there evidence that the organization overcomes the loss of data input and the ability to gather information in decision-making process?

### How you should evaluate?

Verify if there are any records / documents that show any loss of inputs during any operation (create, read, update or delete) on data records. Log files should be verified to try and identify issues during information transactions and if these information products are used by decision-making routines. Is there any guide to overcome data loss?

### Listen for

The IT team have a report on problems that occurred during operations. Any loss of data records is then mapped and do / do not influence the information products for decision-making.

### Follow-up questions

What are the policies and practices on overcoming transactions that are suspected and how this reflects on decision-making information products?

### What is needed as evidence?

A printed document or digital file that has the policy or practices for overcoming issues during data transactions.
IS4H-MM Question
Could you describe how the MOH/organization incorporates the outcome of Open Government Data initiatives or open health data to provide support for decision making?

How you should evaluate?
Verify if there is a process or a guideline that can show how to extract data from Open Government Data initiatives or open health data sources (open formats).
Identify if there are recorded decision process that relate to the adoption or use of open health data sources.

Listen for
Are there rights of access to information from open health data sources or from Open Government Data directories?

Follow-up questions
Evidence based decisions (What is evidence and when are different types appropriate?) What is the legal and policy framework for health data security, health data archiving and health digital preservation?

What is needed as evidence?
A printed document or digital file that contains any evidence on the use of Open Government Data or Open health data as means to a decision-making process.
IS4H-MM Question

Are executives at health-facility/MOH aware of the purpose or value of the Data Governance programs to support decision-making?

How you should evaluate?

Verify if there is an understanding of a Data Governance program at the organization and if there is any form of evidence on what these processes are. Usually responders reference Data Quality procedures. Try to find tools like the RACI Matrix that record responsibilities and accountability procedures.

Identify if there are recorded decision process that relate to some form of Data Governance procedures.

Listen for

Our staff uses the guide for reporting any data quality issues. We have a special team for data issues on consistency, completeness and time series.

Remind the respondents that the focus is on Data Governance and not Data Quality.

Follow-up questions

Are there any documented procedures for Data Governance or process documentation?

What is needed as evidence?

A printed document or digital file that has an evidence based on written procedures on Data Governance or other forms of guidance.
IS4H-MM Question

Are existing data policies documented, consistently maintained and available to help stakeholders choose health data sources during a decision-making process?

How you should evaluate?

Evaluate the documented policy and link it to how different stakeholders choose health data sources. Also try to identify if the staff has the capacity and infrastructure to follow the policy.

Listen for

We have a policy that guides us in choosing different health data sources (regional and national) and if decision-making process also use these data sources.

Follow-up questions

Can you show how the policy is used during one of the decision-making processes? Is there a legal and ethical framework that help in this process?

What is needed as evidence?

A printed document or digital file that has an evidence on parts of the policy or if it is a public document, collect a complete version.
IS4H-MM Question

Can you tell about any past critical situation in which you had to make an immediate decision based on quality data? Give an example of a situation in which you had to make a decision when you didn’t have all health data available.

How you should evaluate?

Discuss if at any times decisions based on instinct are made since they must work with incomplete data.

Discuss with the respondents the following scenarios for decision-making process:

- Using available information – Current process are based on informed decisions.
- Analyzing – Knows how to break complex issues into components.
- Investigating – Can take conclusions from different sources of data.
- Acting – Can make decisions without complete info. Doesn’t hesitate to act and able to make sound decision patiently, but in a timely manner.

Listen for

We make decisions based on instinct, since we have incomplete health data. However, our organization does use health data, so an individual who possesses good logical and analytical skills will make the correct decision.

Follow-up questions

Can you show us how are you using health data for the following scenarios for decision-making process: Using available info – Based the process on the information to hand.

Analyzing, Investigating and Acting.

What is needed as evidence?

A printed document or digital file that has the any example on Analyzing, Investigating, Acting on health data as a procedure for decision-making.
<table>
<thead>
<tr>
<th><strong>IS4H-MM Question</strong></th>
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<tbody>
<tr>
<td>Does the organization use non-conventional databases (e.g. emergency calls, absence in school, etc.) to support decision-making (e.g. for health surveillance, immunization strategy, policy development etc.)?</td>
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<tr>
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<tbody>
<tr>
<td>Verify if there are any documents that point to the use of external non-conventional data sources. Identify the data drivers that link to these non-conventional data source. Respondents should talk about any type of formal arrangement (contracts, terms of cooperation) for the use of these external data sources.</td>
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<table>
<thead>
<tr>
<th><strong>Listen for</strong></th>
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<tbody>
<tr>
<td>We have an agreement with various organizations to use their data sources.</td>
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<table>
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<tr>
<th><strong>Follow-up questions</strong></th>
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</thead>
<tbody>
<tr>
<td>What health data patterns or formats that are used with this non-conventional databases? Is there any classification systems or format required?</td>
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</table>

<table>
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<tr>
<th><strong>What is needed as evidence?</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>A documented evidence on Expert reports, National statistics or Information products that are used as non-conventional databases.</td>
</tr>
</tbody>
</table>
**IS4H-MM Question**

Is there any information product that shows how your organization incorporates the outcome of Open Government Data initiatives or open health data to provide support for decision making?

**How you should evaluate?**

Gather evidence on what types of information products are available and if they use open government data / open health data sources to add on existing sources. Respondents should talk about how this resulting product gets used for decision-making. If there is use of any additional national open data directory metadata to help understand the resulting product. Also collect evidence on how the decision-making consumes these information products.

**Listen for**

This national (open) data base is used by our IT staff to aggregate data in various dimensions.

**Follow-up questions**

Are there any health open datasets that you can show us? Is there a report or procedure for data ingestion on health open datasets?

**What is needed as evidence?**

A documented evidence on open dataset directory that are publicly available on the web. An example of the information product that uses the open dataset.
IS4H-MM Question

Can you describe how your organization performs the ethical use of data (How do you recognize the inherent biases and risks in data and analyses? And what is secondary use?)

How you should evaluate?

Request additional information of the ethical guidelines or policy related to data processing and information collection. Ask about if there has been any situation that used biases data analyses in the past and how they dealt with it?

Listen for

Our guidelines for information collection / analyses considers ethical protocols. There are datasets that the policy prevents direct access like for example patient records to cannot be exposed. When building an information product there are also protocol

Follow-up questions

How this policy if adopted or used in the MOH / organizational structure?

What is needed as evidence?

A documented evidence on open dataset directory public on the web. An example of the information product that uses the open dataset.
IS4H-MM Question

Can you describe a difficult problem that you had to sort out at the MOH/Organization where you used quality health data as the basis for problem solving routine?

How you should evaluate?

The assessor should hear the logic that you use to solve a problem using health data along with the outcome that you are able to achieve. Can you explain how the health data was collect data and if it was systematically used and well organized that helped the analysis methods and the decision-making process?

Listen for

These decision-making processes were executed using our software (BI, Reporting Software, Data Directory etc.).

Follow-up questions

Can you tell us about any real challenging problem that you had experienced in your activities that with the use of health data helped your performance?

What is needed as evidence?

A printed document or digital file that has the any example on Analyzing, Investigating, Acting on health data as a procedure for decision-making.
### IS4H-MM Question

Your organization has adequate capacity to analyze data (data science) and continuously use it for decision-making?

### How you should evaluate?

Ask to look at some routines for data analytics and if there are health staff that could use these routines to create information products that are used by senior management during decision-making situations.

### Listen for

These routines are executed using some software that connects to the health data sources.

### Follow-up questions

Can you give us an example of the output of these data science routines?

### What is needed as evidence?

A file that shows evidence on datasets and reports generated by these data science routines.
IS4H-MM Question

Does your organization have a KM methodologies/process (lessons learned, Communities of practices, After action reviews, etc.)?

How you should evaluate?

Look for adopted practices from KM initiatives and policies that relate to communities of practice, institutional memory and lessons learned

Listen for

We have a digital repository that concentrates on file management.

Follow-up questions

Can you show some examples on the work done with communities of practice, institutional memory or lessons learned?

What is needed as evidence?

A printed document or digital file that has an evidence on communities of practice, institutional memory or lessons learned.
IS4H-MM Question

Does your organization have a Knowledge and Information Management (KIM) strategy and is it integrated within the MOH strategy?

How you should evaluate?

Identify if there is a clear understanding of the impacts that relate to Knowledge Management and Information Management and what it entails for the Organization. The evidence can be part of the strategy or the KM and KIM practices or processes from the documentation.

Listen for

We have adopted KM initiatives in different stages.

Follow-up questions

Do managers understand why and how KIM is critical to the organization?
Is there a KM champion at Board level?

What is needed as evidence?

A printed document or digital file that has an evidence on the Knowledge Management activities and how these are related to the strategy.
IS4H-MM Question

Information governance (roles and responsibilities clearly defined) procedures and mechanisms adopted are shared among Health Organizations?

How you should evaluate?

Discuss how the organization implemented information governance within its structure. These organizations share with MOH or health centers information that are part of the HIS.

Listen for

We have a Governance structure that also discusses information flow, but there are limitation on the Governance body for information management.

Follow-up questions

Is the Governance structure just related to information and ICT or does it also relate to health data and KM initiatives?

What is needed as evidence?

A printed document or digital file that has an evidence.
IS4H-MM Question

Does your organization adopt regulations for the use of sensors in health information systems (use of Internet of things - IoT) as well as regulating IoT data?

How you should evaluate?

Is there sensory data streaming from health devices that need some form of regulation or legislation. Verify if some form of regulation is in place. Sensors that collect data and needed to interoperate with other health information services follow regulation.

Listen for

We have simple health monitors that can connect to our local Wi-Fi network.

Follow-up questions

If not, do you have any process in place that controls in some way how data is used or transferred by these devices and sensors?

What is needed as evidence?

A printed document or digital file that has some reference to the regulation for IoT.
**IS4H-MM Question**

Is there a disposition in the organization to share lessons learned and an agreed upon definition of what lessons learned entails within health information systems?

**How you should evaluate?**

Verify using one KM discipline, a method or a KM process as an example, if there is a shared vision on KM initiatives.

**Listen for**

We have discussed with various groups the use of lessons learned and other KM practices.

**Follow-up questions**

Can you remember any other KM initiative within the organization?

**What is needed as evidence?**

A printed document or digital file that show any sort of documentation used during the lessons learned session.
<table>
<thead>
<tr>
<th>IS4H-MM Question</th>
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<tbody>
<tr>
<td>Does your organization provide training and is it available to familiarize health-facility staff with tools to capture lessons learned or other KM tools like expertise location?</td>
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<table>
<thead>
<tr>
<th>How you should evaluate?</th>
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<tbody>
<tr>
<td>Verify if there are any additional efforts to make KM a MOH/Organization initiative and if there are plans to adopt these initiatives in various areas.</td>
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</table>

<table>
<thead>
<tr>
<th>Listen for</th>
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<tbody>
<tr>
<td>The MOH / organization is enrolled in adopting KM practices and these initiatives will cover all of our organizational structure.</td>
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<tr>
<th>Follow-up questions</th>
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<tbody>
<tr>
<td>Could you describe one additional scenario where this situation can be understood?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>What is needed as evidence?</th>
</tr>
</thead>
<tbody>
<tr>
<td>A printed document or digital file that has some examples on these situations.</td>
</tr>
</tbody>
</table>
**IS4H-MM Question**

Is Knowledge and Information Management included as part of the change management program at the MOH or organization?

**How you should evaluate?**

Try to understand if the assessment group from the MOH/Organization understands the important aspect of change management as part of the KM strategy.

**Listen for**

How they address the change management activities?

**Follow-up questions**

Could you describe additional information on the change management initiative?

**What is needed as evidence?**

A printed document or digital file that has written procedures on change management.
### IS4H-MM Question

Does your organization have KM initiatives for health-staff like digital literacy programs or hands-on sessions for scheme classification and taxonomy management for categorizing health information or services?

### How you should evaluate?

Discuss with the assessment group what are the initiatives for digital literacy and if there is any form of hands-on group activities for schema classification or any form of knowledge representation. Try to understand how it is done and if the organization adopts this as a continues practice.

### Listen for

How they address the need for changes in knowledge representation. How they are working with digital literacy and if it is a continues practice at the MOH/organization.

### Follow-up questions

Could you share with us some of the digital literacy program strategies? If there are knowledge classification practices, can you talk more about them?

### What is needed as evidence?

A printed document or digital file that has an evidence on any element of the digital literacy program or the practices from the knowledge classification documents.
IS4H-MM Question

Are there KM initiative/technologies in place at the Organization that support the KM Strategy? Do you agree that there are KM approaches and practices like knowledge repositories, lessons learned, expertise directory, knowledge mapping, knowledge discovery?

How you should evaluate?

The are theoretical bases that suggest that the primary support to KM initiatives are the use of classifying systems either by the creation or the reuse of knowledge or codification approach. Verify if the MOH/organization understands the reuse of knowledge in this perspective or if it adopts other perspectives.

Listen for

Try to identify some form of understanding from the team on knowledge initiatives/technologies

Follow-up questions

Can you give us an example on some KM approaches and practices?

What is needed as evidence?

A printed document or digital file that has an evidence on KM approaches and practices like knowledge repositories, lessons learned, expertise directory, knowledge mapping, knowledge discovery and knowledge audit.
IS4H-MM Question

Does the MOH/organization have a categorization of KM technologies according to their kind of support to KM initiatives for Hospital and Primary care staff?

How you should evaluate?

The use of categorization of KM technologies should help the adoption and understanding of the use of KM strategies. Discuss what are the proposes knowledge gaps and how they handle this through either tools or knowledge domains.

Listen for

Try to understand how categorization of KM technologies is by staff. Discuss what are the knowledge gaps and how they handle this through either tools or knowledge domains.

Follow-up questions

Have you done a knowledge gaps or knowledge management assessment and if they can share the results?

What is needed as evidence?

A printed document or digital file that has an evidence knowledge gaps or knowledge management assessment results.
IS4H-MM Question

Are there KM initiatives for health staff like digital literacy programs or classification scheme like Taxonomy Management for categorizing health information or services?

How you should evaluate?

Find examples of classification schemas and how the organization manages these forms of knowledge representation.

Listen for

How they address the need for changes in knowledge representation.

Follow-up questions

Can you give us an example of evidence-based practices (safety, data related)?

What is needed as evidence?

A documented evidence on evidence-based practices.
IS4H-MM Question

Does your organization have a sustainability approach defined for continuous IS4H framework improvements? Are IS4H Strategic Goals embedded within other long-term strategies?

How you should evaluate?

Verify if there is a plan that demonstrates how sustainability is approached at the MOH/Organization level.

Is there a strategic plan that has a fixed topic on IS4H program and continuous implementation?

Listen for

Respondents should also talk about the long-term strategies and how they map to the IS4H Strategic Goals.

Follow-up questions

What are the formal mechanism securing funding and investments required to sustain IS4H initiatives?

What is needed as evidence?

A printed document or digital file that has plans on sustainability for the IS4H or an action plan that states the IS4H Framework.
IS4H-MM Question

Are the principles of “openness” integrated into organizational policy?

How you should evaluate?

Discuss how openness is about how personal data is collected, how to use patient/exam/procedures data, the way these data are shared, the way patient data is secured and other situations. Verify if there are clear and accessible information about how personal data is collect and the purpose of collection at the point care.

Listen for

How do they register personal data and what are limits and credentials to use it?

Follow-up questions

How do you guarantee that this data is protected correctly?
How do you guarantee that confidentiality and privacy are protected?

What is needed as evidence?

A printed document or digital file that has evidence on how the confidentiality and privacy are protected.
IS4H-MM Question

Does the MOH/Organization have a budget for IS4H resources and information technology strategies or resource mobilization strategy?

How you should evaluate?

Try to have access to any versions of the budget that have any information on IS4H Framework elements. Verify if there are written strategies about information technology, governance, KM and other strategic goals from the IS4H Framework and if there is a budget related to these goals.

Listen for

We have adopted IS4H Framework as a guide to budget definition for the strategic goals.

Follow-up questions

Can you give us a recent example on the adoption of the IS4H Strategic goals and budget allocation?

What is needed as evidence?

A printed document or digital file that has an evidence on budget structure or examples of budget allocation.
IS4H-MM Question

Are there any policies for Information transparency, legislation or compliance adopted by the organization based on best practices from the Open Government initiative?

How you should evaluate?

Try to identify if there is a concern on information transparency, or if there is a legal framework that support information systems for health initiatives and the IS4H Framework Program.

Listen for

How to they work with transparency and other initiatives.
Try to listen for Transparency on Information.

Follow-up questions

How can health be a champion of openness across government?

What is needed as evidence?

A printed document or digital file that has an evidence on the IS4H Framework adoption.
IS4H-MM Question

Does your organization exchanges data based on Open Government initiatives?

How you should evaluate?

Are there examples of how the organizations uses Open Government as a basis for sharing data among governmental units? Discuss if this is a MOH/Organization initiative or something that is local.

Listen for

There is a national initiative on Open Government and we have shared OG-Health data with the national Open Data Directory. This is now a two-way initiative and we use Open Data for better decision making.

Follow-up questions

Does OG directives provide support for sharing or interchanging data?
If yes, how does Open Government data directives provide support for sharing data?

What is needed as evidence?

A printed document or digital file that has an evidence on OG dataset adoption for health data or interchanged data. Examples on how the application is using the shared data.
IS4H-MM Question

Does the MOH/Organization achieve convergence of interconnected and interoperable health information systems?

How you should evaluate?

Discuss how interoperability is about connecting two or more services and how they use it to add value to patient/exam/procedures data, the way these data connected and if it is secured and other situations. Verify if there are clear and accessible information about interoperability and how these services are made so that one can sign up for a health service integration plan.

Listen for

How they are making the service register available and how this benefits personal data they collect.

Follow-up questions

How to guarantee that interoperability and interconnection uses personal data without compromising privacy and ethical issues?

What is needed as evidence?

A printed document or digital file that has an evidence on governance on the interoperability initiative
### IS4H-MM Question

How do you guarantee that delivery of health information will support the identification of reportable situation or outbreaks?

### How you should evaluate?

Try to identify if there is a feedback loop on the use of health open data in the national data directory and internal analytics that helps find epidemiologic statistical issues and other health data related issues.

### Listen for

We had an important case on information verification that lead to reviewing epidemiological reports.

### Follow-up questions

Was there a standard procedure that you had to undertake to review or notify different health data agents?

### What is needed as evidence?

A printed document or digital file that has an evidence on the feedback loop or notification on data verification.
IS4H-MM Question

Does the organization have a strong yet flexible structure that is accountable and adopts transparent governance practices as defined by the IS4H framework?

How you should evaluate?

There is a need to understand how MOH/Organization deals with the structure regarding accountability, transparent governance practices and how it relates to the IS4H Framework. Discuss how they deal with accountability and governance in the MOH/Organization.

Listen for

The accountability procedures and transparency procedures and how they relate to the IS4H Framework.

Follow-up questions

Can you give us an example on how accountability procedures align with the IS4H Framework?

What is needed as evidence?

A printed document or digital file that has an evidence any accountability report or transparency governance procedures.
IS4H-MM Question

Has the IS4H helped to change the population’s wellbeing and established a new standard of care?

How you should evaluate?

A discussion on patient's clinical situation and how the IS4H Strategic Goals have influenced and produced changes on standards for public care.

Listen for

The implementation of approved standard treatments for patients based on the IS4H Strategic Goals.

Follow-up questions

Can you show us the new clinical pathway and the elements from IS4H Strategic Goals?

What is needed as evidence?

A printed document or digital file that has flow or a diagram from the new clinical pathway.
IS4H-MM Question

Does the MOH/Organization deliver products and services that respond to best practices and patterns from the IS4H Framework?

How you should evaluate?

There is a need to understand how MOH/Organization deals with products and services that respond to best practices from the IS4H Framework. Discuss how they deal transforming or adapting the products and services at the MOH/Organization to accommodate the IS4H Framework best practices.

Listen for

How the products and services are listed and how they relate to the IS4H Framework.

Follow-up questions

Can you give us an example on how service procedures align with the IS4H Framework? Can you give us an example on how products align with the IS4H Framework?

What is needed as evidence?

A printed document or digital file that has an evidence any products and services.
ANNEX II - Standards

The IS4H Maturity Model considers the following Health Information Standards:

OpenEHR: Represent a virtual community working on means of turning health data from the physical form into electronic form and ensuring universal interoperability among all forms of electronic data. The primary focus of its endeavor is on electronic health records (EHR) and related systems. The essential outcome of the openEHR approach is systems and tools for computing with health information at a semantic level, thus enabling true analytic functions like decision support, and research querying. There are some key benefits to openEHR's approach. Firstly, it is now possible to build an EHR repository independently of content specifications. In other words, your EHR system doesn't need to know a priori about any of the clinical data it will process, such as vital signs, diagnoses or orders. Models for those things are developed separately. Models for data sets and forms are also developed separately, and UI form components are generated from these definitions. This enables a new generation of EHR systems that routinely adapts to new requirements - because that's how the architecture is designed in the first place. Components and systems conforming to openEHR are 'open' in terms of data, models and APIs. They share the key openEHR innovation of adaptability, due to the archetypes being external to the software, and significant parts of the software being machine-derived from the archetypes. The archetype specification is now an ISO standard (ISO 13606-2). These are now being used by several national governments to specify national e-health information standards.

Strategically, the openEHR approach enables a platform-based e-health software market, in which vendors and developers of back-end and front-end solutions interface via standardized information models, content models, terminologies and service interfaces.

DICOM: Digital Imaging and Communications in Medicine – ISO 12052 is the international standard for biomedical imaging and related data. DICOM defines a full set of network services for exchange, storage and access to images and to products of image analysis applications, as well as services for imaging department workflow management. It has become indispensable to the clinical imaging departments by focusing on their needs for efficient routine production and interpretation of imaging studies. DICOM is implemented in virtually all radiology and cardiology imaging devices and systems, and increasingly in other specialty imaging areas, such as dentistry, ophthalmology, and pathology.

HL7: is an international community of healthcare subject matter experts and information scientists who work together to create accredited standards for the exchange, management and integration of electronic healthcare information. In the mid-1990s HL7 initiated a family set of standards based on a common Reference Information Model (HL7 RIM). These RIM-based standards have been annually published since 2004 and now include the ability to exchange information and support inter- system cooperative processing through messages, electronic documents and
recently services. Most data elements exchanged by HL7 standards are encoded in a terminology created and supported by other standards organizations such as IHTSDO, WHO, etc. HL7 also actively collaborates with other accredited healthcare international and country-specific standards groups that address information domains outside of HL7’s.

IHE: Integrating the Healthcare Enterprise is an initiative by healthcare professionals and industry to improve the way computer systems in healthcare share information. IHE promotes the coordinated use of established standards such as DICOM and HL7 to address specific clinical needs in support of optimal patient care. Systems developed in accordance with IHE communicate with one another better, are easier to implement, and enable care providers to use information more effectively. IHE has Liaison A status with ISO TC 215 for Healthcare Standards and is an active member of the Joint Initiative Council (JIC) along with CDISC, HL7, ISO, and CEN. The IHE technical frameworks are freely available via the IHE website.

- Cardiology
- Dental
- Eye Care
- IT Infrastructure
- Pathology and Laboratory Medicine
- Patient Care Coordination
- Patient Care Devices
- Pharmacy
- Quality, Research and Public Health
- Radiation Oncology
- Radiology

The following ISO Standards are referenced in the IS4H Maturity Model:

- ISO 9000:2000, Quality management systems – Fundamentals and vocabulary
- ISO 9001:2000, Quality management systems – Requirements
- ISO/IEC 17000:2004, Conformity assessment – Vocabulary and general principles
- ISO/IEC 17020:1998, General criteria for the operation of various types of bodies performing inspection
- ISO/IEC 17065:2012, Conformity assessment – Requirements for bodies certifying
  - products, processes and services
• UK2011MM - Maturity Model of the NHS Infrastructure Maturity Model (NIMM) - UK (2011)
• The Information Systems Interoperability Maturity Model (ISIMM) - Stefanus(2012).
• Capability Maturity Model Integration - CMMI Product Team 2006; Paulk et al. (1993).
• E-Government Maturity Models and Open Government - Fath-Allah et.al. (2014)
• Data Governance Maturity Model – MES 2011
• Open Innovation Maturity Model for the Government – Ham (2015)
• Open Data Maturity Model - Open Data Institute 2015
• Transparency and Information Access (Transparent MM) - Salm (2017)
• Balanced Scorecard Maturity Model for IT - Van Grembergen and Saull (2001).