

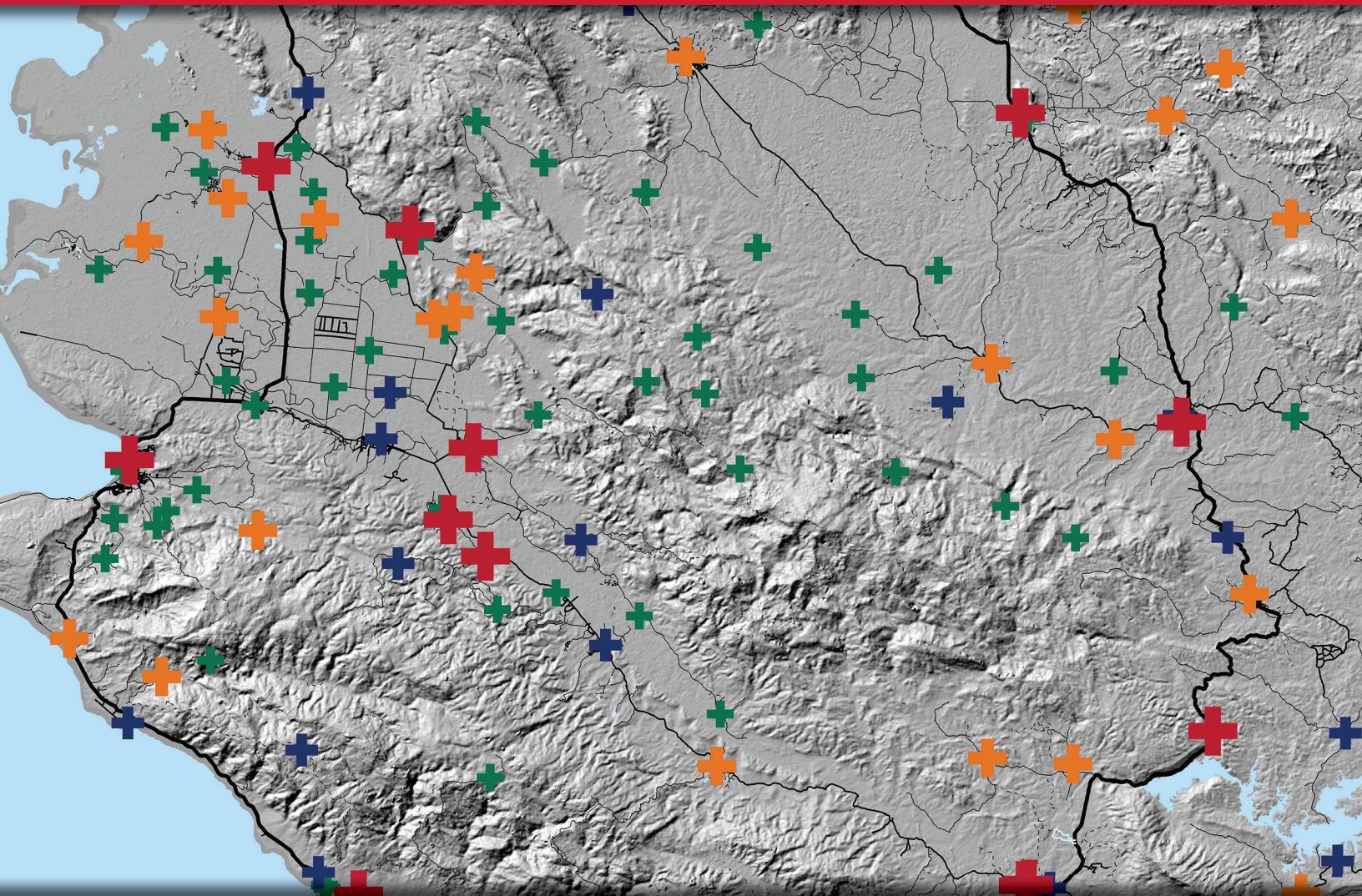


USAID
FROM THE AMERICAN PEOPLE



MASTER FACILITY LIST RESOURCE PACKAGE:

Guidance for countries wanting to strengthen their MFL



May 2017

DRAFT

OVERVIEW OF THE MFL RESOURCE PACKAGE

The Master Facility List (MFL) Resource Package was developed to guide countries through the process of establishing or strengthening their MFL. The MFL Resource Package describes the various elements that need to be in place to have a functional MFL including a governance structure, a comprehensive and up-to-date facility list, and a software platform to house and share the MFL. It discusses key decisions that need to be made during the planning and implementation phases; describes best practices for establishing, maintaining and sharing an MFL; and discusses resource needs. Additionally, the MFL Resource Package includes case studies from various countries, and links to tools and practical resources that implementation teams may find helpful.

INTENDED AUDIENCE

The MFL Resource Package is targeted at individuals or organizations involved in the establishment of an MFL, whether they are involved in planning or implementation stages. The audience may include ministry officials, implementing partners, program managers or donors interested in understanding the process and requirements for establishing a fully functional MFL that is complete, updated and able to integrate with other information systems.

HOW TO USE THE MFL RESOURCE PACKAGE

The MFL Resource Package consists of a series of 10 modules that each address a specific facet of MFL implementation. The modules can be used together or individually, depending on the specific needs of the country and where they are on the development spectrum in achieving a fully functional MFL. Depending on the phase of MFL development a country is in, particular modules (or sections of modules) may be more relevant than others.

The first page of each module includes a summary of the module contents, key audiences for the module, and actions that should be completed before you implement the activities set forth in the module. The modules included in the resource package are:

1. Introduction to the MFL
2. MFL Assessment
3. Key Considerations for the MFL
4. MFL Governance
5. MFL Data Content
6. Geocoding the MFL
7. Establishing an MFL Dataset
8. Establishing a Facility Registry Service
9. Maintaining the MFL
10. Sharing the MFL

The development of an MFL is not necessarily a linear process. Various elements may be developed simultaneously and decisions may need to be revisited as things develop in a given area. We have made an effort to cross reference sections of different modules that are relevant to particular stages of development.

Additional resources are linked or included in the document. The resources were developed by a range of partners who have kindly accepted to share them to aid others through MFL implementation.

MFL RESOURCE PACKAGE DEVELOPMENT PROCESS

The MFL Resource Package was developed with extensive input from a team of persons who have been involved in various capacities in the development or management of MFLs in different countries. The content builds off of previous MFL guidance developed by the World Health Organization, MEASURE Evaluation and Open HIE. This MFL Resource Package seeks to expand and update the guidance and make it accessible to a wide audience. Development of this Resource Package included a literature review, a series of in-depth interviews with key informants, a three-day meeting attended by various experts in this area to discuss in detail the content and structure of the guidance document, and a thorough review process. The content reflects the experiences of government officials involved in the establishment and daily management of MFLs, and implementing partners who have supported various MFL strengthening activities including harmonizing facility lists, conducting data quality audits, geocoding lists, and creating facility registry services to render the MFL interoperable. A full list of contributors is found in the Acknowledgements section.

ACKNOWLEDGEMENTS

The MFL Resource Package was developed with extensive input from a team of persons who have been involved in various capacities in the development or management of MFLs in different countries. The content builds off of previous MFL guidance developed by the World Health Organization, MEASURE Evaluation and Open HIE. This MFL Resource Package seeks to expand and update the guidance and make it accessible to a wide audience. Development of this Resource Package included a literature review, a series of in-depth interviews with key informants, a three-day meeting attended by various experts in this area to discuss in detail the content and structure of the guidance document, and a thorough review process.

Cristina de la Torre and Clara Burgert from ICF led the development and drafting of this guidance document. Lwendo Moonzwe, and Kirsten Zalisk (from ICF) and Aubrey Casey (formerly from ICF) helped to draft the MFL Resource Package, organize resources, and document discussions during the three-day meeting. Andrew Inglis (formerly from JSI) and Scott Teesdale (from InSTEDD) helped draft sections of the MFL Resource Package.

Lynne Franco led a team at EnCompass to conduct a series of in-depth interviews to inform the content of the Resource Package, and subsequently helped facilitate the three-day meeting to review the guidance proposed for the MFL Resource Package.

The following tables list persons who contributed to the MFL Resource Package by attending a three-day meeting, participating in in-depth interviews, contributing resources, reviewing drafts or providing information for the case studies.

Table 1: Persons who participated in the three-day meeting to review the content and structure of the Resource Package.

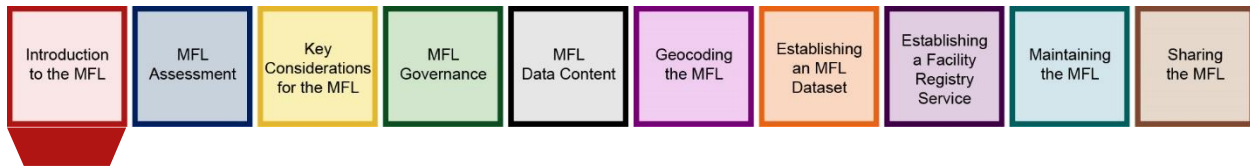
Meeting Participants	Affiliation
Tariq Azim	MEASURE Evaluation/JSI
Noah Bartlett	USAID, Bureau for Global Health
Clara Burgert	The DHS Program/ICF
Aubrey Casey	The DHS Program/ICF
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Meeting Participants	Affiliation
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Carl Leitner	iHRIS/Capacity Plus/IntraHealth
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Scott Teesdale	Open HIE/InSTEDD
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Sam Wambugu	MEASURE Evaluation/ICF
Kirsten Zalisk	The DHS Program/ICF

Table 2: Persons who contributed through interviews or review of the MFL Resource Package Modules.

Name	Affiliation at time of participation
Ian Wanyeki	Health Policy Project/Futures Group
Elaine Baker	Health Policy Project/Futures Group
Bernard Mitto	Health Policy Project/Futures Group
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Robert Colombo	WHO
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Jason Knueppel	BAO Systems
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Alyson Rose-Wood	Office of Global Affairs/HHS
Dykki Settle	iHRIS/IntraHealth
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Ashely Sheffel	Consultant/WHO
Brian Taliesin	Digital Health Solutions/PATH
Ola Titlestad	DHIS2/University of Oslo

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INTRODUCTION TO THE MFL

This module describes what a Master Facility List (MFL) is and why it is important to have one. It defines basic terms, and describes the various pieces that need to be in place to have a functional MFL.

Key audiences for this module:

- All interested in establishing or strengthening an MFL

Note: words in **bold** are defined in the glossary.

Figure 1: Introduction to the MFL—Module Outline

(Press Control and click on any of the boxes to be taken directly to that section)

1 What do We Mean by “Master Facility List”?	4 Elements of a Functional MFL
2 Value of an MFL	5 MFL Development Spectrum
3 Characteristics of a Functional MFL	6 Using the Resource Package

1. WHAT DO WE MEAN BY “MASTER FACILITY LIST”?

A **Master Facility List (MFL)**, sometimes called a **Health Facility Registry**, is a complete listing of the health facilities in a particular country. It includes the data needed to identify each facility such as facility name, **unique facility identifier**, location, and contact information, as well as administrative data to help categorize facilities, such as facility type, ownership and operational status. The MFL may also include information about the service capacity of the facility, for example, type of services offered and number of beds. The MFL is an authoritative list that is *validated, continuously updated, and accessible*. It is the primary source from which other facility lists are drawn. Ideally, the MFL is stored in a **facility registry service**, or software program, that makes the list accessible to stakeholders such as ministries, donors or implementing organizations that need information about facilities.

2. VALUE OF AN MFL

Many stakeholders and information systems require a comprehensive list of health facilities. Facility lists are used for health management information systems (HMIS), disease surveillance and supply chain management. They are also needed by insurance companies, by donors planning coverage for interventions, and by researchers assessing health system performance. Often, these stakeholders create and maintain their own lists of health facilities because an MFL does not exist or is not easily accessible.

Having a single, authoritative and comprehensive MFL has many advantages.

1. An MFL creates efficiencies.

- An MFL allows resources to be spent on maintaining and updating a single list rather than duplicative efforts by various stakeholders to maintain separate lists.
- Pooling or concentrating resources on a single list, and having a dedicated team to maintain an MFL can lead to better quality facility data (i.e. data that are updated and validated more frequently).

2. An MFL is essential for the exchange of information across different data systems.

- The MFL, when widely used, ensures that all departments, ministries, and stakeholders have comparable facility data and use the same unique identifiers for facilities. These unique identifiers allow different sources of information about facilities to link their data.
- The MFL is the backbone for interoperability of various data systems. When the MFL exists in a software program that allows for the exchange of information with other systems, its value and potential uses are greatly augmented. Linking data from human resources, HMIS and supply chain, for example, allows decision-makers to get a comprehensive vision of the operations at each facility. Similarly, an MFL can help unify multiple parallel disease-specific reporting systems, into a comprehensive HMIS.

3. An MFL facilitates planning and management.

- An MFL that contains geocoded data on the health facilities in a country facilitates the planning, management, and targeting of services, through mapping and visualization of the distribution of health services and resources.
- The MFL provides the means of knowing what health services are available, whether they are distributed equitably, and where new health facilities are needed.
- In emergency situations involving natural disasters or disease outbreaks, an MFL helps responders know where health facilities are located and what services are available.
- An MFL serves as a comprehensive sampling frame for researchers.

4. The MFL can support case management of patients.

- For countries using electronic medical records, the MFL helps design systems that track clients across various health facilities where they receive services.
- An MFL that contains information about services can help providers identify the most appropriate health facilities for referring clients.

- If accessible to the general public, the MFL allows potential clients to identify where to seek the services they need.

3. CHARACTERISTICS OF A FUNCTIONAL MFL

For an MFL to be functional and helpful to users, it must meet the following criteria:

- The MFL is comprehensive, including all health facilities in the country.¹
- The MFL has an established **minimum data content** that includes unique identifiers for each facility.²
- The MFL data are current and have been verified within the past two years.
- The MFL is updated regularly and the updating process is supported by an established set of standard operating procedures.³
- The MFL is visible and accessible to key stakeholders and data consumers (i.e. users of MFL data).
- The MFL is housed in a **facility registry service** that facilitates sharing, **interoperability**, and communication with other systems.⁴
- The MFL is accompanied by good governance structure that provides oversight and management of the MFL.⁵
- The MFL meets the needs of data consumers.
- Data consumers have confidence in the MFL data and are assured that the data are valid and complete.
- Harmonization and synching of the MFL occurs only in one direction—from the MFL to other lists.

4. ELEMENTS OF A FUNCTIONAL MFL

For an MFL to be functional, consideration must be given to three key elements: (1) the facility data, (2) the facility registry service that houses the data, and (3) the governance structure associated with the MFL. All three are equally important and only when they are well established will the MFL be able to serve its intended purpose and meet the needs of **data consumers**.

¹ The *Key Considerations Module* discusses how health facilities are defined and which types of health delivery points can be included in the MFL.

² See *MFL Data Content Module*.

³ See the *Maintaining the MFL Module*.

⁴ See the *Establishing a Facility Registry Service* and *MFL Sharing* modules

⁵ See the *MFL Governance Module*.

Facility data: The MFL is essentially a dataset that lists and describes all the health facilities in a country. The dataset contains the list of health facilities and information covering pre-determined facility attributes, which can include: location, ownership, facility type, and services provided. As noted earlier, for the MFL to be useful, it is critically important that the data are both accurate and current.

Facility registry service: The **facility registry service** is a platform for storing, managing, and sharing the MFL data. It allows the data to be visible and accessible to data consumers, and enables them to search, sort, and download the MFL data. Ideally, the facility registry service should facilitate interoperability with other data systems so that MFL data can be more easily shared and used.

Governance structure: The MFL requires a supportive policy environment, leadership to oversee the establishment and long-term management of the MFL, standard operating procedures for the maintenance of the MFL, and measures for resource allocation to support the MFL.

5. MFL DEVELOPMENT SPECTRUM

Countries are at different stages in the development of an MFL. Some are just beginning the process of establishing a nationwide master list of health facilities, and need to develop all three of the key elements—dataset, facility registry service, and governance structure. Others may have a well maintained dataset but are facing challenges in sharing facility data because the facility registry service is inadequate. Yet others may have an MFL dataset and facility registry service, but lack a sound governance structure to oversee the system long-term. Figure 2 illustrates how the three key elements of the MFL can progress simultaneously or independently to produce an increasingly functional MFL. To achieve a fully functional MFL all three elements, the MFL dataset, the facility registry service, and the governance structure, must be well developed. Additional information on improving each element is available in the modules of this resource package.

It is important to assess the situation of your MFL and understand which elements need strengthening. The *MFL Assessment Module* provides information on how to assess the status of an MFL, and what things to look for.

Figure 2: Progression toward a fully functional MFL

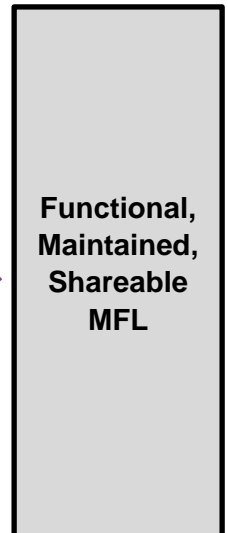
Facility Data



Facility Registry Service



Governance Structure



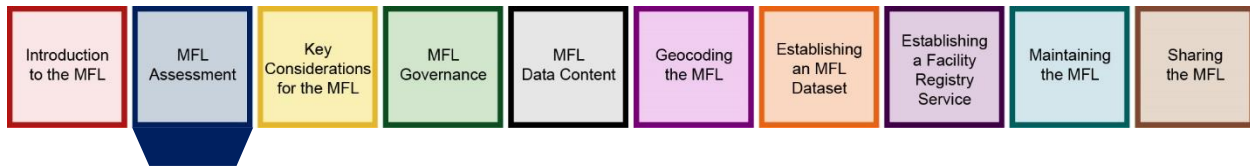
6. USING THE RESOURCE PACKAGE

This resource package contains several modules that can be used together or individually, depending on the specific needs of the country and where they are on the development spectrum in achieving a fully functional MFL. Depending on the phase of MFL development your country is in, particular modules (or sections of modules) may be more relevant than others.

The first page of each module includes a summary of the module contents, key audiences for the module, and actions that should be completed before you implement the activities set forth in the module.

The modules included in the resource package are:

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MFL ASSESSMENT

This module describes what an MFL assessment is and why conducting an assessment is important. The module focuses on assessment of seven key areas that inform recommendations and next steps in establishing or strengthening an MFL. The module also outlines potential challenges and implementation considerations that can arise when conducting an assessment of an MFL.

Checklist of things to do before using this module	Module where information is located
<input type="checkbox"/> Confirm demand for better facility data among known stakeholders	Governance Module
<input type="checkbox"/> Familiarize yourself with the different elements of an MFL	Introduction to the MFL Module
<input type="checkbox"/> Familiarize yourself with key terminology in the glossary	Glossary

Key audiences for this module:
<ul style="list-style-type: none"> • MFL key stakeholders • MFL Steering Committee (if one exists) • Persons designing the assessment • Assessment team leader

Note: words in **bold** are defined in the glossary.

Figure 1: MFL Assessment—Module Outline

(Press Control and click on any of the boxes to be taken directly to that section)



1. WHAT DO WE MEAN BY “MFL ASSESSMENT”?

An MFL assessment can be:

- An evaluation of an existing Master Facility List (MFL) and its supporting environment (for example, policies, procedures, leadership, technology, infrastructure, and workforce) to determine if it is meeting users’ needs and how it can be improved, or
- In the absence of an existing MFL, an appraisal of existing health facility lists and the policy, institutional, and technological environment, to determine the best approach to establishing and maintaining an MFL.

An MFL assessment consists of:

- **Interviews:** Assessors interview a variety of stakeholders, including national-level officials, information technologists (e.g., HMIS officers, developers, persons involved in health information exchange), **data consumers** (e.g., HMIS managers, supply chain managers, donors, NGO staff, development partners, and anyone else who uses or could use the MFL), and **data curators** (i.e., those who maintain the data in existing facility lists, including the MFL, if one exists).

- Review of documents: Assessors review available documents relevant to the establishment or improvement of an MFL. These documents may include, national policy and strategy documents, health facility regulation guidelines, standard operating procedures related to facility lists, facility mapping information, and data specification documents.
- Review of data: Assessors examine the data included in the MFL and other facility lists (1) to identify the data elements in the lists, (2) to get a sense of the completeness and quality of the data, and (3) to identify gaps or discrepancies across lists.

2. WHY UNDERTAKE AN MFL ASSESSMENT?

The purpose of an MFL assessment is to collect information that can inform recommendations and facilitate development of an action plan to establish or strengthen an MFL. The specific objectives vary depending on whether you already have an MFL or are looking to establish one.

If no MFL exists: An MFL assessment should be undertaken early in the MFL planning stage to determine how best to create an MFL in that country, and to inform the decisions involved in establishing an MFL.

When no MFL exists, specific objectives of the MFL assessment include:

- Develop an understanding of the policy, institutional, and technological environment in which the MFL will be established, that will shape its design
- Identify the stakeholders who should be involved or consulted in establishing an MFL
- Develop an understanding of the purpose an MFL will serve in that country (how the data will be used and by whom)
- Identify data sources for building the MFL dataset
- Determine what resources are available or will be made available for establishing the MFL

If an MFL exists: An MFL assessment can be undertaken to determine how well it is functioning.

If an MFL already exists, specific objectives of an MFL assessment include the following:

- Determine whether the MFL meets the needs of data consumers (are the data suitable, accessible, and easy to use)
- Determine if the policies and procedures associated with the MFL are adequate or need to be revised
- Assess whether the human and financial resources set aside for the MFL are sufficient

The *Key Considerations Module* describes several key aspects of an MFL that need to be decided early in the process. Anyone conducting an assessment should become familiar with these issues to be sure they are collecting the information needed to make decisions.

3. AREAS OF FOCUS FOR AN ASSESSMENT

The MFL assessment should cover the seven key areas described below. The methods and focus areas for the assessment will be the same regardless of whether an MFL already exists.

1. Stakeholders
2. Existing facility lists (including the MFL if one exists)
3. MFL software and supporting infrastructure
4. Policy environment
5. Governance
6. Human resources
7. Financial resources

Each of the seven focus areas is described in detail below.

3.1. Stakeholders

The first objective of the assessment is to identify stakeholders who can provide information relevant to the six other focus areas of the MFL assessment. Table 1 outlines the types of stakeholders who can provide the needed information. More details on the types of information to be obtained are included in the following sections of this module. It is important to note that individual stakeholders can have more than one role; for example, a specific national-level health official may also be a list manager, **data consumer**, and **data curator**.

Table 1: Stakeholders who can contribute information to various focus areas

Focus area	Types of stakeholders who can provide needed information
Existing facility lists	<ul style="list-style-type: none"> • Managers of existing facility lists • Data curators • Data consumers
MFL software and supporting infrastructure	<ul style="list-style-type: none"> • Managers of the MFL and other existing facility lists • Local information technology companies • National-level HMIS staff • Persons involved in national eHealth activities • Data consumers who have used the existing software
Policy environment	<ul style="list-style-type: none"> • Persons with oversight of national eHealth efforts • HMIS managers • MOH officials • Persons involved with facility licensing and regulation
Governance	<ul style="list-style-type: none"> • Policy-makers • National-level health officials with authority to make decisions about the MFL • Sub-national level health officials
Human resources	<ul style="list-style-type: none"> • Managers of existing facility lists • Local information technology companies • Implementing partners
Financial resources	<ul style="list-style-type: none"> • National-level health officials • Donors and potential funders • Managers of existing lists • Developers

It is important to talk to people who use, or potentially may use, facility list data (i.e., data consumers). From data consumers, you want to gather information about their data needs, such as how they need to access the data.

Questions to ask data consumers if an MFL exists:

- Does the stakeholder use the MFL? Why or why not?
- What is the MFL used for?
- Does the stakeholder use another facility list in addition to or instead of the MFL? Why or why not?
- How could the MFL be more useful?
- What are the stakeholder's data needs?
- Does the MFL meet the users' needs

Figure 2: Potential data consumers

- National and district-level HMIS staff
- NGO and implementing partners
- Donors
- Consultants who work with the government
- Researchers
- Supply chain managers
- Health financing officials

Questions to ask data consumers if an MFL does not exist:

- What facility list is the stakeholder currently using and why?
- How could the list be more useful?
- Does the stakeholder need or want an MFL? Why or why not?
- What are the stakeholder's data needs?
- What difficulties are users having with the list?

This information can be used to determine the purpose, content, and functionality of an MFL, or it can be used to determine how an existing MFL can be improved. For more about stakeholders, see the *MFL Governance Module*, Section 2: Stakeholder Engagement.

3.2. Existing Facility Lists

The MFL assessment must determine the existence, content, and quality of facility lists being used in the country. If an MFL already exists, it will be the primary focus of the assessment. However, you will also want to review other facility lists being used in the country because they can help in understanding: (1) why the MFL is not used by the stakeholders, (2) the level of duplication and discrepancies between the lists, and (3) what additional data are being collected that could be included in the MFL.

Identify Existing Facility Lists and Data

Usually, a country will have several facility lists. The following are typical sources of facility lists:

- *The MOH* usually maintains information on health facilities in a county.
- *Health Management Information Systems (HMIS)* will have a facility list; however, these lists may not include private facilities.
- *Other government agencies* such as business registration offices, health worker registries, the central statistics office, disease-specific health divisions, and any regulatory body that is responsible for issuing licenses to health facilities will likely have lists of health facilities. Regional or state government offices may also maintain their own facility lists.
- *Non-government entities* that may keep lists include implementing partners, professional medical associations, and organizations involved in the distribution of medical commodities. These sources are often useful for identifying information on private, faith-based organizations (FBO), and NGO facilities.
- *Health facility assessment surveys* conducted in a country may have collected relevant facility information.

Assess the MFL and Other Facility Lists

Table 2 describes key criteria for assessing the facility lists. When no MFL exists, it is important to examine the data contained in the available facility lists in detail. This will help determine if any of the existing facility lists can be used as the foundation for the MFL.

Table 2: Criteria for assessing the facility lists

Criteria for assessing facility lists	Factors to consider
How is the list used and shared?	<ul style="list-style-type: none"> • Who owns the list? • Who uses the list? • What is the list used for? • Is the list shareable and accessible? • What are the challenges associated with using and maintaining the list? • Does the list pull data from the MFL? If yes, what data?
What data about facilities are included?	<ul style="list-style-type: none"> • Does the list contain all the data elements needed for the MFL?¹ • If not, what data are missing? • Does the list include unique identifiers, and are these consistent across lists? • Are the data elements defined according to data specifications for the MFL?²
Is the list comprehensive?	<ul style="list-style-type: none"> • What types of facilities are included in the list? • What definition of a “health facility” is used for the list? • What is the geographic coverage of the list?
Are the data up-to-date?	<ul style="list-style-type: none"> • When was the list updated last? • Was it updated in its entirety (for all facilities and all data elements)? • What data sources were used to update the list? • What methods were used for updating the list? • Were the data validated following the update? • How were they validated and by whom?
Do the data appear to be of good quality?	<ul style="list-style-type: none"> • Do the list managers and users trust the data? • How many facilities have missing data? • Are there obvious errors in the data?

¹ See MFL Data Content Module

² Data specifications should be pre-defined, prior to establishing the MFL. See the MFL Data Content Module for more information.

Criteria for assessing facility lists	Factors to consider
	<ul style="list-style-type: none"> • Using a basic online map, do the locations appear correct? • If resources are available, you may do some data quality checks by selecting a few facilities and verifying directly with them that the data in the list are accurate.

It is likely that you can obtain most of the criteria for assessing the facility lists from the persons charged with managing the lists, but data consumers will also provide valuable information about accessibility and data quality. Additionally, review any available list-specific documentation on content, governance, maintenance, and use of the facility list.

3.3. Facility Registry Service: Software and Supporting Infrastructure

The assessment determines how data for the MFL are stored and shared, and what software and supporting infrastructure are needed for the MFL.³

If an MFL exists, determine what type of software or **facility registry service** is used to house the MFL, what it does, and whether it meets the needs of data consumers.

- What software or facility registry service is used to store the MFL?
- Where is the MFL being hosted (i.e., cloud-based or local)?
- Who developed the facility registry service?
- Who can use the facility registry service, and for what purposes?
- Does the facility registry service allow for:
 - MFL data to be shared (downloaded, exported)?
 - Data consumers to search and sort the data?
 - Persons to suggest changes to the data?
 - Interoperability with other information systems?
- What workflows exist to use and update the facility registry service?
- What challenges have users (**data curators** or **data consumers**) encountered when using the service?

If an MFL or facility registry service does not exist, gather information to understand which software and supporting infrastructure can be used to house, support, and share the MFL once

³ See the Establishing a Facility Registry Service Module

established. You will want to ask what software is used for existing facility lists and how well it works.

In addition, you will want to gather information about the technological infrastructure to determine:

- Whether barriers to technology exist (i.e., electricity, servers, band width, and computers) at different levels of the system, and the implications for the facility registry service
- Whether other information systems need to interact with the facility registry service
- What data standards are being used by these systems
- Whether any infrastructure updates are planned

Review any available data specifications and e-Health strategy documents (see Policy section below).

This information can be obtained from national officials or HMIS staff and local information technology firms or consultants. It can be used to inform how the facility registry service is developed or improved to meet the needs of data consumers, given any infrastructure constraints.⁴

3.4. Policy Environment

Another goal of the assessment is to understand the policy environment and regulatory framework surrounding the MFL. Policy generally sets the parameters for how facility data are collected and shared or disseminated. It is important to identify any policy gaps that need to be addressed. The following are questions to be considered:

- Is there a mandate for MFL implementation?
- Is the MFL part of the country's broader health information system strategic plan?
- What existing policies are applicable to the establishment and maintenance of an MFL?
Examples of such policies include the following:
 - Policies on the regulation and accreditation of health facilities
 - Policies about data sharing and where data need to be hosted
 - eHealth policies
 - Policies about data use
 - National open data policy

⁴ See the Establishing a Facility Registry Service Module for more information.

It is likely that you can obtain this policy information from the MFL **steering committee**, if one exists. If not, the information can be obtained from various government officials. Review any documents available on classification and regulation of health facilities, e-Health or m-Health strategies, and MOH strategies and policies. This information can be used to determine if additional policies need to be developed, if stakeholders need to advocate for policy changes, or how an MFL strategy and implementation plan can be aligned with existing policies.⁵

3.5. Governance

The assessment also aims to understand how the MFL is governed, if an MFL already exists, or to obtain input to set up a governance structure, if there is no MFL. An assessment can help inform the following questions:

- Is there a national authority responsible for the MFL?
- Is there an institutional home for the MFL?
- Who makes decisions regarding content and implementation for the MFL?
- What stakeholders are consulted about these decisions?
- Is there a technical working group that meets regularly to discuss how the MFL is functioning and what improvements are needed?
- Does the governing body regularly consider how the MFL fits in with other health information systems in the country?
- Is there a costed strategic plan for the MFL?
- Do data consumers feel they have a voice in shaping how the MFL is implemented?
- What challenges exist, or do respondents foresee, related to governance of the MFL?
- Are there terms of references or standard operating procedures to describe the processes to be followed in establishing and maintaining the MFL?

This information, typically gathered from the MFL manager or steering committee, other list managers, or national-level officials, can be used to improve or develop a governance structure for the MFL.⁶

⁵ See the MFL Governance Module, Section 3: Policies, for more information on policies relevant to the MFL.

⁶ See the MFL Governance Module for more information on establishing a governance structure for the MFL.

3.6. Human Resources

Another goal of the assessment is to understand human resource needs for establishing and maintaining an MFL.

If an MFL exists, you want to gather information about the number of staff involved in MFL support by level, responsibilities, level of effort, organization, and phase (that is, establishment and maintenance). Additionally:

- Is there staff dedicated solely to the MFL?
- Are staffing levels sufficient to support the MFL?
- What additional support or training do staff need?
- Have roles and responsibilities been clearly defined?
- Are any positions unfilled? If so, why?
- Does the MFL primarily rely on local staff or on international consultants?
- Is staff turnover high?

If an MFL does not exist, you want to gather information to inform how human resources could be organized based on existing structures and capacity.

- Who will provide staff to manage the establishment and maintenance of the MFL?
- Is there capacity within the MOH or with other local partners to fill the necessary positions?
- What types of training will be required?

You will also want to gather information about human resources associated with establishing and maintaining any facility lists that are in use, other than the MFL, to determine the level of duplication of effort. This information can be collected from MFL managers, national officials, and managers of other facility lists. Review any existing job descriptions, standard operating procedures, and job aids available.

Figure 3: Human Resources Needs

- Data curators to maintain, update and validate the MFL regularly or continuously
- Data collectors to gather new data for the MFL
- Data sources to provide updates, when facility data changes
- MFL manager(s) to oversee the implementation of the MFL
- Software developers to create and maintain the facility registry service and to adjust it to meet evolving data consumer needs
- Steering Committee to facilitate high level oversight and funding
- Trainers and supervisors

This information can be used to determine if human resources are adequate for MFL establishment and maintenance, and if not, to develop plans to ensure that human resources needs are met.⁷

3.7. Financial Resources

The final goal of the assessment is to understand both the financial resources that are needed and those that are available to establish and maintain an MFL.

- Who is funding the establishment of the MFL?
- Has a costed action plan been developed?
- Is there a budget line in the national budget for MFL maintenance, including the support of any information technology components?
- What are other potential funding sources?
- What are the costs of maintaining other facility lists, and how are these currently covered?
- Are there opportunities for cost sharing with other initiatives that use the MFL?
- Do the stakeholders understand what establishing and maintaining an MFL costs?

This information, typically obtained from facility list owners, HMIS staff members, MOH budget planners, and donors, can be used to advocate for adequate funding from the government, to target potential funders, and to better understand the level of project activity that is possible—taking into consideration funding constraints—versus what is desired if funding were limitless.⁸

Figure 4: Common Tasks that Require Financial Commitments

- Data collection to fill gaps in MFL
- Staffing to oversee processes to establish the MFL
- Harmonize and clean data from facility lists
- Develop a facility registry service
- On-going technical support for the facility registry service
- Staff to manage, and curate the MFL over the long-term
- Training sub-national staff to collect data, validate MFL data, and use the facility registry service
- Develop SOP, policies and job aids in support of MFL
- Meetings of MFL Steering Committee or technical working groups
- Communication

⁷ See the Maintaining the MFL Module, Section 3.1.3: Maintenance Workforce, for more information on human resources needed during the maintenance phase of the MFL.

⁸ See the Maintaining the MFL Module, Section 3.1.4: Funding for ongoing maintenance, for more information on funding needed during the maintenance phase of the MFL.

4. IMPLEMENTING THE ASSESSMENT

4.1. Who Should be Involved

An MFL assessment can be implemented by any organization; it does not need to be implemented by the MFL managers or **steering committee**. However, the steering committee (if it exists) and other key stakeholders (e.g., health facility list owners) should be involved in the assessment design. They are the primary audience for the assessment findings, and recommendations and next steps require consensus from this audience. It is important to include someone who understands information technology so they can assess issues related to the facility registry service.

4.2. Resources and Timelines

The assessment fieldwork, including interviews and document and data review, can be implemented by a small team of two or three people over a two week period. Additional time will be needed for design and analysis. During the assessment design phase, it is advisable to hold one or more meetings with key stakeholders to determine the purpose and scope of the assessment and to begin identifying persons who need to be interviewed. After the fieldwork is conducted, it may take another week or two to analyze the results, write a report, and disseminate the results to key stakeholders.

Ultimately, the scope of the assessment will depend on the funding available to carry it out. It is important to keep this constraint in mind as you plan for and design the assessment. Below is a timeline and checklist to guide assessment preparation, fieldwork, analysis, and dissemination of results; it can be adapted to fit your needs.

- Assessment preparation (1 week)
 - Convene a stakeholders' meeting to determine if an assessment is needed, and if so, to identify: 1) the purpose of the assessment, 2) the potential implementers, and 3) the financial resources needed and available.
 - Determine who will implement the assessment and what training they may require to do the fieldwork.
 - Define the purpose, scope, and timeline of the assessment.
 - Identify respondents and existing facility lists. Decide which lists to include in the assessment.
 - Develop the tool that will be used to guide the assessment.

- Train the persons who will be carrying out the fieldwork. It is important for the fieldwork team to have a thorough understanding of the MFL. The interviewers will need to have read all the modules in the Resource Package and be familiar with the data collection tools that have been prepared.
- Reconvene stakeholders to review the assessment tool, finalize logistics, and ensure buy-in.
- Assessment fieldwork (1–2 weeks)
 - Interview key stakeholders and informants for the seven focus areas described above
 - Review key documents (e.g., policies, standard operating procedures)
 - Review facility lists as described in Section 3.2 above.
- Assessment analysis and dissemination (2 weeks)
 - Review information collected during the fieldwork.
 - Present preliminary findings to key stakeholders and solicit feedback from them.
 - Draft an assessment report that includes findings and recommendations.
 - Disseminate the findings and recommendations via a stakeholder meeting.

When the findings are available, stakeholders—particularly those leading the establishment or strengthening of the MFL—must determine how best to use the findings. The results can serve as a roadmap for addressing gaps that exist between the data that are available and the data that are needed. A detailed action plan should be developed, prioritized, and costed. In some cases, discussing the assessment results with people external to the project, who are experienced in establishing and strengthening an MFL, can provide guidance in moving the MFL forward.

4.3. Data Collection Tool

To standardize data collection across various types of respondents and to ensure that the interviewers collect all the information needed to inform recommendations and next steps, a tool should be used to implement the assessment. Ideally, the assessment will cover all seven focus areas described in this module, but the content of the final adapted tool will depend on the purpose of the assessment and the types of information key stakeholders need to inform next steps.

5. CHALLENGES

MFL Assessment Challenges	
Challenge	Potential solution
Too many facility lists	<ul style="list-style-type: none">• Gather information about the purpose of the lists from the list managers and users.• Narrow the number of facility lists to those you want to examine in greater detail regarding content and data quality.
Insufficient funds	<ul style="list-style-type: none">• The assessment is a critical step and an effort should be made to cover all focus areas to get a complete picture of the MFL situation. However, when this is not possible, prioritize questions that need to be answered and select the most relevant focus areas.



KEY CONSIDERATIONS FOR THE MFL

This module discusses critical issues and decisions regarding the MFL that need to be resolved early in the planning process. They include decisions on leadership of the MFL, purpose of the MFL, institutional home for the MFL, types of facilities to include in the MFL, type of software used to store and share MFL information, and overall workflows of the MFL. The module provides guidance on key factors to consider when making these decisions.

Checklist of things to do before using this module	Module where information is located
<input type="checkbox"/> Establish a steering committee	MFL Governance Module
<input type="checkbox"/> Engage stakeholders to participate in the decision-making process	MFL Governance Module
<input type="checkbox"/> Completed an assessment of the MFL status (if possible)	MFL Assessment Module

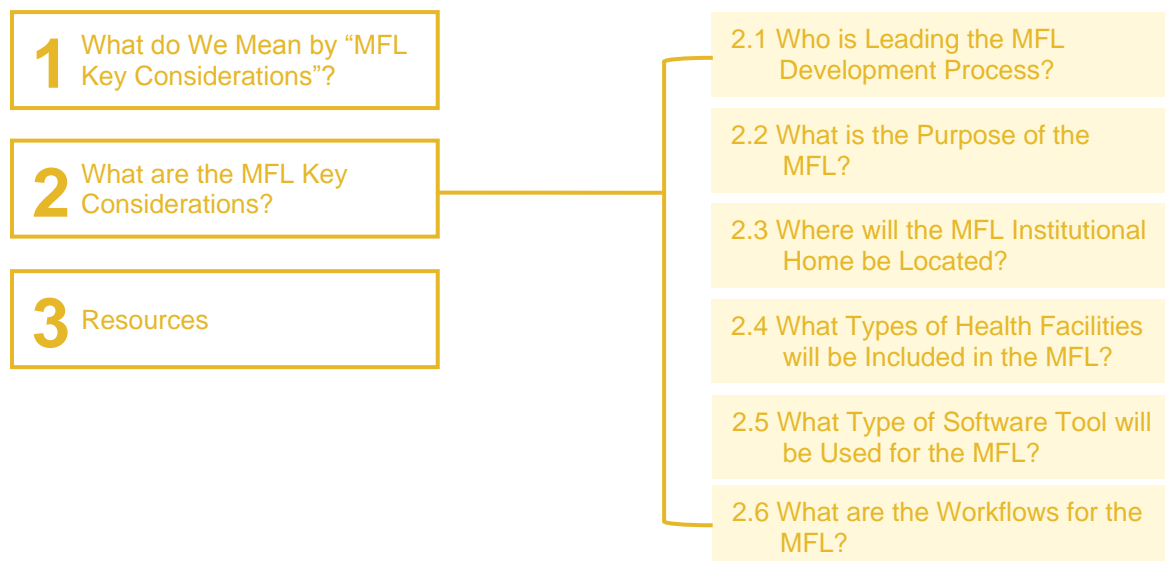
Key audiences for this module:

- MFL steering committee
- Managers who will directly oversee the MFL development process
- Implementers who will assist in establishing the MFL

Note: words in **bold** are defined in the glossary.

Figure 1: MFL Key Considerations—Module Outline

(Press Control and click on any of the boxes to be taken directly to that section)



1. WHAT DO WE MEAN BY “MFL KEY CONSIDERATIONS?”

Key considerations regarding an MFL are the critical issues and decisions that need to be resolved early in the development process. They include decisions about who will lead the MFL development process; what is the purpose of the MFL; where will the MFL institutional home be located; what types of facilities will be included in the MFL; what type of software solution will be used to house and share the MFL; and what are the general workflows associated with data management? All these decisions are important because they directly influence the development process. Without resolving these key considerations up front, successful implementation of the MFL will be challenging.

2. WHAT ARE THE MFL KEY CONSIDERATIONS?

2.1 Who is Leading the MFL Development Process?

The first key decision to be made is who will be leading the process of establishing and strengthening the MFL. It is recommended that a **steering committee** be formed to oversee the planning and implementation of the MFL. Careful consideration should be given to the selection of persons who will make up the committee. Ideally, the steering committee will include:

- Ministry officers who have the authority or connections needed to push the MFL agenda forward, make important decisions, secure funding and delegate tasks;

- Individuals who can advise on data requirements, data sources, and mechanisms for data collection;
- Individuals who can advise on the technological solutions for the **facility registry service** that will store and share the MFL data;
- At least one representative from the technical working groups (TWG) set up to implement key MFL activities.¹

The steering committee can be an existing body tasked with new responsibility for the MFL or a newly formed committee.

The steering committee will be responsible for bringing together key stakeholders and getting consensus on the other key decisions outlined in this module. The primary responsibilities of the steering committee in the early stages of establishing the MFL include:

- Promoting the wider engagement of stakeholders
- Fostering decision-making through consultation and consensus
- Ensuring commitment and buy-in for the MFL
- Planning for establishment of the MFL including securing resources and setting up technical working groups to carry out specific activities in support of the MFL

The *MFL Governance Module* provides more details about the steering committee including specific roles and responsibilities regarding the MFL development process.

2.2 What is the Purpose of the MFL?

Prior to establishing the MFL, it is important to clarify what role the MFL will play in the overall health system, whether it will be part of a broader eHealth strategy, and how it is expected to contribute to the generation of strategic information.

It is also important to understand how stakeholders will want to use the MFL and what they hope the MFL can do for them. Defining **requirements** (and expectations) for the MFL is an important first step because it establishes the foundation for subsequent decisions regarding the MFL. The process helps determine the specific data the MFL will contain and what functionalities the **facility registry service** (the software platform that stores and shares the

¹ See the *MFL Governance Module* for a description of the TWG. Also refer to the *Establishing the MFL Dataset* and *Establishing the Facility Registry Service* and *Maintaining the MFL* modules for more on what the TWGs will be tasked with.

MFL data) should have. The steering committee will help to define the MFL requirements through consultation with stakeholders and MFL **data consumers**.

Current and potential MFL data consumers should also be asked what they want facility data for and how they need to interact with it.² Gathering this information can be done through collecting “**user stories**” that describe the type of user, what they want, and why they want it.

The needs of potential MFL users vary substantially, as illustrated in the text box to the right. It is useful therefore to list all the requirements presented, and then prioritize them according to those the MFL can accommodate and those beyond the scope of the MFL. For example, it may not be realistic for the MFL to include all community distribution sites. If resources are limited, it is important to determine which requirements can be addressed immediately (e.g., obtaining a full list of public facilities) and which can be addressed at a later date (e.g., adding information about services offered).

Figure 2: Examples of user requirements

- The HMIS needs a list of all public facilities with unique IDs so that it can pull data from different health programs (e.g., malaria or HIV/AIDS) to get a full picture of service provision at the facility level.
- A donor needs the MFL to include service data so it can know which facilities in specific districts offer HIV/AIDS services.
- Disaster response teams need to know the exact location and number of beds in tertiary care hospitals to refer patients in an emergency.
- Supply chain managers need a list of all sites (including pharmacies and community distribution points) that dispense drugs.
- A researcher needs to sort facilities by type and location, and then download the list to a spreadsheet.

While it is important to understand the full range of user requirements, it is also important that the expectations for the MFL (what it can and cannot do) should be set early in the process, and that these expectations be realistic and attainable. It is likely that the MFL will not be able to meet all data consumer needs, so transparency in the decision-making process is important.

2.3. Where Will the MFL Institutional Home be Located?

The institutional home is where the MFL is established and maintained. The institutional home typically provides the following: oversight and management of the MFL, coordination and leadership, and dedicated staff support for the MFL. An institutional home should be accountable, transparent, and have the capacity needed to ensure the effective long-term maintenance of the MFL.

When deciding on the institutional home for the MFL, there are several factors to consider:

² See the *MFL Assessment Module* for more information on interviewing stakeholders.

- Who has oversight and authority over health facilities (including private health facilities)?
- Is the institution best suited to manage and maintain the MFL?
- Are the necessary financial and human resources available?
- Does the institution have the ability to mobilize resources to support the MFL?
- Can the institution ensure the independence of the MFL as a standalone list?
- Does the institution have the ability to coordinate across stakeholders?
- What specific office or team within the institution will lead the MFL process?
- Does the team have the necessary skills (including data management, GIS, and information technology) to maintain the MFL?³

The institutional home of an MFL is often a sub-division of the Ministry of Health. Typically, countries have one primary owner or institutional home for the MFL but this is not always the case; in Tanzania, three groups share ownership of the MFL.

It is important to identify any limitations associated with the institutional home and to propose solutions that will mitigate these limitations. It is also important to clearly state the relationship between the institutional home and the steering committee. The *MFL Governance Module* discusses the roles and responsibilities of the institutional home in more detail.

CASE STUDIES: INSTITUTIONAL HOMES

Haiti: In Haiti, the unit of Planning and Evaluation was a natural fit to house the MFL and it is now central to the MFL governance process in the country. Establishing the MFL within this unit has proven successful because the unit now uses data from the MFL in its routine health information system.

Tanzania: In Tanzania, three groups have ownership of the MFL.

2.4. What Types of Health Facilities Will be Included in the MFL?

An important decision is determining the types of health facilities that will be included in the MFL. Typically, health services are offered through a variety of service delivery points. It is important to give careful consideration to deciding which of these should be included in the

³ See the *Maintaining the MFL Module* for a description of human resources needed.

MFL and to be aware of the implications of adding different types. In deciding which facilities to include you will need to answer the following questions:

What Constitutes a Health Facility?

It is unrealistic to include all the locations where health providers offer services (for example, if they do so out their own home). Therefore, it is recommended to develop minimum standards to define what a health facility is and to determine eligibility for inclusion in the MFL. If national standards exist for licensing health facilities, those can be used. Also, decide whether laboratories or pharmacies are to be considered health facilities for the purposes of the MFL.

What Types of Health Facilities to Include in the MFL?

Once you have defined what a health facility is, you need to decide which types of health facilities to include in the MFL. The box at the right gives examples of different types of health facilities that may exist in a country. The decision regarding which facilities to include in the MFL will depend on:

Figure 3: Types of Health Facilities to Consider

- Laboratories
- Pharmacies
- Community health post
- Mobile clinics
- School clinics
- Jail clinics

- How useful the information about these facilities is to stakeholders
- The feasibility of collecting and validating the data about these facilities on an ongoing basis
- What data sources exist for acquiring information about these facilities
- The additional budget and human resources needed to maintain the list (the greater the number of facilities the greater the resources needed)

Will Both Public and Private Health Facilities Be Included in the MFL?

When making the decision whether to include private facilities along with public facilities in the MFL, it is important to understand the limits of feasibility of identifying all private facilities, and gathering the necessary information from those facilities on an ongoing basis.⁴ The same criteria for deciding what types of facilities to include in the MFL (described above) can be applied here; in addition, there are the following considerations:

- What data sources exist in the country that can be accessed to gather information about private facilities?

⁴ The *MFL Data Content Module* lists the minimum information about each facility that should be included in the MFL.

- Is there high turnover of private facilities or frequent changes in the types of services provide? If so, this will cause challenges for the maintenance of the MFL.

The types of facilities a country decides to include in the MFL vary from country to country. For example, Kenya wanted the MFL to have an inventory of every facility that was available to see patients, whether public or private. The decision-making process varies in other countries, as illustrated in the case studies below from the Philippines and Haiti.

CASE STUDIES: SELECTING THE TYPES OF FACILITIES TO INCLUDE IN THE MFL

Philippines: In the Philippines, the National Health Facility Registry (NHFR) limits the types of health facilities covered to Barangay (village) Health Stations, Rural Health Units, and public and private hospitals. Public and private hospitals are licensed and therefore easily monitored; this is not the case with other types of private health facilities. The vast number of unlicensed private facilities poses a challenge for health facility profiling, validation, and updating. They were therefore purposefully omitted from the original NHFR. Future plans for the NHFR include working to add other licensed private facilities such as infirmaries, medical out-patient clinics, psychiatric care facilities, drug abuse treatment and rehabilitation centers, and birthing homes.

Haiti: The 2010 Haiti earthquake highlighted the need for a comprehensive and accurate list of health facilities in the country and prompted the creation of an MFL. At the time, private health facilities provided 75% of the country's health care services. It was essential therefore to include private facilities if the proposed MFL. The Ministry of Health (MOH) and multinational partners realized there was no system in place to register the private health facilities into the MOH facility registry. Thus, the establishment of the MFL corresponded to the development of an online facility registry service. This online facility registry service included a system that required the private health facilities to register with the Ministry of Health to be able to provide health services in Haiti. This requirement spurred the private health facilities to work with the MFL stakeholders to supply their facility information.

2.5. What Type of Software Tool Will be Used for the MFL?

The MFL needs to be made accessible to stakeholders and **data consumers**. It is therefore important to determine how MFL data will be stored and shared. This requires determining what type of software solution, or **facility registry service**, will be used for this purpose. The simplest solution is to store the MFL information in a spreadsheet that can be emailed or downloaded. However, this greatly limits its functionality and the potential to use the MFL for more complex purposes such as for data exchange or managing change requests.

The *Establishing a Facility Registry Service Module* provides detailed guidance on selecting a software solution for the MFL and the steps needed to set it up. Here we highlight some key aspects to consider early in the MFL development process:

- Understand the ways in which **data consumers** need or want to interact with the MFL data. Collecting **user stories** helps to document the requirements for the facility registry service to ensure that it meets the needs of multiple stakeholders and data consumers.
- Develop a vision of the activities and functions the facility registry service should carry out.
 - What types of data requests need to be accommodated?
 - Is the purpose of the facility registry service simply to share data files? Or, do you want it to act as a **curation tool** for the MFL as well?
 - Does the facility registry service need to integrate with other information systems?
 - Who will have access to the MFL data? Do you need different permission levels?
- Determine what can be achieved both short-term and long-term with available resources. This may affect whether you need to develop a new facility registry service immediately, or you can wait until a later phase of the project.
- Ascertain the infrastructure requirements for your vision of the facility registry service (e.g., internet connectivity, servers, reliable electrical power, etc.) and whether it exists.

2.6. What are the workflows for the MFL?

Another key consideration is determining the overall workflows for the MFL. These workflows relate to data collection, data management, and data sharing processes. These issues are described in greater detail in the *Maintaining the MFL* and *Sharing the MFL* modules. However, because they will affect various subsequent MFL design issues, it is important to get clarity on the following questions:

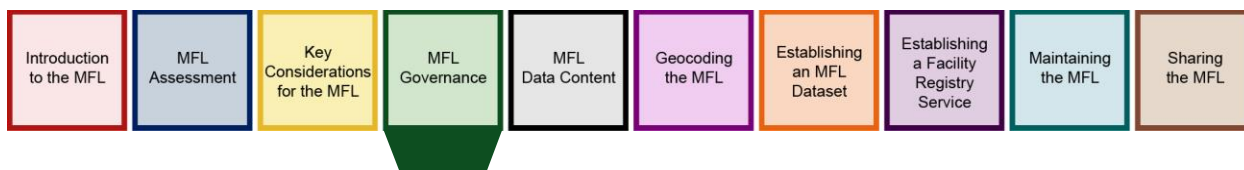
- Is the MFL data management centralized or decentralized?
- How are new data or change requests submitted to the MFL?
- Who can submit data or change requests to the MFL?
- At what stage are the data validated and who is responsible for carrying out this task?
- Will the MFL data approval processes be centralized or decentralized?

- How does the facility registry service interact with and push or pull data to other information systems?
- What is the frequency and timing with which all these activities are carried out?

The processes outlined above depend in large part on the type of facility registry service used for the MFL and the functions it is designed to carry out. Therefore, decisions about the overall workflows need to be made jointly with those regarding the facility registry service.

3. RESOURCES

- [Tanzania Data Management and Maintenance Workflows](#)
- [Examples of user requirements for MFL \(OHIE\)](#)



MFL GOVERNANCE

This module discusses the importance of establishing a governance structure for the Master Facility List (MFL) and describes four key elements of governance that are necessary to successfully establish an MFL. The key elements are leadership, stakeholder engagement, policy environment, and institutionalization and sustainability. The module concludes with a list of common challenges and potential solutions related to MFL governance.

Checklist of things to do before using this module	Module where information is located
<input type="checkbox"/> Become familiar with the existing governance structures and procedures for health systems governance	MFL Assessment Module
<input type="checkbox"/> Prepare a list of potential MFL stakeholders	MFL Assessment Module

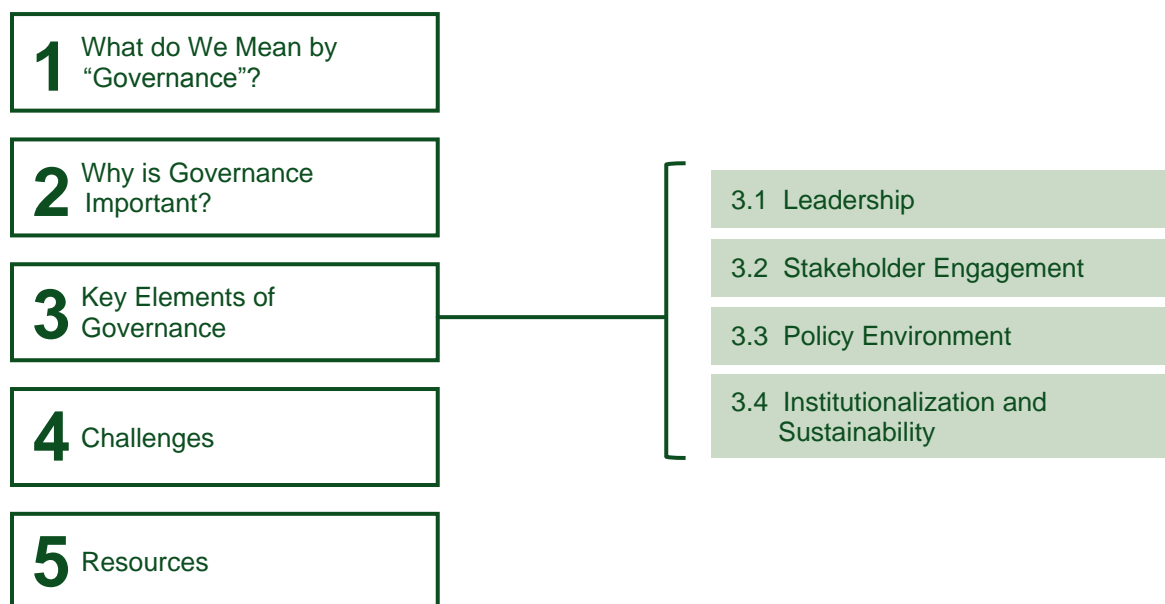
Key audiences for this module:

- Key stakeholders wanting to establish or strengthen an MFL
- Leadership in MOH or other involved ministries
- The MFL Steering Committee (once it is established)

Note: words in **bold** are defined in the glossary.

Figure 1: MFL Governance—Module Outline

(Press Control and click on any of the boxes to be taken directly to that section)



1. WHAT DO WE MEAN BY “GOVERNANCE”?

Governance can be defined as the process through which rules and decisions are made, authority is granted, and institutions and stakeholders are managed. We outline four key elements of governance that are necessary for the success of an MFL: (1) leadership, (2) stakeholder engagement, (3) policy environment, and (4) institutionalization and sustainability. The overall goal of good governance is to generate quality results (i.e., an MFL that meets the needs of **data consumers**), accountability, and sustainability.

2. WHY IS GOVERNANCE IMPORTANT?

Among experts involved in establishing MFLs in various countries, sound governance is cited as the most important factor for MFL success.¹ A strong governance structure around the MFL is critical because it facilitates:

- A common vision and local ownership of the process of establishing an MFL
- Collaboration and the inclusion of stakeholders in the establishment and maintenance of the MFL
- Coordination and the pooling of resources that reduces duplication and increases efficiency
- Establishment of procedures, roles and responsibilities
- Transparency and accountability

¹ The DHS Program conducted interviews with 24 MFL experts during research for this guidance document.

- A means of establishing and setting standards
- Integration across other systems and structures
- Continued commitment and the sustainability of the MFL
- A reduced burden on health system personnel, particularly during times of crises or high demand for health facility information

3. KEY ELEMENTS OF GOVERNANCE

3.1. Leadership

Strong, well-coordinated leadership is essential to the successful implementation of the MFL. Leadership is needed to: (1) advocate for the MFL, (2) provide oversight and direction for the establishment and maintenance of the MFL, (3) ensure a favorable policy and regulatory environment, (4) secure funding, and (5) facilitate planning to guide future investments.

Steering Committee

It is recommended that a **steering committee** be established to serve as the leadership body for the MFL. This should be done early in the planning phase so that the steering committee can help guide the process of establishing or strengthening the MFL.

Primary responsibilities of the steering committee:

- Promote stakeholder engagement (See Section 3.2 Stakeholder Engagement)
- Make critical decisions about the MFL through consultation and consensus
- Develop an overall vision and strategic plan for the implementation or improvement of the MFL
- Delegate responsibilities
- Push through the MFL agenda when roadblocks are encountered

Other responsibilities of the steering committee:

- Provide oversight to technical working groups engaged in activities concerned with the MFL
- Mobilize resources (human and financial) for the MFL through advocacy
- Ensure that legal and policy frameworks are in place to support the MFL (See Section 3.3 Policy Environment)
- Ensure that key management, operational, and financial structures are in place²
- Help determine the requirements for the MFL³
- Ensure that government leaders are briefed as needed
- Ensure open communication with stakeholders

² See *Maintaining the MFL Module* for more on inputs required to sustain an MFL.

³ See *Key Considerations Module*.

- Develop a costed plan and prioritize activities
- Resolve conflict when needed. Discord over ownership of the MFL, reluctance to share data, and opposition to changing current systems and practices are common tensions that a leader or leadership body may need to resolve.

The composition of the steering committee needs to be carefully considered; a steering committee should include:

- Ministry officers who have the authority or connections needed to push the MFL agenda forward, make important decisions and delegate tasks.
- Individuals who can advise on data requirements, data sources and mechanisms for data collection.
- Individuals who can advise on the technological solutions for the **facility registry service** that will store and share the MFL data.
- At least one representative from the technical working groups (TWG) set up to implement key MFL activities.⁴

The steering committee can be an existing body that is tasked with the additional responsibilities of establishing an MFL (e.g., an existing Health Management Information System (HMIS) or E-health committee), or it can be newly formed for this purpose.

A clear vision of the proposed MFL and the roadmap to be used in establishing the MFL will need to be clearly articulated by the steering committee. The exact role of the steering committee will vary according to the country context but will be driven by the needs of the countries. It is important that the steering committee:

- Have a clear vision of what it will be doing and how the decision-making process will operate
- Establish clear roles and responsibilities for all members
- Develop clear, documented rules/guidelines that facilitate addressing procedural issues such as changes in leadership and how leaders are selected or elected

⁴ See next section, Technical Working Group

CASE STUDY: TANZANIA MFL CORE TEAM

In Tanzania, a core team from the Ministry of Health and Social Welfare (MoHSW) played a central role in establishing the MFL in that country. As part of the Monitoring and Evaluation Strengthening Initiative, emphasis was placed on integrated eHealth infrastructure and two priority activities for the MFL were identified: (1) arranging a stakeholder meeting to plan for and define requirements for the MFL and (2) implementing the MFL. The core team met periodically and worked with the University Computing Centre to develop an electronic MFL based on the existing HMIS health facility list. In 2012, more stakeholders joined the MFL core team and in September 2012 a stakeholders' workshop was held to define the prioritized requirements for the Tanzania MFL. The MFL core team identified three key owners of the MFL within the MoHSW—the Directorate of Curative Services, the Information and Communication Technology Unit, and the M&E/HMIS section.

Technical Working Group

In addition to a steering committee, it is necessary to create one or more technical working groups (TWG) to implement the procedures for establishing and maintaining the MFL and the **facility registry service**. The TWGs will develop detailed work plans for achieving predefined goals and will coordinate and manage the technical staff to carry out the work.

TWGs can include both local and international members:

- Implementing partners
- Government staff assigned to the MFL by their respective institutions
- Local research institutions and technology firms
- Consultants

In populating the membership of a TWG, it is important to include **data consumers** as well as technical staff, to be sure the needs of data consumers are considered in the overall design and structure of the MFL.

During the establishment phase, the work of the TWG will be more intense and will require a greater level of effort, staffing, and support than in the maintenance phase.⁵ After establishment of the MFL and the facility registry service, the TWGs should rely more heavily on local staff to ensure continued support and sustainability of the MFL.

⁵ For additional information on these topics, see the following modules: *Establishing an MFL Dataset Module*, *Establishing a Facility Registry Service Module*, and *Maintaining the MFL Module*.

CASE STUDY: KENYA TECHNICAL WORKING GROUP

In Kenya, the National Health Information System (HIS) Coordinating Committee oversees and provides guidance for the MFL. In addition, the Ministry of Health (MOH) has a Technical Working Group (TWG) that oversees the day-to-day workings and maintenance of the MFL. Because all members of the TWG are in the same office, they are able to meet on an as-needed basis to discuss the MFL. Additionally, they have a standing meeting twice a month dedicated to discussing the status of the MFL.

MFL Champion

Often an MFL champion plays a crucial role in (1) obtaining buy-ins and (2) bringing the appropriate stakeholders to the table. A “champion” is someone who advocates for the MFL, convinces stakeholders of the benefits of having the MFL, and secures commitments and the political will to establish or strengthen the MFL.

A champion is central to creating a common vision of what the MFL can be and what it can do. Depending on the context, “selling points” or “incentives” for having an MFL may differ. Some common benefits (selling points) include: avoidance of duplication, cost savings, increased access to data, and the ability to exchange data across information systems.⁶ The champion will advocate for resources and see to it that progress and momentum are maintained for the MFL.

In many countries, the government, usually the Ministry of Health, is the key stakeholder for the MFL. It is important, therefore, that key personnel within the MOH understand the value of a well-structured, accurate MFL. Funders and potential partners also need to be enlisted. Finally, key stakeholders and governments may regard their current systems as “sufficient,” and be reluctant to take action on the MFL. Then, the burden of proving the benefits of the MFL, or of justifying why the existing MFL needs to be improved, often falls to the MFL champion.

CASE STUDY: NIGERIA CHAMPIONS

Through the dedicated efforts of MFL champions in Nigeria, the government now sees the importance and utility of having an MFL that is accurate and continuously updated. The government is discussing with partners how to achieve this goal.

⁶ See *Introduction to the MFL Module*: Section 2. Value of an MFL

3.2. Stakeholder Engagement

Engagement of stakeholders early in the process of establishing an MFL is essential to guide the planning and decision-making associated with the MFL. Engaging stakeholders also encourages accountability and transparency through the open sharing of information on decisions and progress. A stakeholders' meeting at the onset is advisable to reach consensus on key aspects of the MFL including steering committee membership, and ownership and purpose of the MFL.

Stakeholder engagement should also occur at critical points in the decision-making process such as:

- Deciding the **minimum data content of the MFL** (see *MFL Data Content Module*)
- Determining where the MFL will be housed (see *Key Considerations for the MFL Module*)
- Establishing the **requirements** of the facility registry service (see *Key Considerations for the MFL Module* and *Establishing a Facility Registry Service Module*)
- Defining standard operating procedures for updating and maintaining the MFL (see *Maintaining the MFL Module*).

In addition to participating in the governance structure and decision-making process, stakeholders can play a critical role in providing information to shape MFL policy and can contribute to implementation of specific activities. They should continue to be engaged and consulted throughout the implementation and maintenance phases of the MFL. There are various types of stakeholders and their roles in supporting the MFL differ. Table 1 lists some of the key stakeholders to consider for inclusion in the MFL process, their potential roles and responsibilities, and their motivations or reasons for engagement in the MFL process. Conducting a stakeholder analysis and implementing a stakeholder engagement plan is often helpful. Workshops, meetings, and conferences are common avenues through which stakeholders can be engaged.

In the process of engaging stakeholders, it is important to consider the following:

- Cost of facilitating and maintaining stakeholder engagement
- Coordination mechanisms used by key stakeholders
- Competing donor initiatives
- Differing stakeholder agendas
- Ministries (likely critical stakeholders) have their own missions and agendas

Table 1: Stakeholders Relevant to the Overall MFL Process

Stakeholder	Roles and responsibilities	Motivations for becoming involved
Government ministries/local government agencies	<ul style="list-style-type: none"> • Leadership and governance • Create mandates and grant authority for decision-making • Provide financial resources • Facilitate networking and information sharing • Assign human resources to implement and manage the MFL • Grant authority for mobilizing sub-national staff for MFL data collection or verification • Provide existing lists • Provide maps • Agree on data sharing procedures • Housing the MFL 	<ul style="list-style-type: none"> • Efficient use and distribution of resources • Limit duplication • Improved access to facility data • Interoperable systems and data exchange
Policy-makers	<ul style="list-style-type: none"> • Create policies to support the MFL • Align needed leadership • Mitigate resistance • Create mandates 	<ul style="list-style-type: none"> • Efficiencies across government agencies • Time saving • Establishing good governance
Donors	<ul style="list-style-type: none"> • Contribute financial resources • Coordination • Identify partners • Data consumers • Define MFL requirements 	<ul style="list-style-type: none"> • Need quality facility data • Improved M&E • Ability to better target programs and efforts • Eliminate need to develop and maintain their own facility lists • Interoperable systems and data exchange
Local NGOs	<ul style="list-style-type: none"> • Assist with MFL data collection and verification • Provide facility lists • Data consumers 	<ul style="list-style-type: none"> • Need quality facility data • Ability to better target efforts • Use MFL for M&E
International NGOs	<ul style="list-style-type: none"> • Advocate for the MFL • Capacity building • Technical assistance to establish the MFL and facility registry service • Define MFL requirements • Provide resources • Data consumers • Provide facility lists 	<ul style="list-style-type: none"> • Support government initiatives • Need quality facility data • Ability to better target efforts • Use MFL for M&E
CBOs/FBOs	<ul style="list-style-type: none"> • Assist with MFL data collection and verification • Provide facility lists • May own facilities: provide data for MFL • Advocate for the MFL 	<ul style="list-style-type: none"> • Support government initiatives • Need quality facility data • Use MFL for M&E

(continued)

Stakeholder	Roles and responsibilities	Motivations for becoming involved
Private institutions and professional networks	<ul style="list-style-type: none"> • Provide data about facilities • Provide resources • Contribute staff with subject matter expertise • Technical assistance • Define MFL requirements 	<ul style="list-style-type: none"> • Access to facility data facilitates business processes • Potential expansion of business based on MFL information • Interoperable information systems • Use for planning purposes • Enhancement of product offerings • Increased visibility
National health programs (malaria, TB, HIV)	<ul style="list-style-type: none"> • Provide existing facility lists • Provide data about facilities • Define MFL requirements • Data consumers 	<ul style="list-style-type: none"> • Eliminate need to maintain own facility list • Interoperability with national HMIS and other information systems • Better able to target resources and efforts • Use of MFL for M&E
Data consumers (i.e., all those who use MFL data regardless of institution)	<ul style="list-style-type: none"> • Define MFL minimum data content • Define MFL requirements 	<ul style="list-style-type: none"> • Access to facility data • Interoperable systems can exchange information • User friendly facility registry service facilitates access and sharing of MFL data
Technical users	<ul style="list-style-type: none"> • Have user rights 	<ul style="list-style-type: none"> • Mobile portal • Analytical capabilities • Data linkages
MFL and technical staff	<ul style="list-style-type: none"> • Maintaining database • Maintain the facility registry service • Provide technical assistance • Seek ways to improve the MFL (add content, add functions to the FRT) 	<ul style="list-style-type: none"> • Support government initiatives • Salaries • Performance reviews
Medical or clinical staff	<ul style="list-style-type: none"> • Data consumers • Contribute to data (identify information to be updated) 	<ul style="list-style-type: none"> • Identify services available locally • Use MFL to identify facilities for referrals

3.3. Policy Environment

It is important to understand and shape the policy environment in which the MFL will exist. Policies are important because they provide guidance and regulation, establish compliance measures, and set limits on what can and cannot be done regarding MFL data. Policies also help align other stakeholders and development partners around a government-led MFL strategy.

The MFL will likely be regulated by national policies associated with health information systems, eHealth, and data sharing. The *MFL Assessment Module* discusses the need to evaluate these policies to understand how they may affect decisions about the MFL. During the course of the assessment you may identify opportunities for revising policies or for developing new policies if none exist. For example, if a country does not have a policy on open data and data

sharing, this may be a good opportunity to initiate a dialogue on how to structure such a policy in the context of that country.

Establishing policy specifically for the MFL can be helpful for the legitimization and sustainability of the MFL. The design and documentation of governance policy should be developed alongside decisions and solutions implemented for other aspects of the MFL. Prior to creating a policy, several issues need to be resolved⁷:

- Who leads the decision-making process and which key stakeholders should be involved
- If and how to institutionalize the MFL, and setting the requirements of the institutional home
- The degree to which public sharing of the data will be allowed/promoted

If the MFL is being implemented in stages and not all issues have been resolved upfront, a policy may be modified or expanded over time.

Generally, a MFL policy should define:

- Who is responsible for implementation, oversight, revisions or updates to the policy
- Who is accountable for the MFL and for the **facility registry service** that houses it
- How access to and sharing of the data will be granted
- What the funding mechanism is for the recurring costs of maintaining the MFL and what if any constraints or parameters are associated with the funding
- The required level of coordination between the various stakeholders needed for the establishment, maintenance, and sustainability of the MFL
- Who is responsible for defining required MFL data and elements

CASE STUDY: MANDATE FOR THE MFL

In the Philippines, an administrative order is being drafted which describes the role and responsibilities of each stakeholder and establishes the MFL (or “facility registry” as it is called there) as the unique official list of health facilities in the country. It will also mandate municipalities to provide the information necessary for the MFL.

⁷ The *Key Considerations Module* provides additional information on these decisions.

3.4. Institutionalization and Sustainability

Institutionalization

Institutionalization of an MFL involves embedding the entire structure within an institution and setting up standardized management procedures to maintain the MFL over the long-term. Institutionalization enables planning and the allocation of resources needed to implement activities in support of the MFL. It also makes the home institution accountable for how resources are spent and for continuing to deliver an MFL that meets the needs of the data consumers. The quote to the right highlights some of the negative aspects of not having an institutional home.

The institutional home typically provides the following: oversight and management of the MFL, coordination and leadership, and dedicated staff support for the MFL. It also assigns roles and responsibilities to other institutions that need to be engaged. Some best practices for institutionalization of the MFL include:

- Having a mandate
- Having clear roles and responsibilities, management processes, and lines of authority
- Having well-defined standard operating procedures describing the various tasks and timelines for maintaining the MFL and the FRT
- Having a permanent line item in the budget to support the work

When deciding how to institutionalize the MFL and what management processes are most appropriate, it is important to align these with the overall governance structure in the country.

Governance structures are usually **centralized**, **decentralized**, or **federated**. The governance structure in which the MFL is situated will determine how decision-making processes and responsibilities are distributed. Regardless of the governance structure, coordination across the various levels of government and among key stakeholders is critical to successful governance of the MFL.

“A MFL, if it exists, is often a standalone activity, not institutionalized. There is a lack of funding and support for this type of long-term activity, and resource availability can restrict what might be needed to create, validate, and maintain an authoritative updated list” – from key informant interviews

Types of Governance Structures

Centralized: One central authority is responsible for decision-making

Decentralized: Responsibilities are distributed from a central authority to other entities that also contribute to decision-making

Federated: Responsibilities and decisions are shared among multiple self-governing organizations

Sustainability

A critical governance consideration is how to “keep things going.” Institutionalization of the MFL helps foster sustainability by making the institution and team accountable and by establishing management procedures. However, these activities alone are not sufficient over the long-term. Sustainability requires additional inputs, and consideration should be given to the following issues:

- How will the MFL be funded beyond the initial seed money?
- Is there a dedicated workforce to maintain the MFL and the facility registry service, and is the workforce adequately trained?
- Is there oversight to ensure that people are carrying out their roles and responsibilities?
- Is there a mechanism in place to get feedback from **data consumers** on how to improve the MFL?
- Are there systems in place to address the issues associated with high staff turnover (e.g., training more than one person to do a specific job, providing incentives to stay in current position)?

Funding is a critical first step and an important consideration both in the MFL development process and in the sustainability of the MFL. Funding sources vary but international organizations often fund the establishment of MFLs in countries where none exist. In such cases, thinking through what will be needed to maintain the MFL in the future, when these resources are no longer available, is critical. In-country funding for the MFL is ideal because it allows the MFL to be country-led and helps facilitate sustainability.

CASE STUDY: FUNDING THE MFL

In the Philippines, the World Health Organization (WHO) provided financial support during the initial stage of the health facility registry development. Subsequently, for the full establishment and sustainable maintenance of the facility registry, funding is through government budget support of the Knowledge Management and Information Technology Service unit.

4. CHALLENGES

Establishing a governance structure for the MFL poses several challenges. Table 2 lists the MFL governance related challenges that can occur and potential solutions to these challenges.

Table 2: Challenges to Establishing the MFL and Potential Solutions

MFL Governance Challenges	
Challenge	Potential solution
Tensions between various stakeholders (ministries, donors, stakeholders)	<ul style="list-style-type: none"> Steering committee and strong leadership as a means to mitigate challenges Stakeholder meetings/workshops to establish common grounds for cooperation and collaboration Democratic approach of consensus building and promotion of openness to sharing data/authority
Various authorities but lacking in power	<ul style="list-style-type: none"> Use existing systems and power structures Having policies with clear directives
Limited funding	<ul style="list-style-type: none"> Cost a model before hand Prioritize activities and build up the MFL in phases
High staff turnover	<ul style="list-style-type: none"> Have clear written guidelines and standard operating procedures Include detailed MFL-related duties in job descriptions Train more than one staff person to fill a specific role (e.g., curating the database or validating data at the district level)
No champion	<ul style="list-style-type: none"> Stakeholder analysis to understand how each would benefit from an MFL Have the TWG use findings from the assessment to build a business case for the MFL
Lack of procedures	<ul style="list-style-type: none"> Steering committee to establish guidance document or manual that outlines processes and procedures
Lack of buy-in from some stakeholders	<ul style="list-style-type: none"> More advocacy on the benefits of the MFL

5. RESOURCES

- [Ghana eHealth Strategy](#)
- [WHO National eHealth Strategy Toolkit](#)



MFL DATA CONTENT

This module describes the data that should be included in an MFL. It covers both the minimum data fields to include in the MFL as well as the optional data fields that are commonly included. The module is useful both when setting up an MFL and when considering modifications to the content of an existing MFL. Additionally, the module will help guide those involved in assessment of data in an MFL.

Checklist of things to do before using this module	Module where information is located
<input type="checkbox"/> Determine key requirements of the MFL	Key Considerations Module
<input type="checkbox"/> Identify available resources	MFL Assessment Module

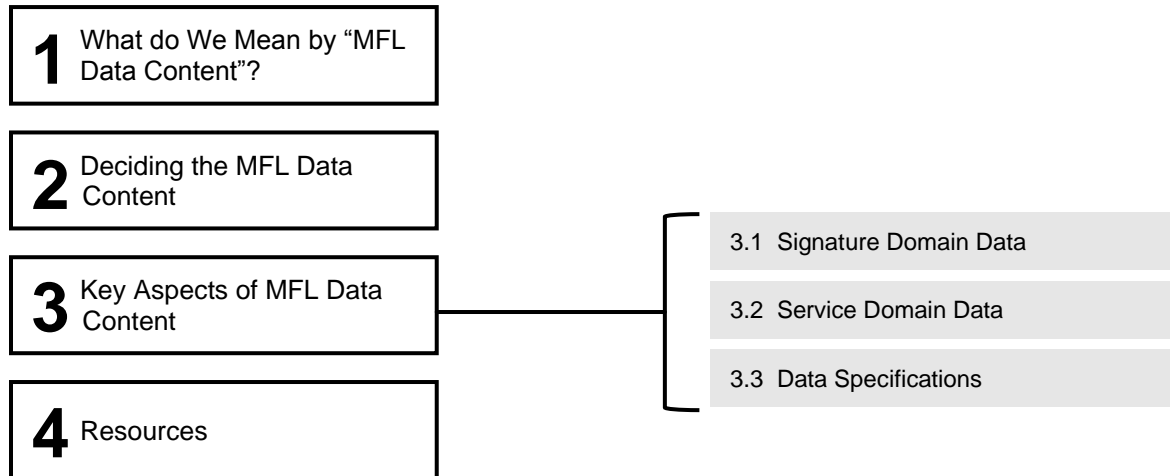
Key audiences for this module:

- MFL Steering Committee
- MFL managers
- Technical Working Group assigned to establish the MFL dataset

Note: words in **bold** are defined in the glossary.

Figure 1: MFL Data Content – Module Outline

(Press Control and click on any of the boxes to be taken directly to that section)



1. WHAT DO WE MEAN BY “MFL DATA CONTENT”?

The MFL data content refers to the information, or **data elements**, that relate to each facility included in the MFL. Typically, an MFL includes both administrative information that can be used to identify and contact the facility (**signature domain data**) and information on the service capacity of the facility (**service domain data**). Both signature domain data and service domain data are described in this module.

2. DECIDING THE MFL DATA CONTENT

It is important to carefully select and define the data elements to include in the MFL. Data elements for the signature domain (see section 3.1) are required while others, including service domain data, are desirable but optional. The inclusion in an MFL of additional or optional data may be useful to MFL **data consumers** but, ultimately, the more data included in the MFL, the greater the cost and the effort required to update and maintain the MFL. Therefore, the decision regarding what data to include in the MFL must necessarily balance the needs of data consumers with the practical consequences of collecting additional data on all facilities, and regularly updating and verifying and that data.¹

The following are recommended best practices for deciding which data to include in an MFL:

- *Consult potential MFL data consumers prior to deciding on the facility data to include in the MFL. It is helpful to have a formal process for identifying the types of facility data that stakeholders*

¹ For additional information about the process required to keep an MFL up-to-date, see the *Maintaining the MFL Module*.

want or need from the MFL, and the ways in which they plan to use it. MFL data requirements can be captured through **user stories**.²

- *Assess the sources available for obtaining the data you want to include in the MFL.* Once the data requirements are identified, it is important to assess the availability of sources for the data and to determine procedures for collecting and validating the data.³
- *Start with the **minimum data content** in the MFL.* To adequately manage the data collection and maintenance process, limit the initial number of data elements to those that are absolutely necessary. Add others as additional financial and human resources become available.
- *As much as possible, include facility data that changes little over time.* Information that changes frequently, such as the name of the chief medical officer, requires the MFL data to be checked and updated more often.
- *Work through the MFL Steering Committee* to engage stakeholders in decisions about the MFL data content. The Steering Committee should revisit the data content periodically to reassess new data requirements and to review the resources available for collecting and validating facility data.⁴

CASE STUDY: DEFINING MFL DATA CONTENT

Kenya: Held a stakeholder meeting to determine which data elements to include in the MFL. They came up with a minimum standard of what you need to know about the facilities and how often the data need to be updated.

Rwanda: Did a formal information gathering to determine which facility data were already available and, among these, which elements they wanted to include in the MFL. Because of funding constraints, they decided to wait on introducing new data elements, adding them to the MFL in steps. They decided on a small initial list of data elements and are working on adding more data elements to the MFL as funds become available.

Philippines: Began with a large list of data elements; however, when they tried to operationalize the large amount of data content, they encountered problems and decided to reduce the list. At this point, the stakeholders met and determined the key minimum data elements that would be included in the MFL going forward.

Tanzania: Gained consensus on data content from a broad group of stakeholders through the use of key informant interviewers and implementation of a three-day workshop.

² See *Key Considerations Module* for additional information on gathering user stories.

³ See *Establishing the MFL Module* for additional information on collecting data for the MFL.

⁴ For more information on stakeholder engagement and the MFL Steering Committee, see the *Governance Module*.

3. KEY ASPECTS OF MFL DATA CONTENT

3.1. Signature Domain Data

The signature domain contains data elements that are used to establish a “fingerprint” for a facility. It includes all the information necessary to identify and locate a specific facility. These data elements should not change significantly over time. The data elements in the signature domain constitute the minimum data content for your MFL.

Signature Domain Data Field	Definition of Data Field	Description of Data Field	Example
Unique Facility Identifier	A unique code that identifies a specific facility and distinguishes it from all others.	Serial numbers are often used as unique facility codes. They are simple, compact, and can be stored in any system. Ideally, they are automatically generated by the system. (Note: Additional information about unique identifiers follows this table.)	Serial Number: 125656443
Facility Name	The official name of the facility	The facility name should be the official name of the health facility and consist of a single text field. It is recommended that the name be free of abbreviations. Facilities may go by several names, for example if different languages are spoken. In such cases, other data fields can be added that include additional names the facility goes by. It is important <i>not</i> to include the administrative unit’s name or level in the name of the facility, unless it is part of the official name. The location or the type of facility should be included in the facility name <i>only</i> if it is included in the official name.	Louis Pasteur Hospital Nairobi Women’s Hospital Lema Dispensary
Facility Type	Describes the classification of the facility	Facility types should be determined by a central authority. The MOH may already have a list of standard facility types, with criteria defining each type.	Hospital Primary Health Care Center Dispensary Mobile Health Care Facility

(continued...)

Signature Domain Data Field	Definition of Data Field	Description of Data Field	Example
Ownership or Managing Authority	Refers to the entity that owns or manages the health facility	Ownership and managing authority should be determined by a central authority. Each facility should have just one type of ownership designation. If a facility can be classified under more than one ownership category, the <i>more specific</i> designation should be selected. For example, a “military” facility can be classified under “government” and “military,” but because “military is more specific, this option should be selected.	Government Military Private Nongovernmental organization Faith-based organization
Location/Address	Refers to the physical location or address of the facility	Ideally, the following specific fields can be defined: <ul style="list-style-type: none"> • Street Name • Street Number • City/ Neighborhood • State/Province/Region • Postal Code <p>However, given the variability between countries in how addresses are listed, this data element will need to be defined at the country level.</p>	Louis Pasteur Private Hospital 380 Francis Medical Center Pretoria 0001, South Africa
Contact Information	Information necessary to get in contact with the facility	Separate data elements are required for each type of contact information. The most important data elements are the facility’s telephone number, and email address.	+ 223 12 976 5555 xyzdispensary@gmail.com
Administrative areas	Refers to the district, province, or other administrative level in which the facility is located	There will usually be several data elements to cover the various administrative levels in a country. To assure that linkages with other data sources are possible, a standardized list of administrative units should be used. The MOH may maintain health districts or zones, i.e., administrative areas that are specific to the function of the health sector and distinct from the geographic units used in other aspects of a country’s governance. In such cases, it is important to understand which administrative breakdown is used by other information systems that the MFL will interact with, and consider whether both the national and the health system administrative boundaries should be used. Each administrative unit should be assigned a numerical designation to clarify the hierarchy of levels. For example, province is level “1”, district is level “2”, and ward is level “3”.	Southern District

(continued...)

Signature Domain Data Field	Definition of Data Field	Description of Data Field	Example
Geographic coordinates ⁵	Refers to the physical location of the facility, typically represented as latitude and longitude	Both latitude and longitude should be specific in decimal degrees (with positive and negative numbers). For latitude, north is considered positive and south is considered negative. For longitude, east is considered positive and west is considered negative.	The latitude and longitude (in decimal degrees) of Lusaka, Zambia are: Latitude: -15.41667 Longitude: 28.28333
Operational Status	Refers to the recognized legal status of a facility intended to provide health services. At any given time, a facility will have a single operational status.	The following are suggested operational categories: <ul style="list-style-type: none"> Operational: Facility is open Licensed: A facility that has been approved and licensed but is not yet operational Registered: A facility that has been approved as an institution and has been registered Closed: A facility that has a valid license but is permanently closed Invalid: A facility where the defining attributes are different from those appearing on the facility license Does not exist: A facility that has been licensed but has not been verified that it physical exists Duplicate: The facility exists and is properly licensed but is an effective duplicate of another facility. 	
Data Year	The year in which the data was collected	When possible, include the year in which the signature domain data were collected—should be specified for each facility entry. In case of duplicate entries, the latest (most recent) year is considered the valid date. If no data year is available, the field should be left blank.	2015

Further Discussion of Facility Unique Identifiers

Unique identifier codes are one of the most important components of an MFL.⁶ They should consist of serial numbers, preferably randomly assigned. A unique identifier code should not include any information about the facility—for example, it should not include a part of the facility name, or reference to the administrative unit—because these characteristics can change

⁵ For detailed information on collecting geographic coordinates, see the *Geocoding the MFL Module*.

⁶ See *Introduction to the MFL Module*

over time. Every effort should be made to avoid having to change unique identifier codes, particularly when multiple systems rely on the codes for linkage with their data.

Serial numbers are simple, compact, and can be stored in any system. Manual generation of codes should be avoided because the process is prone to error and duplication of codes. In decentralized systems, where unique identifier codes are generated at the province level, for example, it is important to assign a range of codes to each province to avoid duplication. For instance, province A is assigned codes 0001–2000, and province B is assigned codes 2001–4000.

CASE STUDY: FACILITY CODES

Philippines: The MFL assigns a random unique identifier to each facility. There is no logic to the numbers; they are randomized by the system. There is no geographic association within the number. Initially, they tried to include administrative characteristics (administrative location of facility) in the unique identifier, but the administrative units changed frequently and the facility codes proved too difficult to maintain.

Tanzania: The MFL assigns a random unique identifier to each facility.

Kenya: The system assigns a random unique identifier to each facility registered in the MFL. Therefore, when the administrative divisions in Kenya were redrawn the facility codes (unique identifiers) were not affected.

3.2. Service Domain Data

The service domain contains data elements that describe the basic services available, infrastructure, and human resources at a facility. While the service domain data are important and recommended for inclusion in the MFL, they are *not considered required minimum data content*. The data elements can be included or excluded, depending on budget requirements, donor priorities, and the purpose of the MFL in the country. You will need to work with key stakeholders and the MFL Steering Committee to select which, if any, service domain data elements to include in the MFL.⁷

⁷ See the *MFL Governance Module* for more Information on stakeholder engagement and the MFL Steering Committee.

Service Domain Data Field	Definition of Data Field	Description of Data Field	Example
Services offered	Information on the basic health services offered by the facility	Information should be adapted at a country level to include the package of services offered through the country's health system, and that are of interest to data consumers. Where possible, each type of service should have its own data field and the data should be limited to a <i>yes/no</i> format.	Family planning Antiretroviral therapy (ART) Labor and delivery
Human Resources	Information on the number of medical personnel by type	The categorization of health personnel is specific to the country. Possible types include, but are not limited to: physicians, non-physician clinicians, registered nurses, and registered midwives. The data should be limited to positive numbers.	Number of midwives: 4
Infrastructure	Information on the number of inpatient and maternity beds and cots present in the facility	For the MFL, it is suggested that only information on inpatient beds/cots (including maternity beds) be collected. Other equipment and infrastructure details should be collected through a separate health facility assessment (SAM, SARA, SPA, HFA, etc.). However, additional equipment and infrastructure data may be added to the MFL, if you chose. Responses should be limited to a positive numbers.	Number of inpatient beds: 15

3.3. Data Specifications

Data specifications are guidelines describing how each data element should be defined and formatted for data entry. Data specifications are important for ensuring that information about facilities is collected in a standardized and consistent manner. Each facility record will comprise a series of data elements that describe the details about each facility. For each data element it is important to clearly define the following attributes:

- **Definition:** A simple description of the data element
- **Data Rules:** A description of the format for the data element along with a list of constraints or conditions that should be applied to a data element. For example:
 - Number of characters
 - Use of letters, numbers and symbols (including accents)
 - Capitalization rules
 - Use of abbreviations if allowed, and if so which ones are permitted (e.g., use only Ave. to abbreviate Avenue)
 - Language (including when to use symbols and accents)
- **Data Source:** Where the information comes from (an individual, survey, organization, or other information system).
- **Required, Important or Optional:** Some data elements are absolutely required to create a new facility record (*required*); some are fundamental to stakeholder needs but may be difficult to acquire (*important*); and some are simply nice to have (*optional*).
- **Missing Values:** In all kind of data collection there will be missing values; information may be hard to get, or the respondent does not have the information. It is, however, important to *distinguish missing information from the value zero*. If the respondent does not know the number of beds in a facility, that information (“Don’t know”) is substantially different from there being no beds in the facility. It is necessary then to assign a code for the missing data. It should always be possible to distinguish the missing data codes from the codes for valid answers. Depending on the valid range of answers, the codes 9, 99, 999..., are recommended to use. Be careful that missing data are not confused with real data (for example, if data are missing for the number of beds in a facility, using the numbers 9 or 99 for missing data may be confusing. It is best to use a number such as 99,999, which is unlikely to reflect the actual number of beds.

These data specifications should be detailed in a data specification document easily accessible to anyone who needs to submit or use MFL data.

International data standards can be used to define data specifications. Data standards are agreed upon rules for how data should be formatted, defined, structured, managed and used. The use of international data standards is important for sharing data, especially for integrating the MFL with other information systems; it allows both systems to share a common language and understand what the data mean.⁸ For example, dates can be entered in various ways as illustrated in the box to the right. Data standards will dictate which format to use consistently to avoid confusion and complication when exchanging data. For example, data standards may require that all dates be formatted as DD/MM/YYYY.

Examples of different date formats

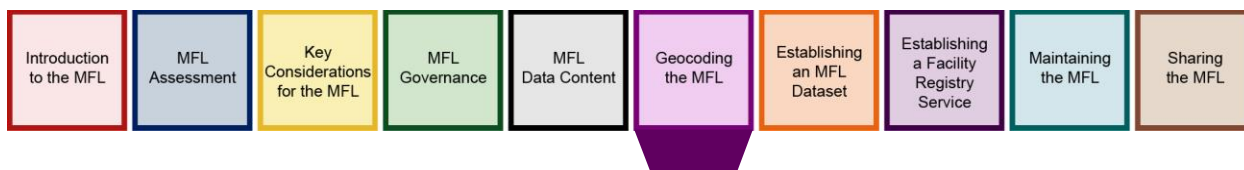
- June 2, 2002
- 2 June, 2002
- 06-02-2002
- 02/06/2002
- 2/6/02

When selecting data standards, it is important to consult with the managers of other information systems with which the MFL will share data to determine which are already in use and which make the most sense in that country context.

4. RESOURCES

- [Haiti MFL Codebook](#)
- [Tanzania Health Facility List Data Specification](#)
- [Rwanda Registry Specifications \(See Page 17\)](#)

⁸ See *Sharing the MFL Module* for more information on integration.



GEOCODING THE MFL

This module provides guidance on the procedures for assigning geocodes to facilities in the Master Facility List (MFL). The module covers key aspects of geocoding, such as selecting schema, methods for obtaining geocodes, validation of geocodes, processes for maintaining geocodes, and considerations for sharing a geocoded MFL.

Checklist of things to do before using this module	Module where information is located
<input type="checkbox"/> Identify the main users of MFL data and documented their requirements	Key Considerations Module
<input type="checkbox"/> Decide the minimum data content of the MFL	MFL Data Content Module
<input type="checkbox"/> Assess content of existing facility lists	MFL Assessment Module
<input type="checkbox"/> Established a Steering Committee for the MFL	Governance Module

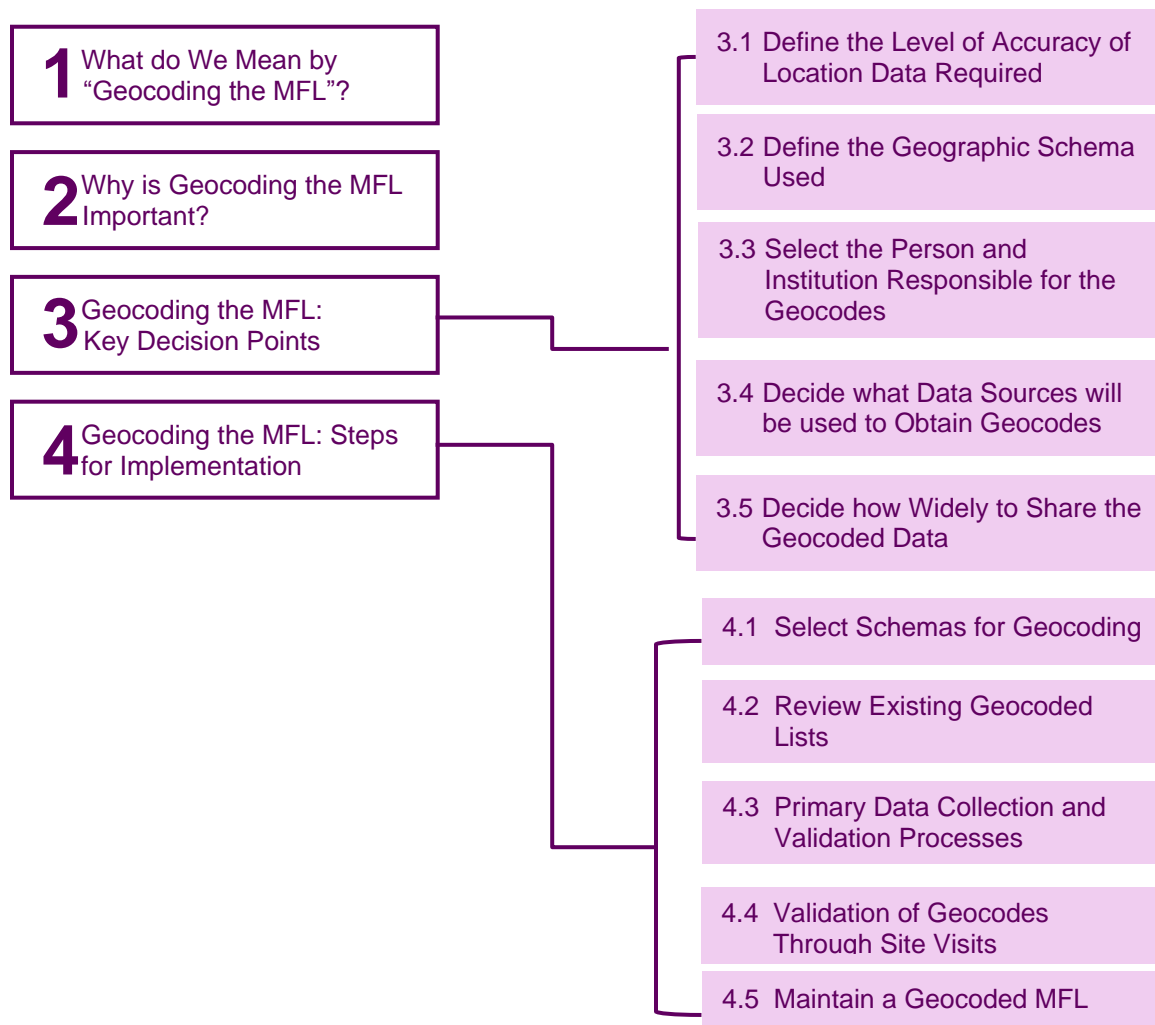
Key audiences for this module:

- Technical staff responsible for collecting or validating geocoded data for the MFL
- Managers who oversee the MFL

Note: words in **bold** are defined in the glossary.

Figure 1: Geocoding the MFL – Module Outline

(Press Control and click on any of the boxes to be taken directly to that section)



1. WHAT DO WE MEAN BY “GEOCODING THE MFL”?

Geocoding the MFL entails gathering and assigning physical location data (typically using geographic coordinates for latitude and longitude) to each health facility included in the MFL. While an MFL usually includes different types of geographic identifiers, such as the administrative unit (e.g., province or district) in which the facility is found, geocoding provides a more precise location for the facility that can be visualized as a point on a map. Conceptually, geocoding is a simple process but implementation can be complex. There are a number of different approaches to geocoding an MFL, each with costs and benefits attached. The module outlines the most common approaches to geocoding, and discusses key considerations to be reviewed when determining the method(s) to be used. It should be recognized that when geocoding an MFL, it is common practice to use a combination of methods.

2. WHY IS GEOCODING THE MFL IMPORTANT?

An MFL with geocoded facility data has various advantages.

- Geocoded facility data helps to better manage health programs.

Knowing where health facilities are located and where specific services are offered is critical to managing national health programs and targeting interventions efficiently.

- Facility location data can help examine questions related to access, equity and gaps in service provision. Accurate location information about health allows health planners to target interventions, review and assess the impact of programs, and plan future activities.
- With geocoded data it becomes possible to easily visualize and query the MFL using a mapping program such as Google Earth or by using a Geographic Information System (GIS). Mapping the locations of facilities helps in visualizing the health facility landscape. The geographic information enables coordination and management of services by identifying areas of high or low concentration of activities and then making adjustments to service locations to improve service availability.
- Location information can help with budgeting and planning for activities that involve the transport of goods and human resources, such as supervisory visits or the delivery of commodities.
- Geocoding the MFL makes it possible to link the MFL to other datasets using geography.

Using geocodes is one approach to integrating data from different sources. Linking the MFL data to other datasets allows for greater insights into health programs and their interaction with factors that can influence their effectiveness. From a geographic perspective, it can be of value to understand the location of facilities and services relative to factors such as population distribution (overall population or key populations), transportation networks, markets, climate, or agricultural patterns. The key to this process is having other geocoded datasets – also referred to as “geo-enabled data” (data that can be mapped) – that can be linked to the geocoded MFL.

- Geocoding assists with management of the MFL

Including geocodes in an MFL facilitates the management of the list. Knowing the exact location of facilities can help identify duplicate listings in the MFL (if for example a facility had been entered twice with a different name). If district lines are redrawn, geographic

coordinates can also help correctly reassign facilities in the MFL to their new administrative unit.

To be most effective, the MFL should include the location of every health facility in the system, however even partially complete geocoded data in an MFL can be beneficial. It is better to have some locations in an MFL than none at all because of the benefits these data provide.

3. GEOCODING THE MFL: KEY DECISION POINTS

A number of key decisions must be made before initiating the process of geocoding an MFL. Some of these decisions will need to be reviewed and adjusted as the geocoded MFL evolves over time. Most decisions need to be made in conjunction with other MFL key decisions, such as those relating to MFL maintenance procedures or decisions related to sharing the MFL data. In this section we highlight the key decisions and in section 4, we provide additional technical detail related to the implementation of these decision points.

The six main decision areas are:

1. Define the level of accuracy required
2. Define the geographic schema used
3. Select the person and institution responsible for obtaining and maintaining the geocodes
4. Decide what data sources will be used to obtain the geocodes
5. Establish the frequency of update and review
6. Decide how widely to share the geocodes

3.1. Define the Level of Accuracy Required

The required level of accuracy of the geocodes depends on how the MFL will be used.¹ If the MFL is primarily used to map locations of facilities for planning purposes, then having the location of the village or town where the facility is located is likely sufficient. If the MFL must be used for navigating to facilities for supervisory visits or for the provision of commodities, then highly accurate location for each facility is needed. Some types of analytics may require more precise locations, for example if one wants to study how distance to facilities affects uptake of services and health outcomes.

The level of accuracy desired affects the level of effort required to obtain the geocodes. Precise locations require visiting the facility to collect the exact geocodes, whereas less accurate locations (such as situating the facility within a town) may be done remotely using software such as Google Maps.

¹ For more on understanding user requirements for the MFL see the Key Considerations Module and the Establishing a Facility Registry Service Module.

The decision on accuracy should be reviewed at least every few years to maintain viable geocodes that continue to meet the needs of the MFL users. If the MFL **user requirements** shift, or the cost of obtaining geocodes changes, then the required level of accuracy can be altered. It is important to note that such changes will likely have consequences on the methods used to collect and validate geocodes.

3.2. Define the Geographic Schema to be Used

The *schema* of the geocode is the primary data format used to store the geocodes. Section 4.1 describes the various types of schema formats that can be used. Each format has its own nuances of structure; for example, under geographic coordinates there are the following variations: (1) degrees, minutes, and seconds, (2) degrees and decimal minutes, and (3) decimal degrees. Therefore, the schema needs to be clearly defined and documented so that users of the MFL can access this information.² Note that as long as the schema is known, it is easy to convert between different schemas.

Schema Recommendation

The recommended starting point for the schema is to use latitude and longitude in decimal degrees, with WGS84 as the datum. The reasons for this are: (1) latitude and longitude are widely understood, (2) decimal degrees are easy to review and to identify data issues, and (3) WGS84 is a common datum. Together they make it easy to integrate the MFL data with other geographical data.

When deciding which schema to use, consider the following:

- the primary use of the geocodes
- the needs of the MFL administrators
- the needs of other stakeholders with whom the list will be shared

If the geocodes are to be shared widely, then use of a well-known schema is recommended. Generally, it is recommended to match the schema with the primary use of the geocodes, then document its characteristics (data type, format and datum) and share these details with users of the MFL.

3.3. Select the Person and Institution Responsible for the Geocodes

When deciding who to charge with maintaining the geocodes it is important to understand the roles and responsibilities this job entails, and how they will interact with the other roles and responsibilities associated with the MFL.³ The responsibilities of the team charged with managing the MFL geocodes are described below:

² The MFL Data Content Module has information on defining and documenting data specifications for the MFL.

³ See the *Maintaining the MFL Module* for a description of the various responsibilities associated with the long-term maintaining and management of the MFL.

1. Establishing and implementing the procedures for geocode collection
2. Identifying processes for validation of geocodes
3. Assessing and validating geocodes
4. Maintaining and sharing the MFL geocodes
5. Responding to inquiries regarding the geocoded data
6. Documenting the procedures for geocoding the MFL and making them accessible to users

These responsibilities can be divided up or assigned to one person, depending on the size of the MFL. They can be managed centrally or regionally as long as there are standardized procedures. Typically, the person(s) tasked with managing the geocodes should be within the same institution and unit as others managing the overall MFL to facilitate management and coordination. It is recommended that more than one MFL team member be involved in the geocoding process so that with the departure of key staff, geocoding skills are not lost.⁴

3.4. Decide what Data Sources will be Used to Obtain the Geocodes

A key decision with regard to geocodes is whether you will collect new data or use existing geocodes from other facility lists. The decision will depend on what data are available, how trustworthy they are, and whether they meet the accuracy criteria you have previously established. The availability of financial and human resources for new data collection also needs to be considered.

Many existing facility lists already have geocodes, which can be used as a foundation for generating a geocoded MFL.⁵ A logical first step is to review these lists and determine what information can be pulled from them. Section 4.2 provides additional details on how to review, assess and validate existing geocoded data. Keep in mind that the pulling data from existing lists requires matching facilities across lists which can sometimes be a time-consuming and cumbersome process.⁶

If new data collection is required for all or a subset of facilities, it is important to develop specific plans and procedures for the collection of missing geocodes and for validating them within the MFL. Visiting all facility locations solely for the purpose of collecting geographic coordinates is a time- and resource-intensive activity that has limited value, and thus is probably not a viable option. Another means of data collection is to link the collection of health facility geocodes with other scheduled visits to health facilities such as supervisory visits, facility surveys, and commodity deliveries. Data collection for geocodes should be coordinated

⁴ See *Maintaining the MFL Module* for more information on MFL roles and responsibilities.

⁵ For more information on review of existing facility lists, see the *MFL Assessment Module*.

⁶ For more information on harmonizing lists, see the *Establishing an MFL Dataset Module*.

with other MFL data collection or data validation activities.⁷ Section 4.3 describes best practices for collecting geocodes.

3.5. Decide How Widely to Share the Geocoded Data

The decision on whether and how to share the geocodes for the MFL should be done in accordance with the policies developed around governance of the MFL. The *Sharing the MFL Module* discusses the importance of a MFL sharing policy and describes various factors to consider in developing such a policy. That information is also relevant to the sharing of geocodes.

Among the factors to consider regarding the sharing of geocodes is the trade-off in value between the utility of the data to MFL stakeholders and the sensitivities associated with the data. For instance, the location of military clinics could be considered sensitive. The MFL Steering Committee and MFL Managers need to carefully consider what data to make available and to whom, and to develop written policies around this.

Data Access

When sharing a geocoded MFL, the sensitivity of the location data needs to be taken into account. It may be necessary for some data to be restricted. The following will need to be carefully defined prior to sharing the data:

1. Who has access to the geocodes
2. What procedures are required to receive access to the geocodes
3. Are separate steps necessary to access the geocodes (compared to other MFL data)
4. Do specific types of sites require separate access policies (e.g., health facilities located at military establishments)

Data Formats and Metadata

In addition to sharing the geocodes it is important to also share the metadata, or information about:

- how the geocodes were collected
- When were the geocodes collected
- what exact schema used
- the level of accuracy used

It is necessary for data users to have this information (1) to manipulate the geographic data elements in the MFL, and (2) to integrate MFL data with other geographic data.

⁷ For more information on data collection approaches for the MFL, see the Establishing an MFL Dataset Module.

Feedback on Geocoded Data

Receiving and incorporating feedback from MFL data users on the accuracy and utility of the geographic data within the MFL is important. It is likely that MFL data users will eventually become reviewers of the quality of the lists of geocodes and can help in identifying errors and improving data quality. Establishing a mechanism whereby errors can be flagged and suggested changes submitted for review is important. For more in this please refer to the *Maintaining the MFL Module*.

4. GEOCODING THE MFL: STEPS FOR IMPLEMENTATION

This section provides additional technical information and recommendations for establishing a geocoded MFL dataset.

1. Selecting schemas
2. Reviewing existing geocoded lists
3. Primary data collection and validation processes
4. Maintaining the geocoded MFL

4.1. Selecting Schemas for Geocoding

The schema of the geocode is simply the data format in which the geocodes are stored. It is possible to have more than one schema, though it will be necessary to define one as the primary schema. Selecting the schema(s) will require consideration of how the geocodes will be used and the needs of the users of the MFL. For instance, if a particular schema is commonly employed in other databases accessed by MFL users, then it may be helpful to select that schema. However, it is important to note that if a schema is known, it is generally easy to convert between different schemas. Common data schema types are described below.

Address

A formal physical address can be a schema. Usually it includes a block number, street name, and city. While a physical address can be part of an MFL, the formal physical address infrastructure is not always complete or well-known and can be subject to change. Therefore, the physical address is not generally recommended as the primary geocode, although it is useful information to be maintained in the MFL.

Advantages:

- Provide information that is useful to navigate to a facility location without needing GPS or other navigation devices

Disadvantages:

- Requires as a prerequisite that a formal address structure is in place and electronically available that can be used for geo-referencing the address so the location can easily be mapped

Resources needed:

- List of facilities with the physical addresses

Coordinate Systems

A coordinate system is a reference system for pinpointing locations in relation to one another. They have three main elements, reference point (0,0), units of measure (meters, degrees, etc.) and mathematical algorithm (datum) representing the curvature of the earth. Based on a coordinate system you can use GIS software to generate maps of different locations. Below are two common coordinate systems and considerations if a local coordinate system exists.

Latitude/Longitude

This is perhaps the most well-known geographic coordinate schema, and is commonly used in computer systems. For instance, if you put latitude and longitude into Google, a map will be displayed of the location. The unit of measure is degrees measured in latitude and longitude.

- **Latitude** measures north/south location. North of equator values range from 0-90 degrees with 0 being the equator. South of the equator values range from 0 to -90 degrees;
- **Longitude** measures east/west location. East of the prime meridian (which runs through Greenwich UK) values range from 0 to 180 degrees, and west of the prime meridian, values range from 0 to -180 degrees.

A degree is approximately 111 km at the equator, which reduces as you move further from the equator. This is the default schema used in many geographically enabled devices such as smartphones and tablets. As stated earlier in Section 2.1, this schema is recommended for the MFL because it is commonly used.

Advantages:

- Commonly understood by people and computers
- Immediately available for mapping and navigation to location
- Default schema for many data collection tools (e.g., GPS units, mobile phone data collection applications)

Disadvantages:

- Possibility of data collection errors in the field. Recording latitude and longitude requires recording up to 13 digits, and small errors can lead to the location being incorrectly recorded.
- Potential errors if data format is not clearly defined and followed. If the data format, whether Decimal Degrees (DD), Degrees, Decimal Minutes (DDM), or Degree, Minutes, Seconds (DMS), is not clearly stated or known, the ability to determine the true location is limited.
- Only useful for navigation; unable to determine distance between locations without conversion.

Resources needed:

- GPS-enabled device (either GPS unit or device with a GPS chip such as a smartphone or tablet)

UTM Universal Transverse Mercator

This coordinate schema is based on a system that divides the world into 60 zones, each 6 degrees of longitude in width. Within each zone, location is defined as *easting* and *northing* in meters from the origin point for each zone. Easting refers to the eastward-measured distance (or the x -coordinate), while northing refers to the northward-measured distance (or the y -coordinate). This schema is often used for measuring *length* (e.g., length of a river) and *area* (e.g., size of a forest).

Advantages:

- It is a commonly used schema
- Units are easily understood (meters)
- Able to determine distance between locations without conversion

Disadvantages:

- Possible data collection errors in the field. Recording Easting and Northing measurements requires up to 13 digits, which increases the chance of small errors that lead to the incorrect location being recorded.
- Need to know which of the 60 UTM zones the coordinates correspond to

- If the area of interest extends across more than one zone (e.g., Tanzania extends across 3 zones), the GPS device needs to be programmed to the proper UTM zone before taking a location recording. Failing to do so can lead to distortion in actual location. Additionally, areas that cross the equator can introduce complications around use of UTM zones.

Resources needed:

- GPS-enabled device (either GPS unit or device with a GPS chip)

Local Coordinate System

Some countries or regions of the world have their own coordinate system, defined (i.e., designed) to better match the curvature of the earth across a smaller area such as a country, as opposed to the entire planet. This schema is usually based on historical mapping units.

Advantages:

- If the local coordinate system is widely used at the local level, integrating the MFL data with local GIS datasets will not require conversion.

Disadvantages:

- Conversion to other common data formats and data sources outside the country can be complex. For example, gridded population, road network (open street maps) are in global common coordinate systems and for them to be used with a local coordinate system requires conversion. In such a case, a global common coordinate system is preferred over a local coordinate system.

Resources needed:

- Parameters of the local coordinate system and the ability to be added into the GPS device
- GPS device (either GPS unit or device with a GPS chip)
- Conversion algorithm to and from common coordinate system(s) so that MFL can be mapped over geographic data.

New and Innovative Geographic Identifiers

In addition to traditional methods of collecting geographic location, the advent of mobile technology has initiated new and innovative ways of collecting and storing geographic location. One of the new methods being used is *What3words*.

What3words is a new schema, a location system that divides the world into squares three meters on a side (3m x 3m); it then assigns a unique 3-word identifier to each square. This algorithm

provides a way to identify which square your facility is in. Using a specially designed app, you can type in the name of the square, and it will map it for you. It thus becomes a communicable address like any zip code or street address, but accurate to 3mx3m. This type of schema may reduce errors in coordinate reporting by using words rather than long series of digits to record a location. The *What3words* schema requires use of an app and is best suited for locations where smartphones are available and used. The system is being used in over 170 different countries by the World Bank, the United Nations and others, including national governments and postal services.

Advantages:

- Using a smartphone that collects, stores, and records 3 words is more reliable and less likely to have data collection errors than trying to record 13 digits.
- Can be incorporated with other data collection apps on smartphones using SDK or API
- Can be used for offline navigation with smartphone
- Is available in multiple apps and across GIS platforms including ArcGIS and QGIS
- Free batch conversion or use of the API to convert to and from latitude/longitude coordinates for use in other maps or datasets (some users prefer converted data)
- Limited technical skills required to use the system
- Can easily be written, spoken, or sent digitally

Disadvantages:

- Primarily designed for use with smartphones
- Needs to be converted to be used in certain maps
- Still new and requires some technological skill to obtain the full benefit of *What3words*

Resources needed:

- Smartphone or tablet with a GPS chip.
- Internet access if manually converting to latitude and longitude, but not for any tool or application with the SDK inside

4.2. Reviewing Existing Geocoded Lists

Once the decision has been made on the schema to be used for the MFL, the next step is to review existing facility lists containing geocodes to determine which existing geocodes can be used and which sites will require a geocode to be obtained. This activity should be included in the overall MFL assessment. The outcome of the assessment should place the geocodes for each facility in one of three categories: validated (ready to use), provisional (needs to be validated), or to be collected (missing geocode). Facilities that have a geocode that meets the required accuracy from two independent sources can be classified as *validated*; facilities that have a geocode that meets required accuracy from only one source can be classified as *provisional*; facilities that do not have geocodes that meet the required accuracy should be classified as *to be collected*. This classification helps determine which existing data can be used and determines the level and type of action required to complete the MFL with corresponding geocodes for each health facility.

Assessment of Completeness, Accuracy and Quality of Existing Geocodes

It is important to look at the overall completeness of the geocodes from the available list(s), the level of accuracy, the date of the last update, and the method of data collection. This information provides the foundation for determining whether the data can be used and whether facilities need geocodes to be collected.

Completeness: you will need to determine how many of the facilities in the list(s) have geocodes, and how many are missing.

Accuracy: you will need to determine if the accuracy of the existing list(s) meets the accuracy requirements defined for the new MFL. For example, if the data are used for navigation, aiming to arrive within 10 meters of the site, and the schema is geographic (using decimal degrees), then the accuracy of the geocodes would need to be to the fourth decimal place to meet the stated accuracy requirements.

Quality: you will need to determine whether the location data are correct. To do this, you can map the location to see the geocodes fall within the recorded administrative area, and whether they are plausible (e.g., they don't fall in the middle of a body of water). You should also verify that the geocodes correspond to the right facility. When reviewing existing geocode data, it is important to examine how they were collected to determine how reliable the data are.

Once the useable geocodes have been identified in existing lists, the next step is to compare geocodes from different lists with each other. The aim is to use the existing lists to determine the validity of each geocode. Codes that match lend assurance to their validity. Matches do not need to be exact, but the locations should be within a reasonable range of each other, for example within 100 meters (the exact range you set will depend on the level of accuracy you

have determined needing in the MFL). Where large discrepancies exist, further verification will be needed. The outcome of the review process will be a list of facilities, categorized according to the status of their geocodes (validated, provisional, and to be collected). The results make it possible to determine the level of effort needed to completely geocode the MFL. Following this process, you still need to further validate the geocodes, as described in section 4.4 below.

4.3. Primary Data Collection and Validation Processes

Assigning a geocode to a location in the MFL is a simple concept. The complication comes from ensuring that all geocodes within the MFL can be proven to be reliable. If even a few geocodes are found to be incorrect, the whole list of geocodes can come into question and trust may be lost in the reliability of the MFL. Establishing sound procedures for collection and validation, documentation of processes, and documentation of the source for every geocode can help build trust in the MFL geocodes. Providing transparency through documentation enables data users to know the quality of the geocodes within the MFL, and thus trust the geocodes.

The process of collecting and validating geocodes must necessarily be coordinated with overall MFL management. Three steps are recommended: (1) primary data collection of the geocode, (2) data quality check, and (3) data validation check by revisiting the site. The third step is optional because while revisiting the site is ideal for validation, it may not be practical in some instances. How these three steps are implemented should be well documented to demonstrate the reliability of the geocodes within the MFL.

Action Plan to Fill in Gaps and Validate Existing Data

Once the quality and percentage of geocodes for all facilities is known, the next step is to develop strategies to deal with any gaps in the data. This action plan will depend on a variety of factors such as (1) type, size, and distribution of data gaps, (2) resources available for data collection (people, equipment and funds), (3) level of effort required to carry out the data collection method(s), and (4) importance of geocoding the MFL. The plan should be documented to assist with securing funds and for collaboration with other activities.

There are two main strategies for collecting geocodes using a GPS receiver or a GPS-enabled device:

1. Targeted visits to facilities solely to collect geocodes
2. Adding GPS data collection to routine or planned visits to facilities

The primary difference between the two approaches is in the level of control associated with the data collection process, timing of data collection, need for coordination with other activities, and overall cost.

Targeted visits to facilities to collect geocodes are a focused effort to collect site coordinates and can provide high quality data in a timely fashion. However, cost can be a factor in using targeted visits so this approach is rarely used.

Including GPS data collection with other activities that bring people to facilities (e.g., supervisory visits, commodity delivery) is one option for collecting new data or for validating existing data. It is important to keep in mind that “pairing” with another activity requires coordination and can result in additional time being needed to complete the geocoding process. Added effort and oversight may be needed to ensure that proper data collection methods are used.

The action plan for addressing data gaps can be a combination of approaches: targeted visits and opportunistic collaboration with other routine visits. As the MFL becomes more established, the recommendation is that an increasing proportion of GPS data collection be done through collaboration with other routine data collection. It is also recommended that when finalizing the plan for filling in the gaps in geocodes, a phased approach to long-term processes for data collection (for new sites) should be specified.

Regardless of the approach, it is imperative to have clear written protocols and training materials on how GPS data are collected in the field, stored, and transmitted.

Finally, for both primary data collection and validation of geocodes, implementation of a feedback mechanism to identify and report issues with geocodes should be considered.

Primary Data Collection of Geocodes

When visiting a health facility, a geocode can be collected using a *GPS receiver* or a *GPS-enabled device* (e.g., smartphone or tablet). Each device has advantages and disadvantages, although there are a number of similarities in the process. Below are key points for weighing the benefits of the two devices.

GPS Receivers

A stand-alone GPS receiver is primarily designed for personal navigation but it can be a useful tool for capturing geocodes. Many GPS receivers are ruggedized so they can function well in remote locations. Each receiver has its own process for capturing a geocode but in general the receiver will display the geocode location and store it on the GPS receiver for download later. Because they vary, it is important to refer to the receiver’s instruction manual for specific information about how to capture and download. The primary advantage of GPS receivers is that they are specifically designed to handle geocodes. At the same time, this characteristic is also a limitation because the GPS receiver is a single-task device that cannot easily collect any other attribute information.

Smartphones or Tablets

There has been a rapid growth in the use of smartphones for data collection. Most tablets, smartphones, and even some basic phones come with a built-in GPS chip and therefore can capture location information. The quality of GPS chips has improved to the point where these devices can have the same accuracy as a GPS receiver. A key advantage of using smartphones or tablets for collection of facility geocodes is the ability to capture other health facility information as well through specially designed data collection forms. This makes it possible to pair the geocode data with other data, such as facility name and services offered, ensuring that the geocode is correctly linked to the right facility. It is also possible to sync the directly with the MFL database if connectivity and the facility registry solution permits. Typically, data collection on these devices requires an app specially designed to capture data and geocodes. These apps can be found in the device's relevant app store or custom apps can be created using tools such as ODK or iFormbuilder.

When collecting geocodes at facility sites, it is information to also record the method used (GPS devices, smartphone, map) and the date and time of the data collection. This information is useful for documenting the source of the geocode and for checking data quality. With the advent of electronic data collection and near real-time data transfer, there is opportunity for rapid data transfer and feedback. The value is that the electronic data collection can allow feedback while data collectors are still in the field. However, expectations and understanding of roles and responsibilities need to be well established to ensure that the feedback mechanism is used effectively.

Cartographically Determining Location

When there are limited opportunities to physically visit a site, then locating the site using cartographic methods is a temporary option (until the location can be visited). The main disadvantage of using cartographical methods is lack of confirmation that the right geocode has been assigned to a particular facility. If this method is employed, using multiple sources such as Google Earth, topographical maps, and people with local knowledge, can minimize the likelihood of the geocode being incorrect. When a cartographic method is used, it should be documented in the MFL and viewed as an interim source of information until a geocode from the location can be obtained.

Potential Data Issues during Data Collection

In the process of data collection of geocodes, potential issues regarding the list of facilities may come to light. For example, a common type of data issue is duplication – the same location has two names. For example, Alpha District Hospital may also be known as St. Paul Hospital. In this case, the duplication needs to be documented and eventually resolved with the MFL maintenance team. Therefore, as part of in the data collection process, there needs to be a

procedure in place for documenting discrepancies in the facility list and resolving them according to the MFL structure.

Documenting Data Collection Procedures

It is important to have well documented procedures for the collection of geocodes to ensure that they are obtained in a standardized manner. In addition, the process for physical data collection and recording requires training materials to provide the data collectors with clear instructions on how to collect geocodes. The storage of data and the process of transferring the data collected will also need to be agreed upon and documented.

Data Quality Checks

After collection of new geocodes, the data must be reviewed to ensure data quality of the geocodes before they are added to the MFL. There are multiple ways of checking whether the geocode is representing the correct facility at the correct location. However, the best way to validate a geocode is for someone to physically visit the site and confirm that the geocode there matches the recorded geocode.⁸ Below are ways of checking the validity of geocodes that do not require going into the field. The shared principle behind these methods is assessing the validity of geocodes by comparing them with other known geographic information.

1. Do the coordinates match with the MFL schema?
2. When mapping geocodes, compare them against other known locations or landmarks, e.g., other health facilities in the MFL
3. Do the geocodes appear in or near the border of their associated administrative unit? If a location is near or on the border of its administrative area then it may be correct, but other data are needed to confirm it is in the right location.
4. If it is a large health facility, is the location on or near a road? Is it in the center of a town? Larger health facilities are always located on or near a road and usually in a town center. If it is not, then other data are needed to confirm it is in the right place.
5. When mapped over imagery, is the location an improbable site, e.g., in a river, in a dense forest, or in the middle of open plains?

After the geocode is reviewed and identified as a viable location by checking the geocode against other known geographic data, then it becomes available for provisional use. The geocode will still need to be validated but it may be some time before there is an opportunity for validation by revisiting the site.

⁸ It is considered a match when both coordinates are within 10 meters.

4.4. Validation of Geocodes through Site Visits

Validation of geocodes is required regardless of the data source (a pre-existing list or new data collection). Validation serves to verify that geocodes are correct and that they have been assigned to appropriate facility within the MFL. Validation of location data can be done when a site is being visited for other purposes (e.g., commodity delivery or supervisory visits). The process entails re-collecting location data and comparing it to the data in the MFL. A pre-defined margin of error (i.e., acceptable deviance between the two location readings) should be pre-determined. If there are discrepancies, it is important to review the methods used to collect the geocodes and to re-verify until two separate readings provide the same information.

The opportunity for validation through revisiting a site usually requires both a willingness to coordinate with all parties involved, and that all parties involved see the value of validating geocodes during the site visit. It also requires careful training of the teams going to the field as well as written instructions on how to collect, store and transmit the data.

As with other changes and updates to the MFL, geocoded data should include the date when they were collected and date of verification, to show that the geocoded MFL is being well-maintained.

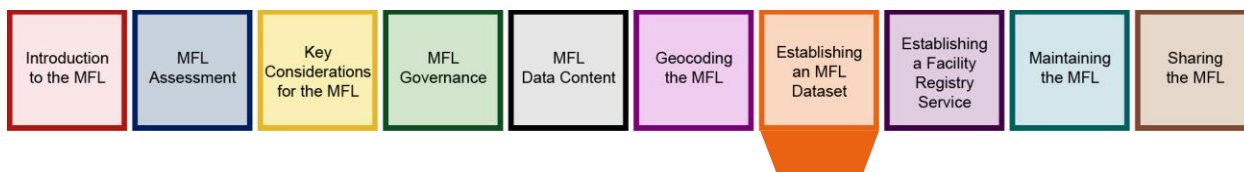
4.5. Maintaining a Geocoded MFL

As with all information within the MFL, geocoded data need to be maintained to ensure that reliability and trust in the MFL are retained. Effective maintenance recognizes that the MFL will have to accommodate regular changes in the list, and resources will need to be set aside specifically to maintain geocodes.

Together, the increased use of electronic data and the integration of GPS sensors into smartphones provide an opportunity to decrease the burden of physical data collection and management of geographical data through the greater use of IT innovations. Regardless of the technology used, four main factors are suggested to ensure sound maintenance of geocoding:

- Create processes to identify changes in the MFL and whether they trigger a likely change in the geocode. If the change in the MFL does trigger a possible change in the geocode, then the site is added to a tracking sheet of geocodes to be checked and either replaced or validated.
- Setup and document the standard methods for checking the geographic data.
- Update documentation of the geographic data elements, generally known as “metadata.” The metadata is descriptive documentation that contains information on the schema, datum, method of data collection, and format of the data elements in a geographic dataset. The metadata will need to meet national geospatial metadata standards.

- Schedule regular mapping and review for tracking changes in the geocodes. This should be done in coordination with review of the rest of the MFL. The aim is to review how well the MFL has been maintained and to improve the maintenance process to increased reliability and reduce maintenance costs.



ESTABLISHING AN MFL DATASET

This module describes the process of establishing an MFL dataset. Some sections of the module apply to countries where no MFL exists, others are applicable to countries that already have an MFL but need to fill gaps in the data or to validate the data content. Using the flow chart in Figure 1, you can quickly determine which sections of the module are most appropriate for your situation.

Checklist of things to do before using this module	Module where information is located
<input type="checkbox"/> Consult stakeholders to understand how the MFL data will be used	MFL Governance Module Key Considerations Module
<input type="checkbox"/> Determine what data should be included in the MFL	MFL Data Content Module
<input type="checkbox"/> Conduct an assessment of the MFL and available facility data in your country	MFL Assessment Module
<input type="checkbox"/> Set up a steering committee to lead the process of strengthening the MFL	MFL Governance Module

Key audiences for this module:

- Steering committee for MFL strategic planning
- Managers of the MFL
- Implementing organizations who will assist in establishing the MFL dataset

Figure 1: Establishing an MFL Dataset—Module Outline

(Press Control and click on any of the boxes to be taken directly to that section)



1. WHAT DO WE MEAN BY “ESTABLISHING AN MFL DATASET”?

Establishing an MFL dataset involves compiling the facility data you need from different sources and validating the information you have obtained. There are various approaches to establishing an MFL dataset. The best approach depends on which data are already available, the quality of those data, and how well they align with the pre-established MFL requirements.¹ Depending on the country, you may need to build a new MFL dataset from scratch, harmonize existing facility lists into a MFL, collect and add additional data to complete a MFL, or simply **validate** an existing MFL.

The module outlines the various steps and decisions that must be made in the process of establishing an MFL dataset. Some steps may be skipped for countries that are further along.

¹ For additional information see the *Key Considerations Module* and the *Data Content Module*.

2. KEY STEPS IN ESTABLISHING THE MFL DATASET

2.1 Determine What Data the MFL Will Contain

Before you begin the process of establishing an MFL, you need to have determined what facility data you want included in your MFL and what format the data should be in. See the *MFL Data Content Module* for detailed information on these issues.

2.2 Identify Available Facility Lists and Assess Their Content

You will also need to have identified and assessed the existing facility lists in the country, including the MFL, if there is one. The *MFL Assessment Module* contains detailed guidance for assessing facility lists. The assessment will help you identify what facility lists exist, how complete and up to date the data are, and whether the data contained in these lists can help build or supplement your MFL.

After assessing individual lists, consider the group of lists as a whole, to determine:

- How complete are the data available?
 - Do you have data for all or most data elements of the MFL?
 - Do you have data for all or most health facilities?
- What data are missing?
- Will you need to collect new data to fill gaps?
- Are there important discrepancies across lists (for example, facility names or addresses are not the same)? Is it possible to determine where the error lies?
- Are the data in the lists defined according to the data specifications and standards you have set for the MFL?²

2.3 Identify a Good List to Serve as a Starting Point

If an MFL already exists in a country, and you have determined that the data are reasonably complete and of good quality—even if there are some gaps—you can skip this section.

If a country does not already have an MFL, the information you have gathered about existing lists will help determine if there is a facility list of sufficient completeness and quality that it can be used as the basis for establishing your MFL. To serve as a solid foundation for the MFL, this list must meet most of the MFL criteria for data content and quality. The list does not need to be complete, but it should:

- Be credible—you trust the data sources and methods used to update and validate the list;
- Have enough information about facilities to populate a good proportion of needed MFL data;
- Contain data that was collected or verified within the past five years.

² See the *MFL Data Content Module*

If some data elements or facility types are missing, those can be collected separately. The more important aspect of this step in the process of establishing an MFL is determining whether you have confidence in the validity of the data in the list you have selected. If there are too many errors, incomplete information, or other data quality concerns, it may be best to start from scratch with an entire census of health facilities. If you are unsure about data quality, you may want to do spot checks and data validation for some data elements. See Section 2.7 below, “Validate Data for Each Facility,” for more information.

If none of the lists meet sufficient assessment criteria—for example, the lists are too outdated or the data are fragmented and incomplete—then you will need to consider starting from scratch and collect new facility data. For more information, see Section 2.6 below, “Collect New Data.”

CASE STUDIES: STRATEGIES USED FOR ESTABLISHING THEIR MFL DATASET

Kenya: New data collection was used to create the MFL because no existing list had sufficient information to serve as a starting point. The MOH conducted the new data collection by sending each district a template that outlined the requested data fields. The districts collected the information and reported it to the MOH, which then compiled the data and used it to create the initial MFL.

Nigeria: Each state had a different process for registering and identifying facilities. The Federal Ministry of Health harmonized data from multiple lists, assigned new unique identifiers, and began a process of to remove duplicates.

Tanzania: The MFL was created by implementing both new data collection and harmonization of existing lists. The existing lists came from various sources such as government ministries, multi-national organizations, and other agencies.

Haiti: After the 2010 earthquake, Haiti realized the importance of having a list of all the health care facilities in the country. A preliminary MFL was developed by merging information from various lists and consulting knowledgeable persons. This preliminary MFL was then posted to a public website where anyone could recommend corrections or additions to the list.

Philippines: The directory was maintained by the NHFR Team at the Department of Health (DOH), with the sub-national health offices and the licensing bureau both having upload rights. This arrangement led to the creation of duplicate records and, from an initial roster of 17,000 facilities, the list ballooned to 40,000. Additionally, input into the directory was not efficient, resulting in the facilities list being both overly large and incomplete—i.e., duplicate facilities and missing and incorrect data. The NHFR Team spent a substantial amount of time cleaning the directory and flagging potential duplicate facilities, which was a challenging and time consuming process. Duplicates were matched by health facility name and location (administrative unit, geographic coordinates). The team additionally devised a set of rules for identifying potential duplicates. For example, they flagged all districts that had more than two hospitals.

2.4 Address Gaps in Data

If you have identified a facility list that will serve as the basis of the MFL, you need to clearly document any gaps that exist in this list. Gaps can be: (1) missing data (for example, there are no geocodes), (2) incomplete data (for example, a sub-set of facilities such as military hospitals are missing), or (3) data that appear to be erroneous. You will likely already have noted these gaps during the course your MFL assessment. However, at this point it is important to examine the gaps in data carefully to know exactly what additional information needs to be gathered to supplement the existing data in the facility list, and thereby create a comprehensive MFL.

Next you need to determine where to get the data needed to complete the facility list. Generally, there are two options for doing this. You can either pull data from another existing facility list, or you can collect data directly from the facilities. In some cases you will need to do both. For example, you may find a list that has the necessary data for facilities in one region of the country, but need to collect that data for other regions.

When choosing whether to pull from other lists or to collect new data, give careful consideration to the level of effort required and the associated costs. Pulling from different lists can be more complicated than expected if facility names and unique identifiers don't match. If you think the gaps in your list can be addressed using data from other available lists, see Section 2.6 "Harmonize Lists into a Single List."

If the missing data are not available in current lists, or if harmonization is not a practical solution, you will have to fill the gaps by collecting new data. See Section 2.5 "Collecting New Data" for information on how to do this.

2.5 Collect New Data

During the process of establishing an MFL, you may need to conduct new data collection. This is the case if you do not have all the information for your MFL **minimum data content**, and you cannot fill the gaps using information available in other lists. Be clear about the types of new data you need to collect; specify the following:

- Types of facilities you are including³
- Geographic areas where data collection will occur
- Data elements you need to gather, along with clear definitions for each
- Data collection tools or measurement approaches you will use
- Data sources you will use

Approaches to new data collection include the following:

Health facility assessment surveys—can provide new data for the MFL. Examples of such surveys are the World Health Organization's Service Availability and Readiness Assessment (SARA) and the DHS Program's Service Provision Assessment (SPA). These surveys can be administered as a census, or in select regions, or targeted to a specific type of facility, depending on the information that needs to be collected. You can coordinate with them to make sure they are collecting the data needed for the MFL per the data specifications you have decided upon. For planning purposes, you will need an estimate of the number of facilities in each geographic area and their approximate locations. A facility assessment survey will provide information

³ See the *Key Considerations Module* for more information on determining what facilities to include in the MFL.

beyond what is needed for the MFL and may be beneficial for other purposes. However, this is an expensive option to carry out.

Targeted facility census—An alternative to a full facility assessment survey, is to send teams into the field to collect the data directly from facilities only on the data elements needed for the MFL. Sending trained data collectors improves the quality of the data you will get.

District Health Information Officers—can be enlisted to collect information about facilities in their districts. They tend to be familiar with the various facilities and can coordinate with local MOH staff to help gather specific data as needed. These efforts can either be coordinated with scheduled supervisory visits to facilities or be done separately. A simple questionnaire specifically designed for the MFL is helpful to aid the data collection process.

Crowd sourcing—soliciting contributions from a large group of people in a community or from data consumers can generate new data. In remote areas particularly, the community itself is often a necessary source of data. However, this method is not ideal because the persons collecting and sending in the information have not been trained to collect the data, and may not understand the exact definitions and measurement approaches specified for the MFL.

Collecting data on facility locations requires a more meticulous approach. For more information, see the *Geocoding the MFL Module*.

New data collection can be costly, depending on the approach that is used. Therefore, it is important to consider carefully the available budget before planning for new data collection. If the budget is limited, data collection can be done in stages, such as targeting one sub-group of districts at a time. It is important to prioritize which data are needed most urgently. Usually, data pertaining to the signature domain is critical to a MFL and should take precedence over data describing services offered at the facility.⁴

⁴ See the *Key Considerations Module* for more information.

Once the data have been collected and entered into your list, you will need to begin the process of validating the data for each facility. See Section 2.7, “Validate Data for Each Facility.”

CASE STUDY: NEW DATA COLLECTION

Tanzania: In addition to the harmonization of lists, a data collection tool was used to collect additional information and to validate or verify the information in the existing lists. The tool was about 4 pages and collected information on a wide range of information including: name, location, administration level, unique facility identifier, contact information, facility type (which included better categorization of facilities than was used in the existing lists), ownership, infrastructure (number of beds, rooms, transport, waste, etc.), services offered, physical location and service area population.

2.6 Harmonize Lists into a Single List

When the plan calls for harmonizing lists, keep in mind the costs and resources required to carry out this procedure. The time and effort required for matching facilities across lists and for data cleaning is often underestimated, which has the potential to cause significant delays in establishing an MFL. Ideally, you establish a technical working group or committee of experts that oversees the harmonization process.

Harmonization can serve two purposes. It can be carried out to add additional facilities and their complete records to the MFL. Alternatively, harmonization can be carried out include new data about facilities already in the MFL.

To harmonize the lists, you will first need to:

- Identify which data will be kept from each list
- Compare data element definitions (or **data specifications**) across lists that you will use to populate the MFL to make sure they are consistent
- Estimate what proportion of facilities can be matched electronically across lists. To match electronically, the facilities will need to have identical data in one or more key data elements (e.g., same unique identifiers or geocodes, or the same name plus administrative units). The inconsistent use of accents or abbreviations, and misspellings will impede electronic matching. If the proportion of non-matching facilities is high (over 25%) determine how long it will take to verify and individually cross-reference each facility between lists.

You will then:

- Match facility records to create one record per facility in the MFL.
 - Organize the facility data—you will want to organize the facilities by lowest appropriate administrative level (often, this will be district level). It is also helpful to sort them alphabetically if the matching will be done by hand.
 - Identify facility records that correspond to the same facility
 - Electronic matching is best when there is a large number of facilities. The simplest approach is to try to match facility data per district based on facility name. However, small differences in spelling can fail to electronically match a same facility across lists. Geocodes and unique identifiers are usually not consistent across lists and are not recommended to be used for matching.
 - For matched facilities, do a quick check of the other data fields for the **signature domain** to verify that the facility is in fact the same across both lists.
 - Manually—for facilities that were not matched electronically, you will have to match them on an individual basis. For facilities to be considered a match, the following data should be the same for both records
 - Facility name—a slight difference in spelling, naming, or abbreviations may have prevented the electronic match from recognizing these facilities as a match
 - Facility type (hospital, clinic, rural health center, etc.)
 - Managing authority (public, private)
 - Location within administrative units
 - Combine the information in matching records to yield one record per facility. If entries cannot be matched, flag the multiple entries for reconciliation during the validation process.
- You may also want to import data for new facilities (not included in your MFL). In this case, you do not need to merge records, but you do want to verify that the facility is not already listed under another name.

A common challenge that arises during data harmonization is discrepancies in facility-level data—spelling differences, address or location differences, and differences in the naming of facilities. If you are not sure whether some facilities are in fact matches, it will be necessary to consult district or facility personnel.

Once you have harmonized the data into a single list, you will create the unique facility identifier codes for facilities that do not already have them.⁵

When harmonization is complete, you should reassess the new list for gaps.

⁵ See the *MFL Data Content Module* for more information on facility codes.

CASE STUDIES: PROCESS OF HARMONIZATION

Tanzania: Harmonizing the existing lists included matching for geographic administration level, facility name, geocodes, multiple IDs, ownership, and facility type. In addition, a data collection tool was used to obtain additional information about the facilities, and to validate and verify the information in the existing lists.

Nigeria: To establish Nigeria's MFL, the Federal Ministry of Health (FMOH) had to harmonize data from multiple facility lists. The goal of the process was to allocate new unique identifiers and eliminate duplication of facilities. An intelligent unique identification system was used to create new unique identifiers. Following this allocation, matching of independent identifiers across different information systems (those previously deployed in the country) was attempted. A manual matching process was employed—any facility records that were a 100% match were considered similar records and the data in the other system was used to improve the information from the primary MFL that the FMOH had compiled. Any facility records that were a partial match were reviewed further by the FMOH. The FMOH was responsible for verifying whether the data were associated with one or more than one facility and entering the verified facility information into the MFL.

2.7 Validate Data for Each Facility

Once the necessary data have been input into the MFL, you need to **validate** the data for each facility. Validating the list involves determining if you have data quality issues that need to be resolved. This is an ongoing process that should continue throughout the life of the MFL. All data in the MFL need to be validated, but accuracy of the signature domain component of the MFL is of particular importance.

It is recommended that, when possible, individuals familiar with the health facilities in their own localities (for example district health information officers) be responsible for validating the data. Data validation can be carried out through supervisory visits or through dedicated visits to the facility to determine the validity of the MFL data. If visits are not possible, telephone or email contact with the managing authority can suffice (with the exception of validating coordinates).⁶

⁶ See the *Maintaining the MFL Module* for more information on validating MFL data.

CASE STUDY: PHILIPPINES VALIDATION WORKSHOPS

The Philippines organized subnational validation workshops during which the MFL team and Department of Health (DOH) representatives worked together to clean and complete the existing MFL. They reviewed the list facility by facility to verify the data and correct them as needed. This process took about one year to cover 16 of the regions in the country. These validation workshops were useful whereas previous attempts to correct and fill gaps in the data by sending lists to subnational representatives were unsuccessful due to low response and poor internet connectivity. At the same time, the workshops provided a forum for (1) training DOH representatives on the process of updating the MFL, and (2) improving their skills in the collection of data on geographic coordinates of facilities using Google Map or GPS devices.

Once you have validated the data for each facility and assigned unique identifiers, you have a validated MFL that is ready to share.

3. GOVERNANCE ISSUES TO CONSIDER

When you have determined the best process to follow in establishing your MFL dataset, you will need to set up a technical working group tasked with implementing the work. It will help with developing a work plan, creating a budget, and establishing a timeline to aid in managing the process.

Stakeholder engagement is critical at every step in the process of establishing an MFL dataset. Stakeholder buy-in and support is especially important if you want to harmonize lists owned by different groups, and reach consensus on a single authoritative list for the country.⁷

⁷ For additional information on stakeholder engagement, see the *MFL Governance Module*.

4. CHALLENGES

Establishing MFL Dataset Challenges	
Challenge	Potential solution
Too many facility lists exist	<ul style="list-style-type: none"> • Work with the MFL Steering Committee or Technical Working Group to determine what lists should be assessed and considered for building the MFL • Eliminate lists that are old or contain few relevant data elements or are duplicative of data available elsewhere. • Determine whether harmonizing many lists is more or less cost-effective than new data collection.
Too many data elements included in the MFL	<ul style="list-style-type: none"> • Work with the MFL Steering Committee or Technical Working Group to determine what the minimum content should be and prioritize the need for additional data • Consider the costs • Fully understand the implications and costs of adding more data elements to the list, what issues might arise, and how those issues will be dealt with • Consider the costs and data collection burden required to keep the list up-to-date in the long-term
Non-standard facilities (i.e., not “brick and mortar”) or mobile facilities	<ul style="list-style-type: none"> • Determine what sources of data will be used for these types of facilities • Determine what value their inclusion in the MFL will bring against added cost of doing so • Location data will need to be general (for example, just naming the district where they operate) • Anticipate needing to validate data for these types of facilities more frequently as they tend to change more often
Addressing discrepancies between MFL and externally managed facility lists (donors or civil society)	<ul style="list-style-type: none"> • Work with the MFL Steering Committee, Technical Working Group and list owners to determine how data discrepancies will be addressed • Validate data in the MFL to make sure it is accurate

5. RESOURCES

- [Development of a Master Health Facility List in Nigeria](#)
- [Development of a Master Health Facility List: Haiti's Experience](#)
- [Tanzania MFL data collection form](#)
- [Rwanda MFL data collection form](#)



ESTABLISHING A FACILITY REGISTRY SERVICE

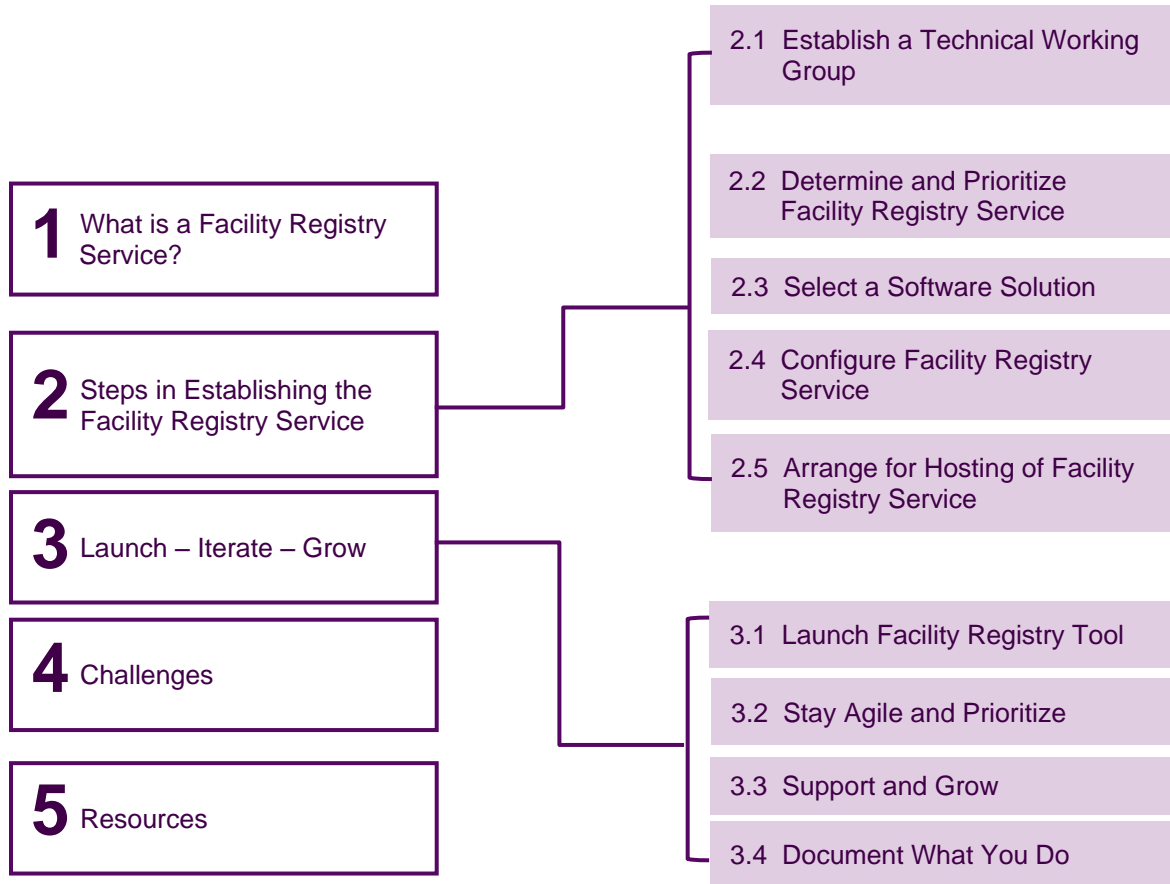
A **facility registry service** is a software solution that houses and shares the Master Facility List (MFL). This module describes the steps required to develop and launch a facility registry service. It also provides information about the various decision points and approaches encountered in the process of establishing a facility registry service.

Checklist of things to do before using this module	Module where information is located
<input type="checkbox"/> Gather user requirements and goals for the MFL	Key Considerations Module
<input type="checkbox"/> Determine processes and workflow for updating and curating the MFL data	Maintain the MFL Module
<input type="checkbox"/> Review existing data sharing policies	MFL Governance Module
<input type="checkbox"/> Decide the MFL data content and define data specifications	MFL Data Content Module

Note: words in **bold** are defined in the glossary.

Figure 1: Establishing a Facility Registry Service – Module Outline

(Press Control and click on any of the boxes to be taken directly to that section)



1. WHAT IS A FACILITY REGISTRY SERVICE?

A **Facility Registry Service** is a software solution that stores and shares the Master Facility List (MFL) data. Depending on its design, a facility registry service can serve a number of additional purposes. A facility registry service can:

- Enable **data consumers** to read, search, sort, download, and use facility data.
- Facilitate **data curation** by (1) allowing users to submit suggested data updates, (2) recording changes made to MFL data, and (3) archiving data that is no longer valid.

- Act as a common component of a **health information exchange** (HIE) and enable more complex interoperability use cases.¹
- Serve as a portal for data consumers to ask questions or to suggest improvements regarding the facility registry service itself or the data contained in the MFL.

2. STEPS IN ESTABLISHING THE FACILITY REGISTRY SERVICE

2.1 Establish a Technical Working Group

The first step in the process of establishing the facility registry service is creating a technical working group tasked with development and implementation of the facility registry service. At a minimum the group should include developers, government representatives, and the primary MFL data consumers as well as those who will be responsible for the long term management and maintenance of the MFL. It may be necessary to establish subcontracts with local or international information technology (IT) firms to support the development phase.

The working group will need to coordinate closely with the MFL Steering Committee to assure that the development process aligns with the broader MFL goals, that national eHealth and data policies are taken into account, and that the necessary resources are available.² Stakeholders should also be consulted regarding key decisions about the facility registry service to avoid difficulties that might otherwise arise. It is also important that the TWG establish a plan for measuring the success of the facility registry service in meeting MFL goals.

2.2 Determine and Prioritize Facility Registry Service Requirements

Gather Requirements

To successfully implement a facility registry service, begin by identifying the persons, agencies, institutions, and organizations that are likely to use it. Second, determine how the different types of users want to access and interact with the MFL data. As discussed in the *Key Considerations Module*, it is helpful to gather user stories to understand user requirements for the facility registry service. Give particular attention to the needs of the following groups which are most likely to use the facility registry service:

- **Data consumers** – persons who access and use the MFL data
- **MFL administrators** – persons responsible for overseeing all processes related to the MFL
- **Data curators** – persons responsible for managing, updating, and validating the MFL content

¹ See Open HIE (Open Health Information Exchange) for more information on health information exchanges and the role of the MFL and the facility registry service within this system: www.ohie.org

² See the *MFL Governance Module*.

- **Data suppliers** – persons or information systems that submit facility data or updates to the MFL

When considering the requirements, it is important to note the following:

- Whether the MFL will exchange data with other information systems. For example, the MFL may need to pull data from a facility licensing database or push data to a health management information system (HMIS).
- Whether international standards will be used to facilitate data integration.
- What processes and workflows used to update and maintain the MFL data need to be supported by the service?³ Specifically, it will be necessary to know beforehand (1) what the data sources for the MFL will be, (2) how data are submitted and by whom, (3) what is the data validation and approval process, and (4) the guidelines for documenting and archiving changes to the MFL data.
- What types of access permissions and restrictions need to be built-in?⁴

Prioritize Requirements

The requirements for the facility registry service should be prioritized and decisions made regarding what can be accomplished with the available resources. You can create a phased implementation plan to address immediate needs while putting off other functions until additional resources become available. To facilitate prioritization, collaborating organizations need to have a common set of goals for how facility data are to be managed and shared.

Assess Gaps

Once the facility registry service requirements have been identified and prioritized, you need to provide a plan designed to meet the requirements. We recommend consideration of the following questions that can highlight gaps between what currently exists and what you want to achieve:

- Is new software needed to support the MFL? Consider whether existing solutions can be improved to meet most requirements, or whether a new software solution is needed. The MFL assessment⁵ will have helped identify whether software solutions exist to house facility lists, and to what extent they meet the needs of data consumers.

³ See the *Maintaining the MFL Module* for more information on these processes.

⁴ See the *Sharing the MFL Module*

⁵ See the *MFL Assessment Module*

- Can the existing infrastructure (e.g., Internet connectivity, servers, electrical power, etc.) adequately support the facility registry service? Consider whether enhancements to the infrastructure are needed and whether they can feasibly be implemented.

2.3 Select a Software Solution

After you have determined what the facility registry service needs to be able to do, you can consider the different software solutions available; it is likely that several solutions will meet your needs. To facilitate the decision-making process, the following suggestions should be considered:

- Decide whether you will use open source or proprietary software. This decision depends on the financial and personnel resources available to support development of the facility registry service. It will also depend on the user requirements and which software can best meet those requirements.
- Determine what the software can do “out of the box” and how much additional programming will be needed to meet the facility registry service requirements.
- Consider which software solutions are most familiar to local information technology (IT) partners. This will affect (1) how much external technical assistance will be needed to set up the facility registry service using this software solution, and (2) whether the technical skillset is available in-country to support the specific software long-term.

Open Source Versus Custom Solutions

Recently, open source software solutions have been developed that meet many of the common requirements for a facility registry. These facility registry service solutions have been developed through in-country implementations and likely have many of the features you will need (see box at right). When deciding whether to use an existing facility registry service solution or to create a custom solution, consider the following:

1. Using an open source, facility registry service solution can result in a quicker and cheaper path to implementation and scalability. However, ongoing support of the facility registry service is still needed over the long term. Support may be available through the various developers and technical staff who have worked to design these facility registry solutions.
2. Some facility registry solutions are available for use in the cloud, and nontechnical users can get started immediately configuring the facility registry service and uploading available data.

Open Source Facility Registry Service Solutions

Two open source software solutions that can easily be configured to function as a facility registry services are:

- [Resource Map](#)
- [DHIS2](#)

3. These open source solutions can serve as the foundation of the facility registry service and then be adapted or built upon as needed. For example, it is possible to add custom interfaces and portals to meet local or very specific requirements.
4. Existing facility registry service solutions provide out-of-the-box support for commonly used and accepted **application programming interfaces (APIs)** and interoperability workflows.
5. A custom-developed solution allows you to have total control over the facility registry service design and development and can therefore better meet very specific requirements. However, the costs can be higher than using open source solutions.

Keep the Facility Registry Service Independent

The facility registry service should primarily seek to fulfill the requirements identified for the MFL. Preferably, it should not exist embedded within another information system. It may be tempting to house the MFL within an HMIS solution, for example, but this is not recommended as this could lead to unnecessary complications when modifications to the MFL need to be made. Having an independent (though integratable) solution allows changes to be made to the MFL content or structure without impacting the operations of other information systems.

The OpenHIE Community or Practice

The global OpenHIE community maintains a community of practice dedicated to the development and implementation of facility registry services. This community provides a forum where members can seek support, share experiences, and participate in the development of solutions to common challenges.

See:
[OHIE Facility Registry Community](#)

CASE STUDY: SELECTION OF FACILITY REGISTRY TOOLS

Bangladesh, Kenya, and the Philippines opted for custom-based solutions for their facility registry tools. (See [Bangladesh](#), [Kenya](#), [the Philippines](#).)

South Africa elected to use the open source DHIS2 platform to house their MFL. However, they are using a different DHIS2 instance than the one used for the HMIS, thus keeping the two databases independent.

Tanzania and **Rwanda** are using an open source reference tool built on Resource Map solution with customized portals. (See [Tanzania](#).)

2.4 Configure Facility Registry Service

After a software solution has been selected, you will need to configure the registry with the appropriate details driven by the data specifications and requirements that you have identified

and prioritized.⁶ Configuration should be approached in an iterative fashion, meaning that it is done in a phased manner with each phase involving user testing and the resulting feedback being incorporated into the next iteration. Configuring the facility registry service includes the following activities:

- *Define fields and metadata.* Take the MFL data specifications and set up the fields in the registry.
- *Institute permissions.* Define the appropriate access for those who will read, edit, or curate the facility registry. Permissions may vary by role, fields, or even geographic responsibility related to a role.⁷
- *Implement integrations.* Ensure that the facility registry service connects with and shares data effectively with partner systems that need to either use or contribute data. Begin by prioritizing the integrations, ensure you have collected the related requirements, and decide if international standards will be used. Then, carry out the integration using standard based, reusable transactions and interfaces that make it easy for technologies to share data with each other.
- *Develop applications.* If the software solution cannot be configured to meet all requirements, it is possible to develop external applications. This approach facilitates greater levels of customization and functionality by connecting the facility registry solution over APIs to other applications that serve either custom or specific roles that are neither intrinsic nor exist within the scope of the facility registry. Examples of such applications include programs that implement a particular curation process or help to identify duplicate records.
- *Design user interfaces.* User interfaces (or portals) serve as a means for users to interact with a program. They can be used to present data with a particular branding or to customize the presentation of data for specific types of users. For example, a facility “look-up” for the general public has a substantially different set of requirements and related solutions, compared with a portal designed to be used by the MFL management team. In this case, it is likely preferable to set up two distinct interfaces – using the same data source – that respond to the particular needs of each group.

If using an existing open source facility registry solution, it may be possible to work with the software provider to enhance or add features to this reference solution. This is the preferred approach if the enhancements are likely to be beneficial to other implementations.

⁶ See *the MFL Data Content Module* for more on data specifications.

⁷ See *Sharing the MFL Module for more on providing access to the MFL*

2.5 Arrange for Hosting of Facility Registry Service

A question that often arises regarding a facility registry service is whether it should be hosted locally on a Ministry of Health or organizational server, or it should be cloud hosted. The answer depends on existing national policies, data security concerns and available resources. Many countries have laws that regulate where national data can be stored and who owns those data. The legal framework around these issues must be carefully examined. Data localization laws in particular must be consulted prior to deciding where to host the MFL data.

Hosting options for open source facility registry solutions

Some open source facility registry solutions mentioned earlier are available online and typically hosted via a cloud service. The implementation can be achieved by (1) leveraging a cloud hosted instance or (2) downloading an instance to a local server. The main benefit of choosing the cloud hosting, is that users can begin using the facility registry service immediately, while minimizing associated costs and logistics.

Data security is another consideration when selecting where to host the MFL. Many cloud-based servers provide data security measures as part of their services, and it is important to ascertain the details of those security measures. When a local server is being evaluated, it is necessary to consider whether similar security measures are in place and if they are continually supported and updated.

If there are no legal constraints, the choice of host centers on what is most practical in a given setting. It is common practice to begin with a cloud hosted instance and, over time, to migrate the service to a locally hosted instance.

- *Cloud Hosted* – Cloud based hosting is advantageous when the local infrastructure environment (including physical servers, electricity, connectivity) is weak or unreliable. Additionally, cloud hosting often comes accompanied by support services related to data security, backups, server maintenance and troubleshooting, thus eliminating the need to find local teams to manage these tasks.
- *Locally Hosted* – Facility registry services can be installed locally on a server under the direct ownership of implementers such as the Ministry of Health. The full spectrum of operations and infrastructure support for a locally installed instance are then shifted to the implementers. The cost of implementing a facility registry can increase substantially during the process of establishing the necessary physical infrastructure and technical support. The main benefit of hosting locally is that implementers have greater control and autonomy regarding management of the infrastructure supporting the system.

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hosted instance or (2) downloading an instance to a local server. The main benefit of choosing the cloud hosting, is that users can begin using the facility registry service immediately, while minimizing associated costs and logistics.

3. LAUNCH – ITERATE – GROW

3.1 Launch Facility Registry Service

Planning for and executing the launch of a facility registry service is an important step, particularly when a public interface is being used. You need (1) to consider the appropriate communication channels for announcing the launch and (2) to involve the partners who were identified early on when the facility registry service requirements were gathered. Further, it is important (3) to encourage participation and engagement with the facility registry service, allowing for self-service and easy channels of support. Finally, (4) be welcoming to those who want to collaborate with the facility registry or provide support.

3.2 Stay Agile and Prioritize

Ensure that an agile and iterative process continues after the launch of the facility registry service. This involves considering new and yet-to-be-resolved priorities, and developing and testing enhancements in short cycles. This process means that user testing and iteration of the features and configurations of a registry take place simultaneously, repeatedly, and as often as possible, rather than just at the end of a project lifecycle. This iterative process maximizes user input into the facility registry service solution. Testing a solution only at the end of the project adds significant risk.

Additional requirements and user stories will be generated throughout the lifetime of the facility registry service implementation; these should be prioritized and similarly addressed when resources are available. Additional development can take place and be informed through routine testing and re-prioritization as new requirements arise. A software code repository (e.g., Github) can help to transparently document and track issues and updates to a facility registry service, keeping both technical and nontechnical users engaged and up to date with progress.

3.3 Support and Grow

Ongoing technical support is needed for the facility registry service. The team tasked with managing the MFL over the long-term will need to coordinate this technical support with the assistance of one or more developers. Their job will be to triage, document and resolve requests for system enhancements and integrations, as well as troubleshooting user problems. Common types of ongoing support for facility registry services are the following:

- *Developer and operations support.* Ongoing support is needed for the configuration, enhancements, infrastructure, and logistics of the facility registry service. For instance, it

may be desirable to improve the curation workflow or develop other applications that operate in coordination with the facility registry service. These activities are usually handled by developer and operations support. When the facility registry service is hosted locally, there is a need for operations support to include: monitoring error logs, maintaining a server, ensuring security protocols, and conducting backups and software updates.

- *Integration support.* Over time additional data consumers may want to integrate with the MFL, or may have changing requirements regarding data integration. These partners will likely need technical assistance to add the appropriate codes in their application to facilitate integration.

3.4 Document What You Do

Documentation of decisions, processes, challenges and resolutions related to the facility registry service is important for adequate management and support of these systems over time.

4. CHALLENGES

Establishing a facility registry service for the MFL poses several challenges. The table below lists some of the common challenges and potential solutions.

Facility Registry Service Challenges	
Challenge	Potential solution
Insufficient funds to meet all the user requirements	<ul style="list-style-type: none"> • Prioritize user requirements the involvement of the various stakeholders and the MFL Steering Committee • Cost out the different options and determine if other agencies or organizations are willing to invest in the facility registry service • Choose open source software that provides cost savings
Facility registry service is too complex	<ul style="list-style-type: none"> • The facility registry service should focus primarily on housing and sharing MFL data • Extra functionalities should be given careful consideration before inclusion in the facility registry service • Determine if the requirements can best be met by a separate application rather than the facility registry service
Insufficient consideration of long term cost of the facility registry service (as opposed to cost of initial setup)	<ul style="list-style-type: none"> • Identify the long-term maintenance, technical and support requirements associated with the facility registry service and establish a budget for them.
Insufficient training and support for users of facility registry service	<ul style="list-style-type: none"> • Have a small IT team continuously available locally to provide support, answer questions, and trouble shoot when issues arise

5. RESOURCES

- [Tanzania Resource Map User Guide](#)
- [DHIS2 Documentation](#)
- [Tanzania MFL user requirements](#)
- [Potential Use Cases for the Development of an Electronic Health Facility Registry in Nigeria](#)
- [OHIE Facility Registry Service User Testing Guide](#)
- [Planning an Information Systems Project—PATH](#)



MAINTAINING THE MFL

This module describes the procedures that need to be implemented to maintain the Master Facility List (MFL) and keep it up to date. The module provides guidance on updating and verifying existing facility data in the MFL and making adjustments to the types of data collected. The module also covers aspects of maintenance related the facility registry service that houses the MFL. It discusses issues that need attention during the planning phase, and describes the management and staffing needs for proper maintenance.

Checklist of things to do before using this module	Module where information is located
<input type="checkbox"/> Understand the purpose and value of an MFL	Introduction to the MFL Module and Key Requirements Module
<input type="checkbox"/> Establish a Steering Committee to oversee MFL development process	MFL Governance Module
<input type="checkbox"/> Understand the Context within which the MFL will be implemented	MFL Assessment Module

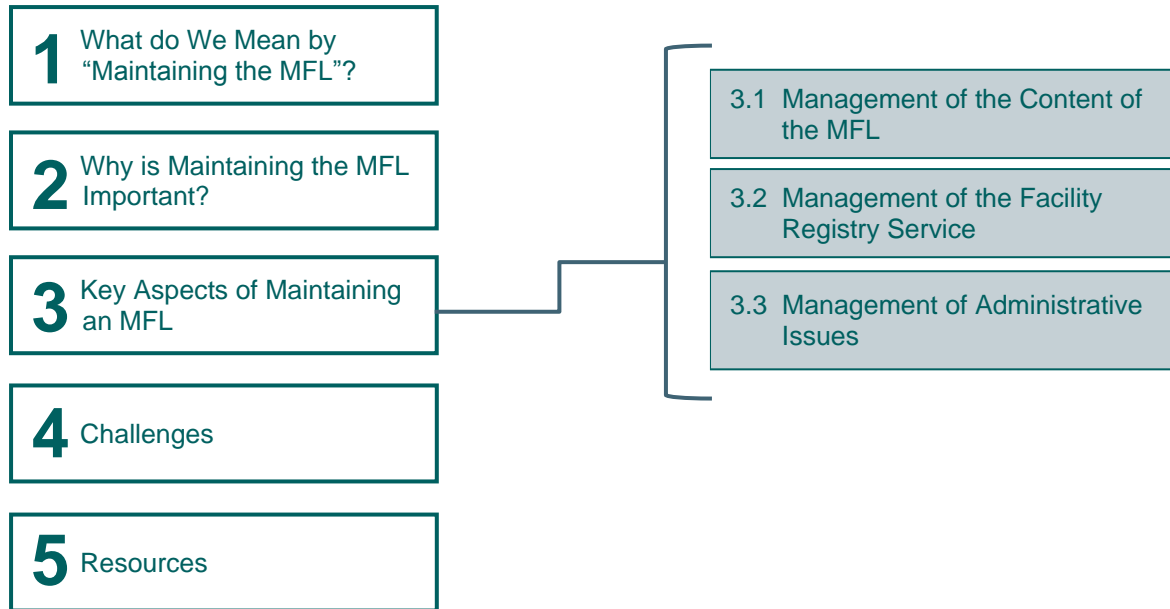
Key audiences for this module:

- MFL Steering Committee
- MFL Technical Working Group (TWG) tasked with developing MFL maintenance procedures
- MFL managers who overseeing implementation of these processes

Note: words in bold are defined in the glossary.

Figure 1: Maintaining the MFL – Module Outline

(Press Control and click on any of the boxes to be taken directly to that section)



1. WHAT DO WE MEAN BY “MAINTAINING THE MFL”?

After the MFL is established—meaning a dataset exists, has been validated, and is housed on an appropriate software solution—it must be maintained over the long-term. Maintaining the MFL involves implementing procedures that ensure that the data are updated, accurate and complete, and that the data continue to meet the needs of stakeholders. It is important that well-defined, feasible processes, standard operating procedures, funding, and human resources are in place to maintain the MFL and enable sustainability.

Maintaining the MFL involves the following components:

1. Management of MFL content to ensure that the data are current, reliable, and useful to data users:
 - Updating (i.e., adding or changing) the data for individual facilities
 - Auditing existing MFL data regularly to verify its continued accuracy
 - Reviewing the data elements included in the MFL and making adjustments as needed
2. Management of the MFL **facility registry service** (i.e., the software that houses the MFL data):
 - Troubleshooting problems that inevitably arise
 - Responding to new user requirements when they arise
 - Supporting integration with additional information systems over time

3. Management of administrative activities related to the MFL:
 - Ensuring that adequate leadership is available to oversee the maintenance process, resolve conflicts, manage expectations, and handle queries that arise
 - Establishing and implementing maintenance standard operating procedures (SOPs)
 - Ensuring that there is sufficient staff to maintain the MFL
 - Ensuring that there is adequate funding for maintenance

2. WHY IS MAINTAINING THE MFL IMPORTANT?

Maintaining the MFL is important because facility data can quickly become outdated. New facilities open for operation while others close, facilities may be upgraded, and the types of services offered by facilities change periodically. Ultimately, maintaining the MFL is important because if the data are not of high quality (i.e., accurate, current, complete, and relevant) the information will not be useful to data users. If an MFL is perceived to be outdated, incomplete, or inaccessible, it ceases to be a valuable tool and stakeholders will revert to developing their own parallel facility lists.¹

3. KEY ASPECTS OF MAINTAINING AN MFL

3.1 Management of the Content of the MFL

Maintaining the MFL requires implementing procedures that ensure that the data are accurate and current, and that the data continue to meet the needs of stakeholders. Three procedures are fundamental to maintaining an MFL content.

- Updating the MFL data—MFL data sources or users propose changes to the MFL (such as adding or deleting facilities, or editing data about a facility) and **data curators** verify and approve the changes that are submitted. This procedure can be thought of as a “push system” whereby data updates are pushed by data sources or users to the MFL.
- Auditing the MFL—Persons in charge of the MFL periodically conduct checks of the MFL data to verify continued accuracy. This procedure can be thought of as a “pull system” whereby data are pulled from the MFL for verification.
- Reviewing the data elements included in the MFL—A consultative mechanism is in place to determine whether the data elements included in the MFL continue to meet the needs of data consumers; adjustments are made to the data elements as needed.

¹ See the *Introduction to the MFL Module*.

Updating MFL Facility Data

Updating the MFL content entails adding or changing MFL data. The process of updating the MFL has three possible outcomes: (1) data for a new facility are added, (2) data for a listed (but no longer active) facility are archived, and (3) data for a listed facility are changed or updated.

1. *New facility added*—If a facility not already included in the MFL is determined to exist, it should be added to the MFL. If a regulatory authority is responsible for issuing health facility licenses, this authority should be included in the updating process. New facilities should be communicated by the authority to the appropriate MFL data curator for addition to the MFL. However, if such an authority does not exist or if the MFL includes health facilities that fall outside of the authority’s control (e.g., private facilities operated by NGOs or FBOs), other methods, such as a periodic facility census, or obtaining data from local data sources might be needed to gather accurate and complete information about new facilities.
2. *Facility data archived*—If it is determined that a facility does not exist or has shut down, the data for that facility is archived within the MFL. It is important to archive the facility record rather than delete it so a record can be maintained. If the facility never existed, its operational status should be set to “Invalid” or “Does not exist”. If the facility did exist but is closed or no longer operational, its operational status should be set to “Closed”.
3. *Facility data changed*—Information for a facility may change over time (e.g., name change, change in services provided, and change in contact details). Such changes necessitate updating the facility’s entry in the MFL. A record of the changes made should be kept.

The updating process can be *centralized*, *decentralized*, or *federated*.

- *Centralized updating process*—Data are collected and submitted to a central body for review, validation, and approval. The central body is the “data curator.” Local bodies such as district health offices are data sources.
- *Decentralized updating process*—Data are collected and submitted to a local or regional body (e.g., to district health office) for review, validation, and approval. The local body is the “data curator.”
- *Federated updating process*—In a federated system, various separate databases contribute facility data to the MFL (e.g., a facility licensing authority and pharmacy registries). Updates are submitted to and validated by the owners of those databases prior to submitting the data to the MFL. It may be necessary for the MFL data curators to validate the data again at the central level if there are concerns over data quality.

Data Sources for MFL Content Updates

There are two important questions for consideration regarding data sources for maintaining the MFL. First, what are the sources of the data updates, and second, who can submit change requests to the MFL?

A variety of sources can provide information for updating the MFL, including the following:

- Individuals who are familiar with facilities and are typically the “first to know” about changes in data or circumstances. These persons can include (1) district- or county-level health officials who have oversight for a number of facilities, (2) implementing partners who collaborate with facilities, (3) institutions coordinating commodities and logistics systems, and (4) employees of the facilities themselves.
- A broad group of data consumers who become aware of the need for data updates through their interactions with facilities. Typically, this group includes researchers and the general public. Opening data submission to a wider audience may increase submission of detailed data but will likely require additional work verifying all data submissions, especially if the persons submitting have not been trained in how to collect accurate data on facilities.
- Facility licensing authorities that provide information on licensed facilities. This direct source of information about facilities covers newly licensed facilities as well as those that have been upgraded (or downgraded) or have closed.
- Facility censuses or surveys (e.g., SPA, SARA) that identify new information about facilities. This source requires an individual who is skilled in comparing data reported in a national survey/census with data in the MFL. The person notes where discrepancies in facility data exist and determines what information needs to be updated. This process, which requires comparison of large datasets is time consuming, particularly when a large number of facilities are involved.

Regardless of the sources of data used to update the MFL it is advisable that the persons collecting the data have adequate training to understand the format and specifications for the different MFL data elements.

CASE STUDY: TRAINING DATA SOURCES

Philippines. Data validation workshops provided a forum to train subnational DOH officers on the process of updating the MFL. The workshops included the opportunity for attendees to improve their skills in collecting geographic coordinates of facilities using Google Maps and GPS devices.

Submitting Data for MFL Content Updates

Depending on the technology available and the type of data source used, the submission process can be done in different ways.

- *Web interface.* The facility registry service can be set up to receive and process change requests through a web interface.
 - *Online*—If the facility registry service is connected to the Internet, the data source may submit data online directly through this service for the data curator to review and verify. If curators are decentralized, online updates that they make can immediately be visible centrally. Online web interfaces work well in areas where internet connectivity is reliable and regular.
 - *Offline*—It is possible to set up programs that allow data sources to submit change requests offline, when their device is not connected to the Internet. In this case the information can be entered, but the update cannot be sent for validation and approval until an internet connection is established. Offline web interfaces work well in areas where internet connectivity exists but is intermittent.
- *Mobile data collection form.* The facility registry service can be set up to receive and process change requests submitted via mobile technology. A special program and mobile data collection form is set up on a mobile device such as a basic cell phone, a smart phone, or a tablet. The data source enters and sends the MFL data update from the mobile device. The program can be designed to work online or offline. In places where network coverage is not reliable or is nonexistent; data can be entered offline, and sent at a later time when the data source travels to a place where network coverage is regained.
- *Email*—Data can be entered by data sources onto a pre-formatted form and sent via email to a specially designated email address. This approach requires the data curator to monitor email and extract and upload or enter data into the MFL when it is received.
- *Paper form*—Technology-wise, paper forms are the simplest way to submit updates for validation and review and are best suited for areas where network coverage is poor or nonexistent. They are also a good choice if setting up an electronic submission system is not feasible (e.g., because of time, funds, human capacity). While paper forms are “simple,” they do pose a number of challenges: (1) they have to be printed and distributed, (2) they have to be physically transported from point A to point B, (3) the information on them has to be entered into a computer, and (4) they can get lost or damaged. However, as funds, technology, and human capacity become available, paper forms can be transitioned to mobile or web-based submission systems.

CASE STUDIES: UPDATING DATA CONTENT

Philippines. After having been tested using Google Drive spreadsheets, the updating mechanism of the National Health Facility Registry (NHFR) is now directly integrated into its web-based platform (<http://nhfr.doh.gov.ph>) and users can submit requests for updates online. In the NHFR, there are four request categories for updating the Facility Registry: (1) new facility; (2) potential duplicate(s); (3) update of information in a particular field; and (4) closed facility. Once a request for update has been submitted, the NHFR team at the national level validates the request through document review. At this point, the name of the user who submitted the request is captured by the system, providing for user accountability and allowing the NHFR team to follow up should there be questions or clarifications.

Tanzania. District-level health staffs update the data in the facility registry in real time and implement changes directly into the system. Each district has two persons who have been formally trained to update the facility registry. If the district staff has any questions or concerns when they are proposing the updates, the Ministry of Health staff is available to assist them.

Kenya. Kenya used the structure of their existing health reporting system to design a maintenance system for the MFL. The MFL data can be updated on an ongoing basis, with updates made in real time, as needed. The Sub County Health Records and Information Officers are responsible for entering updates into the MFL system, using a standardized form. For tracking purposes, the system keeps a record of who makes the updates.

Reviewing, Validating, and Revising Changes to Facility Data

Any MFL data change requests that are submitted need to be reviewed and validated by a data curator to ensure that they are accurate, valid, and complete. Communication between data sources and data curators—if they are different people—is important for carrying out this step. Communication can take place inside the facility registry service software (through chat features) or by other means (e.g., via phone or email). If necessary, the reviewer can contact a facility directly to ensure the information submitted is correct. Validation may take place at the national or subnational level, depending on the structure of the updating process (centralized or decentralized).

Verification of the facility geo-coordinates should include looking up the geo-coordinates on a map to determine whether the coordinates are *consistent* with other facility data. For example, are the facility's geo-coordinates a match for the reported administrative area? Also, determine whether the geo-coordinates are *feasible*. For example, the coordinates do not place the facility in a body of water or outside the country. Having up-to-date shape files of administrative areas is helpful in this process.²

² See the *Geocoding the MFL Module*.

If the change request is for adding a new facility, the data curator should ensure that the facility is not already in the MFL and assigned a unique identifier.

If the data curator uncovers issues during the process of reviewing and validating the data, he or she should ensure that the issues are resolved before the data are approved. In most cases, the data curator should contact the person who submitted the data, alerting the submitter to the issue, and asking him or her to clarify or correct the issue and resubmit the data.

CASE STUDIES: REVIEW AND VALIDATION PROCESSES IN KENYA AND TANZANIA

Kenya. National-level Ministry of Health (MOH) staff charged with the management of the MFL are responsible for validation and approval of the updates to the MFL. When data validation questions arise, the MOH calls the responsible Sub County Health Records and Information Officers to confirm data and resolve any discrepancies. Additionally, when necessary, the MOH conducts site visits to validate data. Although the validation process takes place at different levels, only the Sub County-level personnel are allowed to make definitive changes and updates to the MFL database. This limitation of access prevents confusion regarding change authorization, and prevents national-level personnel from being able to make changes without Sub County awareness.

Tanzania. The Department of Curative Services (DCS) reviews the proposed updates, validates the information, and either accepts or rejects the updates. While the DCS has the lead in validation, it receives assistance from the Information and Communication Technology (ICT) Unit and the Department of Policy and Planning (DPP) Health Management Information System (HMIS) Section. If there are any questions about the proposed updates, the DCS will follow up with the district staff member who proposed the updates because the district-level staff members have more up-to-date facility information from the facility data collection form.

Approval

Once validated, the MFL updates need to be approved. Approval usually occurs at the central level, but it may occur at a lower level (e.g., district health office) in a decentralized system. Standard operating procedures need to be clear on the matter of who has the authority to approve changes. Once the changes are approved, they can be made in the MFL database.

Documentation of Changes Made

All additions and changes should be adequately documented. For new facilities, a “date added” field in the MFL can be used to track when a facility entry is added to the MFL. Changes made to existing MFL entries should be tracked to ensure that information is not permanently lost and a history of MFL contents is available for reference.

Ideally, a tracking mechanism is built into the MFL facility registry service to automatically record changes and the date on which they were made.³ However, if no such tracking mechanism exists, changes can be tracked separately—either on paper or electronically. A log file should contain the following minimum information to permit changes to existing entries:

1. Facility ID
2. Facility name
3. Facility location
4. Data element that was changed
5. New value
6. Old value
7. Date of change
8. Name and position of person who submitted the change
9. Name of person who approved the change
10. Type of change, i.e., “correction” or “real-life change.”

A correction means the old value was incorrect and was never valid. A “real-life” change means that the old value was valid in the past but is now being updated due to a change in the actual facility status.

Frequency of Updates

Updating MFL content is a continuous process. Change requests should be allowed at any time, and validation should be ongoing to avoid backlogs. It is advisable to send data sources periodic reminders, urging them to submit known changes and updates. Experience from different countries suggests that data sources may not always be in submitting MFL updates.

If continuous updating is not feasible, the verification and updating process can be linked to another regular activity (e.g., delivery of medical supplies, supervision visits) to ensure that it does happen and that the frequency is standardized.

In general, facility surveys or censuses are not ideal sources for regular MFL updates because of their high cost and infrequent implementation. However, a large scale survey or census may be necessary to update the MFL if you have substantial data gaps, if you want to add new data fields for which no current data exist or if substantial time has passed since the last validation and you doubt the accuracy of the data in the MFL.

Geocoded Data—A Special Case

Collecting geo-coordinates and updating the data requires special consideration because there are specific methods associated with the collection of this data. Using new methods or

³ See the *Establishing a Facility Registry Service Module*.

equipment to collect geo-codes may result in different results than the original data. If conflicting data emerge, you will need to consider the source, how well trained the data collectors were and the precise methods and equipment they used, before you make a determination as to their accuracy. The *Geocoding the MFL Module* provides detailed information about collecting and verifying location data for the MFL.

Audit the MFL Content (Also Referred to as “Pull Verification”)

It is important to note that the verification of changes submitted by data sources (or “pushed” data) is different from data verification done through an audit. Verification of “pushed” changes means that data sources have identified and reported data that need to be updated or added, and the data curators are verifying that the suggested changes are accurate. This process focuses on “known” changes and relies on data sources to be proactive in reporting changes.

An audit, or “pull verification,” is the process of periodically checking all, or a sample of, existing MFL content to ensure that the data are valid and entries are not missing. Pull verification should be done periodically (e.g., the entire database is checked annually), or on a rolling basis, in which case a subset of facilities are selected each month for verification. This type of audit process is an opportunity to uncover data that are outdated, incorrect, incomplete, or missing.

The audit process can result in changes similar to those in the updating process (i.e., a facility entry is added, a facility entry is archived, a facility entry is edited). There is also a fourth possible outcome: a facility entry is current, complete, and valid (i.e., it requires no change). If this last outcome is the case, any such entries should be indicated as such (i.e., “no-change”) with the date of verification during the verification process. The verification date is important because it provides a record of when the entry was last reviewed and assessed to be valid.

One approach to the data verification is to provide data sources (e.g., district health officers or facility staff) with forms prepopulated with facility information currently in the MFL. For example, every quarter, the district health management team members can be asked to review all of the MFL entries for the health facilities in their district to identify missing facilities, gaps in data, or incorrect information. The data sources can then make any necessary corrections to the forms and send them back.

As with the content updating process, the audit process can be linked to another regular activity, such as supervision visits. One challenge to keep in mind with such a linkage, however, is that while supervision visits may occur regularly according to policy, in actuality they may be far more variable. Furthermore, supervision visits may not even occur in private facilities. If special site visits are required to verify data, the visits must be included in the budget.

Reviewing the MFL Data Elements

In addition to keeping data for individual facilities current, it is important to make sure that the types of data collected on facilities continue to be relevant to users. It is therefore important to have a regular review of the status of data elements in the MFL. The following questions are examples of the issues considered in the discussions:

- Are all of the data elements currently being collected useful to data consumers?
- Are any data elements missing that are important to data consumers?
- Are all of the data element definitions still relevant?
- Have there been changes in the classification of facilities or the administrative units that need to be incorporated into the MFL?

An inclusive way to answer these questions is through a technical working group (TWG) comprised of key MFL stakeholders, including leadership, facility registry service developers, data curators, and data consumers. TWG meetings can be informed by interviews or surveys of stakeholders not in the TWG. The TWG should meet regularly (e.g., annually) to develop, discuss, and reach consensus on propositions for new MFL data requirements, such as (1) the addition of a new data element, (2) changing the characteristics of a data element (e.g., definition, attributes), and (3) archiving data elements that are not needed or are no longer relevant. Propositions that are supported by the TWG can then be proposed to the MFL steering committee for final approval.

When deciding whether to change the structure of the MFL, it is important to consider the implications of change for data consumers and data curators. The following are some questions that highlight major concerns.

- Will the change require revision of the content updating and validating processes (e.g., data collection and submission forms or facility registry service interfaces)?
- Will the change require additional data curator training?
- Will the change affect data that are already in the MFL?
- How much time would a developer need to make the change?
- Are there adequate funds to cover implementation of structural changes and any associated needs (e.g., training, updates to job aids, guidelines and SOPs)?
- Is there a data encoding standard that can be used (e.g., ISO)? Can custom encoding be avoided?
- How will the change affect integration with other systems?
- Is it possible and appropriate to store the new data elements in other systems that are interoperable with the MFL, rather than having to change the structure of the MFL database?

3.2 Maintaining the Facility Registry service

The facility registry service that houses and shares the MFL data requires ongoing support and maintenance. Here we provide an overview of the long-term maintenance issues related to the facility registry service that need to be considered. More detail is provided in the *Establishing a Facility Registry Service Module* and the *Sharing the MFL Module*.

Routine Management and Troubleshooting

MFL managers need to plan on having a small team of information technology (IT) specialists available to manage and troubleshoot issues around the use of the facility registry service. The following are examples of the kinds of activities for which these teams will be responsible.

- Managing updates used for the facility registry service and handling any compatibility issues that arise during these updates
- Ensuring data security
- Backing-up the MFL data periodically, if this is not an automated function
- Ensuring that the server is fully operational, if the facility registry service is hosted locally
- Assisting users (whether data curators or data consumers) with troubleshooting issues such as inability to log in, difficulties downloading data, etc.
- Troubleshooting issues related to integration and interoperability with other systems

Responding to New User Requirements

It is inevitable that new user requirements will emerge that need to be addressed. The MFL must have a mechanism to collect, prioritize, and respond to these new requirements on a regular basis. New requirements can range from needing to sort data in a different way, to more complex matters such as creating a new program to enable mobile data entry and submission. In addition, there are likely to be new requirements linked to the integration and interoperability of the MFL with other systems, especially in a context of rapidly evolving technology. *While the cost of such changes may be difficult to predict, it is important to plan for a future in which human and financial resources need to be mobilized to meet new requirements.* It is helpful to know which local and international partners can be called on for support in these efforts.

Thorough Assessment of the Facility Registry Service

Periodically, a thorough assessment of the facility registry service should be conducted to determine whether it continues to meet user needs and what changes, if any, should be considered. Some questions to ask are listed below. The *MFL Assessment Module* contains additional information useful for this purpose.

- Is the MFL facility registry service easy to use?
- Is the technology reliable?
- Are there new software solutions that may be more appropriate?
- What are the key challenges users face with the facility registry service?

3.3 Management of Administrative Issues

It is a good idea to start planning for MFL maintenance early in the conceptualization process. And, even when the MFL already exists, it is not too late to establish and implement standardized maintenance processes and procedures. The following are key issues of administrative management that relate to maintenance of the MFL.

- Ensuring that adequate *leadership* is available to oversee the MFL maintenance process
- Establishing and implementing *standard operating procedures* for maintenance of the MFL
- Ensuring that there is sufficient *trained staff* to maintain the MFL
- Ensuring that there is adequate *funding* for maintenance of the MFL

Leadership

Leadership is a key factor throughout the process of establishing an MFL but, on the issue of MFL maintenance, it is of particular importance during two stages in the process:

1. *During the planning stage*—Leadership is needed to facilitate development of a comprehensive approach, including detailed procedures for carrying out MFL maintenance. It is important to do this as early as possible in the planning stage so that after the MFL is established, the necessary pieces—processes, guidelines, staff, and funding—are in place to ensure that the MFL can be adequately maintained. Leadership during this stage requires close consultation with stakeholders, staff at different levels of the health system, and software developers, to reach consensus on what maintenance processes are feasible and can be implemented in the particular context.

“Champions” who understand the importance of ongoing MFL maintenance and are in a position to advocate for it are important stakeholders to involve in planning for MFL maintenance. Their efforts will help ensure that different agencies support the process and that the MFL remains relevant and up to date for data consumers.

2. *After the MFL is established*—It is important to designate an MFL manager or administrator who provides overall leadership for the MFL and oversees implementation of day-to-day MFL maintenance processes. The MFL maintenance responsibilities of this person are the following:

- MFL standard operating procedures (SOPs) are adhered to and updated as necessary
- Maintenance processes in place are implemented appropriately
- Staff tasked with updating or validating MFL data are adequately trained and perform their assigned tasks correctly
- Adequate MFL funding is in place for implementation of maintenance procedures
- New user requirements are collected, prioritized, and addressed

- Issues and problems that arise are quickly identified and resolved
- Stakeholder meetings are held regularly to discuss aspects of MFL content and the continued relevance of the MFL in a context of changing information needs

MFL leadership responsibility should be in the hands of a person who has a managerial position within the institution housing the MFL. This person should have sufficient authority to (1) ensure proper implementation of the maintenance tasks associated with the MFL, and (2) make decisions about resources and staff changes as needed, if results are not met.

The steering committee (described in the *MFL Governance Module*) will continue to have oversight of the MFL. The committee should receive periodic reports on the performance of the MFL and be alerted to any problems that arise or new developments that are needed. Members of the steering committee can be helpful in identifying technical support and finances for new developments for the MFL.

Maintenance Guidelines (Standard Operating Procedures)

To ensure that managing the MFL is standardized and transparent, a set of procedures should be developed outlining how the institution charged with the MFL will handle on-going maintenance of the MFL. Guidelines, standard operating procedures, and job aids should all be developed so that maintenance processes are well-defined and easily implemented. In the process of developing these guidance materials, a number of important questions will need to be answered. (The answers to some of these questions will depend to a large extent on the type of software used for the facility registry service and how it is configured.⁴ The questions that need to be dealt with most commonly are the following:

- Which unit within the implementing agency or organization is responsible for maintenance of the MFL?
- How often will the MFL be updated (e.g., quarterly, on an on-going basis)?
- What processes will be used to update MFL content and who will implement them (e.g., is the process centralized or decentralized; at each level, who is responsible for the specified tasks)?
- What are the mechanisms for submitting MFL content updates (e.g., web-based interfaces, mobile applications, paper forms)?
- Where will the data for updating the content come from (e.g., national health facility regulatory body, sub-national MOH staff, private organizations, other data consumers)?

⁴ See the *Establishing the Facility Registry service Module*.

- How often will the content of the MFL be audited?
- What processes will be used to verify MFL content and who will implement them (e.g., is the process centralized or decentralized; at each level, who is responsible for the specified tasks)?
- Who will be responsible for the technical maintenance and on-going development of the facility registry service (e.g., how will changes to the data elements be handled; how can the facility registry service be further developed to make maintenance processes easier; how will issues encountered when updating the MFL be handled)?
- Who will conduct trainings for data sources and **data curators**, and how often will the trainings be held?
- What sort of supervision and data curator support processes will be implemented?
- Will reminders be sent to data sources and data curators to ensure that they submit updates and perform data validation? If so, how and when?
- Who has authority to make decisions about sharing the MFL data?
- How are questions, data requests, and conflicts handled, reported, and resolved?
- Who will provide the training, technical assistance, and supervision needed to properly maintain the MFL?

Maintenance Workforce

Throughout this module we have described the roles and responsibilities of the persons involved in maintaining the MFL. The following list describes the roles related to MFL maintenance that require permanent staffing:

MFL manager or administrator—Person responsible for overall leadership of the MFL (see leadership section above).

Data curators—Persons involved in managing the MFL data. They have the authority to verify and authenticate changes to health facility data.

Data sources—Persons who provide information on facility data updates or changes. They can include employees of the Ministry of Health, but can also include staff from other government agencies and NGOs, as well as the general public.

Information technology specialists—Persons who maintain the facility registry service and aid in its on-going development.

Trainers—Persons in charge of training the data sources and data curators to perform their MFL maintenance tasks.

Supervisors—Persons who provide supervision for data sources and data curators.

Other staff—MFL maintenance requires persons who perform a range of tasks such as answering questions about the MFL, responding to data sharing requests, collecting new user requirements, and helping to track finances. These tasks may be assigned to the MFL manager, to data curators, or to other staff, depending on the resources available.

Key MFL maintenance staff are situated (sit) within the institutional and unit charged with the MFL. Persons supporting the MFL maintenance process may also reside in other central offices, administrative units (e.g., province, region, district, and health zone), facilities themselves, or even NGOs, CBOs, and other local partner organizations.

The exact composition of this workforce will depend on whether the updating and verifying processes are centralized or decentralized and, perhaps, how many MFL entries there are to keep up to date. When defining the MFL maintenance processes, consideration should be given to the following issues:

- What MFL maintenance tasks need to be completed and at what levels?
- What skills are required to perform the MFL maintenance tasks?
- How many people are needed to accomplish the MFL maintenance tasks?
- What trainings do data curators need to be effective in performing their roles?
- What do information technology staff need to ensure that the software and data platform are reliable?

Thinking through these considerations will help to ensure that an adequate number of appropriately trained staff will be available to maintain the MFL.

Among those who have had the experience of implementing an MFL it is the opinion that, particularly at higher levels, permanent staff with 100% level of effort (LOE) should be involved in MFL maintenance; however, this ideal situation is not always feasible. At a minimum, MFL-related maintenance tasks should be included in staff members' official job descriptions and, during recruitment for MFL-related positions, minimum qualifications that acknowledge MFL maintenance activities should be clearly laid out. Additionally, at least two people should be trained for each position at each level, to ensure continuity if someone changes positions, leaves the organization, or is simply out of the office.

In some places, MFL-related maintenance responsibilities are incentivized (e.g., tied to funds or commodities) to increase the likelihood that they are performed. This may be especially effective for data sources, encouraging them to submit known updates in a timely fashion.

However, incentives may not be needed if maintenance tasks are included in a person’s job description. In such cases, failure to perform these important tasks will be reported on the person’s employment record and may be grounds for termination.

Funding for Ongoing Maintenance

MFL funding must of necessity be a recurring line item in the national budget; MFL maintenance cannot depend on external resources. If the establishment of the MFL is funded by donors, funding will likely be reduced after the establishment phase is completed. Therefore, MFL maintenance must be recognized as an essential part of the government’s strategic plan, even if that plan requires simplified maintenance processes and minimal costs to achieve sustainability.

4. CHALLENGES

Maintaining the MFL Challenges	
Challenge	Potential solution
Staff turnover and training needs	<ul style="list-style-type: none"> • Train multiple persons on all tasks required to maintain MFL • Staff agree to remain in their position for minimum amount of time
Addition of new data elements to MFL	<ul style="list-style-type: none"> • Understand the implications of adding data elements to MFL (e.g., where the data come from, whether new data collection is required, how it affects the facility registry service and integration with other systems). Determine what issues might arise, and how those issues will be dealt with • Work with a developer to make the changes to the facility registry service • Develop a feasible and realistic budget and timeline
Lack of infrastructure	<ul style="list-style-type: none"> • Know what infrastructure is available before developing maintenance processes and guidelines • Determine whether infrastructure updates are feasible and when they are likely to happen • Consider implementing various maintenance processes (e.g., different mechanisms of submitting data) to accommodate a range of situations

Maintaining the MFL Challenges	
Challenge	Potential solution
Changes to political or administrative areas (e.g., district boundaries)	<ul style="list-style-type: none"> • Create new data elements for the new administrative units. Archive the old administrative units so peoples can compare the location of facilities in the old administrative areas with the location in the new administrative areas. • Do not use unique identifiers that are tied to administrative units
Cost of maintenance/sustainability	<ul style="list-style-type: none"> • Consider the costs of maintenance and sustainability in the planning phase (e.g., conduct an assessment to determine estimated costs) • Consider the cost of NOT maintaining the MFL; this likely means that many institutions and organizations will maintain their own facility lists, resulting in cost duplication. • Ensure that there is high level buy-in for maintenance of the MFL • Ensure that funds for the MFL are specified as a line item in the national budget
Lack of compliance in reporting	<ul style="list-style-type: none"> • Have guidelines or policies in place—such as an administrative order—which mandate that updates are timely and accurate

6. RESOURCES

- Kenya Master Facility List Administrative Documents (include maintenance procedures, roles and responsibilities of different actors and user guides)
- Tanzania Health Facility Registry Curation Tool User Guide



SHARING THE MFL

This module describes the processes and considerations necessary for sharing the Master Facility List (MFL). It presents information on (1) the importance of a data sharing policy, (2) decisions regarding what to share and with whom, and (3) what additional documentation needs to be shared along with the data. Finally, the module describes considerations around integration of the MFL with other information systems.

Checklist of things to do before using this module	Module where information is located
<input type="checkbox"/> Set up a steering committee to lead the process of developing and strengthening the MFL	MFL Governance Module
<input type="checkbox"/> Determine the requirements for the MFL	Key Considerations Module and Establishing a Facility Registry Service Module

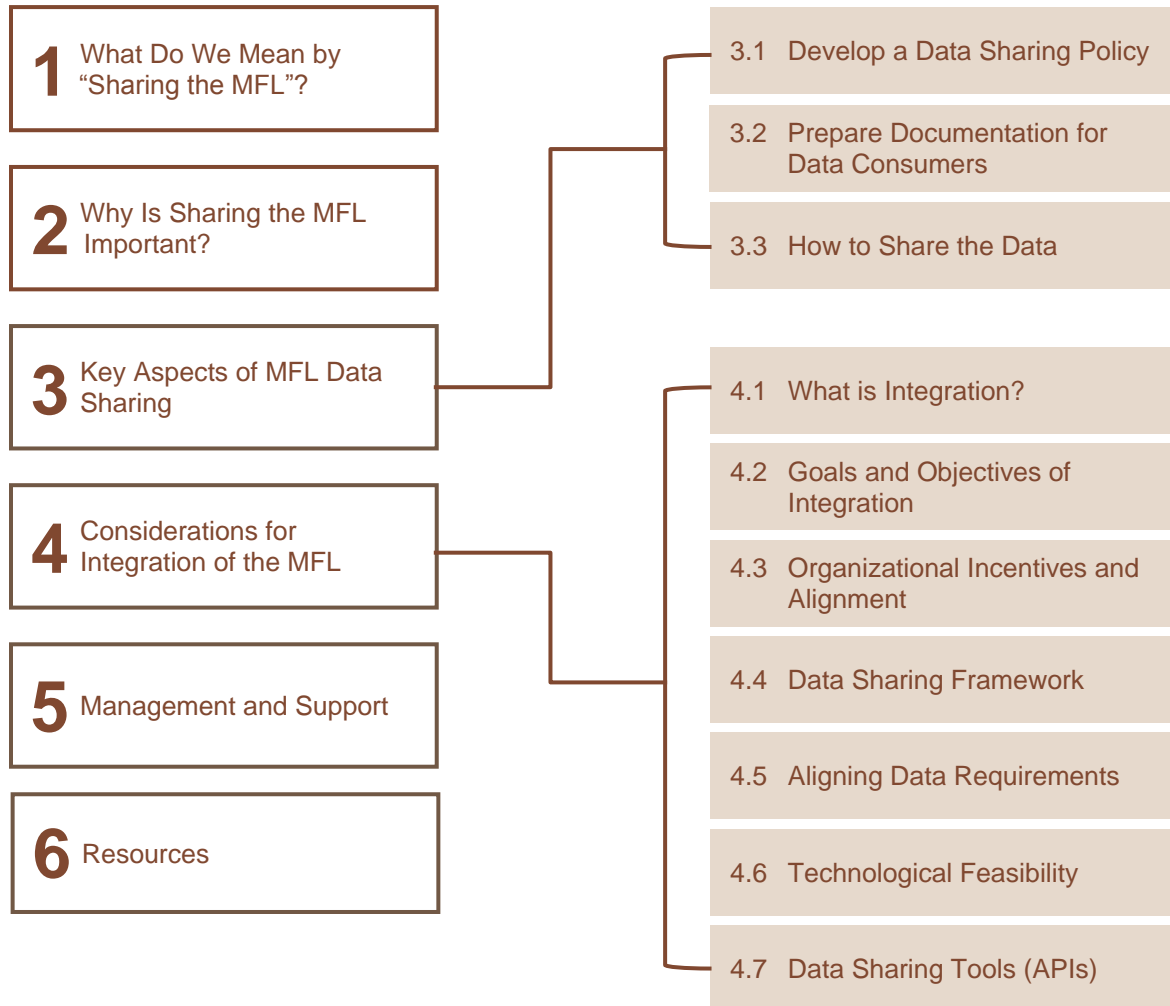
Key audiences for this module:

- Steering committee for MFL strategic planning
- Managers of the MFL
- Technical Working Group responsible for establishing the facility registry service
- Developers

Note: words in **bold** are defined in the glossary.

Figure 1: Sharing the MFL – Module Outline

(Press Control and click on any of the boxes to be taken directly to that section)



1. WHAT DO WE MEAN BY “SHARING THE MFL”?

Sharing the MFL entails making MFL data accessible to **data consumers**. There are a number of ways to share the MFL, some more effective than others. The following are ways that MFL data can be shared:

- The dataset is shared using a spreadsheet that can be downloaded or emailed.
- A public portal is established through which users can access and manipulate the data.
- The MFL is integrated with other information systems.

While data sharing itself can be fairly straightforward, a number of issues need to be considered before implementation. This module discusses the various aspects of data sharing that need to be taken into account.

2. WHY IS SHARING THE MFL IMPORTANT?

The primary value of an MFL lies in people's ability to access and use the facility data it contains. Many types of stakeholders can benefit from accessing a comprehensive and up-to-date list of health facilities, including government ministries, donors, and development partners. It is advisable to share the MFL as broadly as possible. The following are additional advantages that typically come with sharing MFL data.

- The greater the number of data consumers able to access and benefit from using the MFL, the more valuable the MFL becomes. With accruing value, the MFL is more likely to become a government priority and more likely to receive the resources needed to remain current and to function optimally.
- Sharing tends to improve the quality of the MFL data because, with a wider set of "eyes," there is increased likelihood that someone catches outdated or erroneous data. Further, data consumers who value the MFL may be more likely to scrutinize the quality of the data they are using.
- A widely shared MFL ensures consistency of facility data across systems. Stakeholders who use the MFL as their primary facility list will have the benefit of standardized information as well as the same set of unique facility identifiers across organizations and information systems. They can then more readily link up the data and exchange information.
- Sharing the MFL can potentially be a source of revenue if an access fee is applied to selected private sector users (e.g., health insurance organizations).

3. KEY ASPECTS OF MFL DATA SHARING

3.1. Develop a Data Sharing Policy

A key aspect of the planning process for MFL data sharing is development of a data sharing policy. Having a comprehensive data sharing policy is important to assure that the following activities and requirements are adequately considered.

- Sharing procedures and decisions are transparent and known to current and potential users of the MFL
- Sharing of MFL data complies with existing policies governing national data
- Management of the MFL is more efficient because of clear processes and procedures
- Requests for MFL data are addressed and handled consistently

A data sharing policy should specify the types of MFL data that will be shared and who has access to the data. In addition, the policy should describe in detail the decision-making and approval processes associated with MFL sharing. A number of factors need to be considered in deciding these issues; these are explored detail below. (Considerations specific to integration are discussed in section 4.3.)

What MFL data are shared?

The data sharing policy will need to specify what MFL data can be shared. The types of MFL data shared and how broadly the data are shared depend on a number of factors including (1) national and institutional data policies, (2) the needs of data consumers, and (3) the presence of sensitive data in the MFL that may require protection.

National and institutional policies

Countries may have existing policies that govern how data are to be stored and shared. In some cases, there may be open data mandates that require all data to be accessible; in other cases, countries may be more protective of their information and have strict rules about who can access data, what types of data can be shared, and the procedures to follow to obtain permission to access the data. Having a thorough understanding of the policy context is important when making decisions about MFL sharing.

Consider not only national policies but also policies specific to the government institutions affiliated with the MFL. Further, if the MFL is pulling data from other sources (e.g., a national health facility licensing board), it is important to determine whether the data sources have restrictions on sharing or redistributing those data.

Needs of consumers

Deciding what data to share should take into account the needs of the MFL data consumers. If the data are too restricted, the MFL ceases to be useful to stakeholders. However, the MFL may have data that only a limited number of consumers require; then it may not be necessary to make these data publicly available. Data consumers can be assigned to different levels of access; the process is described below in the section on access to data.

Presence of sensitive data

Some data contained in the MFL may be highly sensitive. For example, the location data of facilities that serve highly vulnerable populations can, if misused, pose a threat to clients of these facilities. Types of information in the MFL that may be regarded as sensitive include the following:

- Certain categories of services provided at facilities (e.g., prevention services for sex workers; rehabilitation services for people who inject drugs)

- Geo-coordinates of certain types of facilities (e.g., HIV outreach centers)
- Personally identifiable information (e.g., name and contact information for facility director)

Sensitive information should be restricted to trusted users. The types of data that are accessible to different groups of users should be clearly stated in the MFL data sharing policy.

Who has access to the data?

Different types of data consumers should have differential access to MFL data. In general, data consumers can be classified into four domains of access:

- *Trusted domain users:* These are government officials who work directly with the MFL or need the MFL to populate government information systems. They have broad access to the MFL data and therefore require additional security and logins to access the data.
- *Middle domain users:* These include development partners and insurance companies, both of whom need fairly comprehensive facility data to carry out their work, but may not need all the details in the MFL. Security measures should be in place for this group too.
- *Public domain users:* Public access to non-sensitive MFL data is recommended so that as many data consumers as possible can use the data. In addition to the general public, this group typically includes researchers, survey industries, and marketing companies. Such public access need not require credentials; users can simply access the MFL data via a public portal.
- *Administrative domain users:* A small group of individuals consisting of data curators and others directly involved in the establishment and maintenance of the MFL are granted complete access to the database, including editing rights.

The MFL data sharing policy should define these user domains for the specific country context. It should also describe processes for entering into data use agreements, if these are required. Data use agreements can be established with data consumers to clarify how the MFL data can and cannot be used. The agreements can also specify any rules for attribution (e.g., acknowledging the MFL and the institution that manages it), and any restrictions, if needed, regarding the redistribution of MFL data to third parties. Usually, these agreements are not required for the public user domain.

Approval process

The MFL data sharing policy should outline the processes for evaluating and approving requests for access to the MFL data. The approval process may vary depending on the user domain and type of access requested. For example, no approval may be needed for accessing

basic data from a public portal, whereas a more careful vetting process is needed for approving a request for system integration with the MFL.

The policy should indicate the persons responsible for approving share requests, the criteria used in making these decisions, and the expected timeframe for reviewing the request.

3.2. Prepare Documentation for Data Consumers

Data consumers will need additional information about the MFL dataset in order to understand how the data are structured and how they can be used. This background information about the MFL data is often referred to as **metadata**. The following documents should be readily accessible to data consumers, preferably through online document repositories.

- Data specifications document¹—Describes how each data element in the MFL is defined and the parameters associated with the data.
- Summary of the process for updating the MFL and the frequency of updates—This document is important first because it informs data users how current (up-to-date) the data are; second, it alerts data users to possible changes to the dataset resulting from the update process.
- Log of recent changes to MFL data—The log includes the dates of changes to MFL data.

3.3. How to Share the Data

A number of approaches can be used to share the MFL data. The decision on which approach to use should be based on user requirements that specify in which format they need the data. It also depends on the type of facility registry service that is established to house and share the MFL.²

- The MFL dataset can be sent electronically (e.g., by email). If resources are not available to develop other means of data sharing, this sharing approach will work. However, it is not generally recommended because it is difficult to control who gets access to the data and its distribution can lead to problems of version control later if people continue circulating an outdated MFL file.
- The MFL can be made available as a read-only document on a website where users can view or download it as needed.

¹ See *MFL Data Content Module* for more information on data specifications.

² See the *Key Considerations for the MFL* and the *Establishing a Facility Registry Service* modules.

- The MFL can be shared through an online interface that allows users to query, filter, and download the data. Examples include: Kenya, the Philippines, and Tanzania.
- The MFL data can be shared through integration with other information systems.

Because data consumers are increasingly interested in integration of the MFL, this option is discussed in detail in Section 4.

4. CONSIDERATIONS FOR INTEGRATION OF THE MFL

4.1. What is Integration?

Integration is the process of physically or functionally linking multiple information systems to create a combined system or unified solution. *Data Integration* refers to the combination or exchange of data from one or multiple sources into a tool or platform that uses the acquired data for transactional or analytical purposes. Integration with the MFL is necessary to enable other systems that require the facility list to access the most recent (updated) information.

Most often, integration of the MFL aims to share the MFL facility data with other systems that need a comprehensive list of facilities. However, integration can work in the other direction, with information systems sending updates to the MFL.

Two common approaches to data integration involve the following:

- *Data synchronization*: This is an automated process through which one system (e.g., the HMIS) updates its facility list by checking for discrepancies, and then harmonizing with the content of another system (i.e., the MFL).
- *Data warehouses*: These are repositories that store data from multiple sources. The data can then be combined for analytical purposes.

To successfully integrate a facility registry with other systems requires both technical and program management activities. Good management and governance are essential to ensuring that the interested parties are in agreement and that the technical solution for integrating the

Integration vs Interoperability

Integration is the process of linking multiple systems, whereas *interoperability* is an intrinsic property of the systems themselves which describes their ability to exchange and interpret data.

Interoperability is defined as the extent to which systems and devices (in this case the facility registry service) can exchange data and interpret that shared data. For two systems to be interoperable they must first be able to exchange data and second understand that data so that they can be used by data consumers without changing the data's semantics.

Note: Definition adapted from the Healthcare Information and Management Systems Society (HIMSS)

MFL is acceptable to all those involved. The process of integration follows the five steps outlined below.

- Goals and Objectives of Integration
- Organizational Incentives and Alignment
- Data Sharing Framework for Integration
- Aligning Data Requirements
- Technical Feasibility

4.2. Goals and Objectives of Integration

After one or more systems have been identified for integration with the MFL, the first step is to define and agree with collaborators on the goals and objectives of integration. Simply put, what will be achieved through working together that cannot be achieved through the current status in which each system is independent? The reasons for integration vary among stakeholders because each group has different interests and requirements. The goals for integration may be dictated by implementers, programs, funders, governments, policies, caregivers, and even individuals, such as analysts who interact with each system. Creating a common vision of what is to be achieved is critical in the early stages of the process. It may be useful to organize an integration workshop to help implementers identify cross-cutting problems and goals.

4.3. Organizational Incentives and Alignment

With the goals and objectives of integration defined, the next step is to ensure that organizational incentives are present and that all parties are aligned regarding achieving those goals. Affected organizations need to consider the following factors:

- Whether the integration aligns with institutional mandates and policies
- The benefits to be gained individually and collectively from integration
- The real and perceived risks of integration
- Whether staff have the capacity to manage an integrated system
- How the upfront (capital) costs and ongoing (operational) costs will be funded

Maintaining integrated systems requires ongoing effort. Sometimes, the ongoing cost of the integration falls on the organization that has the technical capacity to keep things running, not the organization that has the mandate and resources, or derives the most value from the integration. This scenario highlights the potential divergence in incentives and alignment in successfully achieving and maintaining integration.

Trust plays an important role when the various teams and organizations are in the process of integrating systems. At the outset, transparency in sharing incentives and disincentives to integration is important to help groups resolve concerns related to data.

4.4. Data Sharing Framework for Integration

When the collaborating organizations have (each) determined that there are sufficient incentives and alignment to pursue integration, the next step is to make sure there is a data sharing framework in place that adequately details the governance and contractual requirements for integration. Ambiguity in the data sharing framework is a major deterrent to integration.

In addition to the considerations discussed in the section on developing a MFL data sharing policy, a data sharing framework for integration should clearly define the following issues.

- What data are shared through integration? In which direction? How often?
- What are the assumptions about read/write/administrative access?
- How will data be curated and kept up to date?³
- Are there data sharing policies that affect each organization? Which ones are they? Who imposes them? Are the policies compatible?
- What are the constraints with respect to access rights and physical placement of data? Does it matter when and where data are stored, who has access to them and how, and for how long?
- Are there different guidelines for different types of data?

4.5. Aligning Data Requirements

A major step in the integration process is determining whether integration is possible in terms of data compatibility. There are two aspects to this issue that need to be considered.

- How are the data formatted?—This is referred to as syntactic interoperability. Given the current widely used syntactic markup languages and schema standards such as XML, RDF, and JSON, differences in formatting are surmountable and syntactic interoperability is relatively easy to achieve.
- How are the data defined?—This is referred to as semantic interoperability. In a scenario in which two systems are to be integrated, it is vital to determine any differences in how data elements are defined and managed, and understand the resulting limitations. The goal is to align the definitions and constraints that are inherent with the data elements that are defined in the MFL and in other systems. Having access to proper documentation about the

³ The *Maintaining the MFL Module* provides a detailed discussion on curating and maintaining the MFL.

data is necessary for completion of this step (see section 3.2 *Preparing Documentation for Data Consumers*).

There are a number of important checks that need to be made before integration of the MFL data can be implemented.

- Check that facility identifiers match and that legacy identifiers are preserved.
- Check that geographic and/or administrative hierarchies match. For example, are the same administrative boundaries, names, organizations, and levels of specificity being used?
- Check that the facility types and categories of services are defined in the same way.
- Check whether some information (e.g., facility ownership) is included in a single data element with multiple response categories, or kept in several data elements with yes/no responses for each.
- Check that there is agreement on what *empty*, *NA*, and *nulls* mean
- Check that there are records of when data were last updated and by whom (for quality control purposes).
- Check that there is maintenance of ontology mappings between terminology standards and project datasets.

4.6. Technological Feasibility

The last step in the integration process is to consider whether integration is feasible at the existing technological level.

For almost every scenario imaginable there are numerous proven solutions that resolve technical interoperability needs within even the most exceptional constraints. Common challenges that must be overcome with regards to integration are the following:

- System deployment and connectivity—Which systems are installed where, with access to what, and under whose control? For example, a computer running in an office of a non-governmental organization may access the Internet, but itself may not be addressable as a web service. This creates practical constraints such as “who calls whom” and “push vs pull” notifications in a given integration scenario. Also, inconsistent connectivity from mobile devices, facilities, and general Internet availability in low and middle income countries make it necessary to cache data and queue messages for reliability. It may also be required to put processes in place to resolve conflicting updates or lost messages.

- Accessing data securely—Typically, secure data access implies authentication (securely identifying users and systems), authorization (limiting who can see certain data or perform a particular function), and auditing (tracing what was done). Sometimes an organizational obstacle to integration emerges due to the lack of consensus about who manages these overall permissions and how, often resulting in access that has to be maintained point-to-point. While the technological considerations all need to be specifically addressed, they are generally the easiest challenges to resolve in the process of integration. For health care and other fields, technological obstacles and resulting solutions have been well documented, and can be applied to future integrations.

Programmatically, core details for successfully carrying out the technical aspects of an integration include the following:

- Reach agreement on the direction of data integration; that is, who is the source of data and who is the consumer?
- Agree on push or pull, who triggers these events, and when. This might be a manual, scheduled, or triggered process.
- Agree on where the trigger and script will be hosted or run. For example, is it in the facility registry server, a HMIS server, or a third party service?
- If the integration is done via a bridge script or point to point, make sure to have ad-hoc service credentials or use single-sign-on OpenID tokens to avoid having credentials lying around in other servers.
- Try to run the scripts against staging or replica datasets before production.
- Use interoperability profiles of standards and interoperability specifications to reduce the surface area, cost, and complexity of implementing standards.
- Integrate first and standardize later; this will increase efficiency and ensure that the standardization process is well informed.

4.7. Data Sharing Tools (API)

Application programming interfaces (APIs) are tools that enable integration and the exchange of data. Multiple APIs are available to facilitate the automated transmission of data across systems. These are technical tools used by developers, but it is good to be aware of them as reusable options to connect systems and address interoperability with standards based tools. The following are examples of APIs that have been used for MFLs.

- Facility Registry API—Is a RESTful style API that was developed within the OpenHIE community to support integrations for facility data. <http://facilityregistry.org/>
- Care Services Discovery API—Is a method used to share facility data along with health worker data, through the use of an interlinked registry [CSD: IHE Documentation](#); [OpenHIE Workflow: Query health worker and/or facility records](#)
- Other APIs—It may be desirable to use or implement other API standards, depending on the use case, technical staff experience, or limitations of the methods above. These include native APIs for specific facility registry service solutions, such as the DHIS2 API or Resource Map API. Other examples that facility registries may support are GeoJSON, RSS, and CSV. These are different data formats that particular users may want to take advantage of.

5. MANAGEMENT AND SUPPORT

Ongoing management and support of a facility registry’s integration and data sharing needs is important for its long term success. Together, the lead implementing group, supported by the steering committee and technical partners, constitute a proven combination for success, while also supporting local ownership and sustainability. Ongoing support for MFL sharing should include the following:

- *Designated person to respond to support requests as they come in from users.* The response at times may be that there is no way to fix an issue at this time, but having a point of contact to work with users and seek work arounds in these instances is extremely valuable.
- *Technical staff that can handle technical issues and fix bugs when they come up.* A time and materials agreement here can be a cost-effective approach, so staff are engaged only as needed.
- *Routine meetings of the steering committee to plan and maintain a strategic vision for the MFL and the associated integrations.* This may include additional fundraising or petitioning for resources if substantial enhancements are required.

Funding for technical support activities can be combined with routine support for the home institution’s systems. While most facility registry service efforts and related integrations have, to date, been driven by MOH and funder-related grants, other cost-sharing options may be possible, including the following:

Tiered approach to cost sharing—Access to some data is free while access to other data requires payment of fees.

Cost recovery model—Some partners or data users pay fees depending on how much they use the data. Similar models also depend on use or access rights to cover costs.

No fee for use of MFL data—Access to MFL data and services is provided by the government or owner of the registry, and no fees are charged.

6. RESOURCES

- FRED API
- CSD Profile
- Other APIs of Interest to FRs

MFL RESOURCE PACKAGE

GLOSSARY

Application Programming Interface (API): Are sets of rules, specifications and tools that software programs follow to communicate with each other. An API serves as an interface between software programs and facilitates their interaction and allows them to exchange information back and forth.

Centralized: Functions, powers, management and responsibilities for the MFL are concentrated at the national level within a particular agency or unit. All of the important decision making is kept at this central level.

Codebook: A document that describes the layout of the data in the MFL and details what the values associated with the data elements mean.

Completeness (of a list): The extent to which (1) all information is available for all facility entries in a list, and (2) there is an entry for each relevant facility in a list. A list is only complete if all relevant facilities have an entry in the list, and all data elements are available for each entry in the list.

Data consumers: Individuals who use (or could potentially use) the data in a facility list.

Data curators: Individuals responsible for maintaining, updating and validating the data in a facility list.

Data domain: A set of items that makes up an MFL entry, including items in both the signature and service domains.

Data element: A unit of data to be included in the MFL and for which each facility will have a value. Examples of data elements included in the MFL are: Facility name, Facility address, Facility phone number.

Data integration: Refers to the combination or exchange of data from one or multiple sources into a tool or platform that uses the acquired data for transactional or analytical purposes.

Data specifications: A guideline to ensure comprehensive and consistent data definition. For each data element, the following needs to be clearly defined in the data definition specifications:

Name: Short name or database code used to describe the data element.

Definition: Simple description of the data element.

Type: Classification that identifies the data element (e.g., text, numeric, yes/no, select one, select many, hierarchy, date, site, user, identifier, email, phone).

Data rules: Description of constraints or conditions that should be applied to a data element to improve accuracy and clarity.

Data source: Where the data element is comes from.

Data standards: Documented agreements on representation, format, definition, structuring, tagging, transmission, manipulation, use, and management of data.

Data suppliers: Persons or information systems that submit facility data or updates to the MFL. Data suppliers may be electronic information systems (such as a facility licensing database) that push data to the MFL.

Decentralization: Functions, powers, management and responsibilities for the MFL are distributed or dispersed at the sub-national level.

Facility Registry Service: The software solution that is used to store, manage and share the MFL data.

Federated: Functions and powers are shared multiple self-governing organizations according to an agreement among the member organizations.

Geocodes: are precise geographic coordinates that identify the location of something, in this case of a health facility. Typically, they specify location in terms of longitude and latitude.

Harmonize: The process of combining data from numerous facility lists into one single list. The process of harmonization includes a data cleaning component – identifying gaps and de-duplicating data.

Health Facility Registry: A different name for a Master Facility List. These terms can be used interchangeably.

Health Information Exchange: A network of information systems that are interlinked and can exchange data to facilitate analytics and monitoring of the health system.

Institutionalization: The embedment of an initiative within an organization, society, or country. Institutionalization requires adequate funding, sufficient staffing, governance, standardized processes, support from stakeholders, and acceptance by users. When the MFL is institutionalized, it contains valid data that are accepted and used by many people. Institutionalization is one component of sustainability.

Interoperability: A property of a product or system, whose interfaces are completely understood, to work with other products or systems, present or future, without any restricted access or implementation.

Maintenance: The process of maintaining the MFL after they are established to ensure that the MFL contents are valid and complete and the facility registry service is relevant and working without issues.

Master Facility List (MFL): A complete listing of health facilities in a country. It includes the data needed to identify each facility such as facility name, **unique identifier**, location, and contact information, as well as administrative data to help categorize facilities, such as facility type, ownership and operational status. The MFL may also include information about the service capacity of the facility, for example, type of services offered and number of beds.

MFL managers: those persons responsible for overseeing all processes, staffing and budgets related to the MFL.

MFL owner: the organization or agency that has control over the MFL and is responsible for housing and overseeing implementation of the list.

Minimum data content: The minimum set of data elements that describe facilities that must be included in the MFL. Other data elements can be added as resources allow, but the minimum content is required for all facilities from the onset.

Requirement: A singular documented physical and functional need that the MFL must be able to perform. It is a statement that identifies a necessary attribute, capability, characteristic, or quality of a system for it to have value and utility to a data consumer.

Service domain: Basic information on the service capacity of each facility that provides a basic inventory of available services and facility capacity, providing essential information for health systems planning and management [WHO].

Sharing: Process by which MFL data are made accessible to third parties.

Signature domain: A set of identification items for each facility that serves to uniquely identify each facility in order to prevent duplication or omission of facilities from the list [WHO].

Steering committee: A leadership body that is responsible for overseeing the establishment of the MFL, making strategic decisions about the MFL, and is responsible for ensuring and monitoring its long-term implementation.

Sustainability: The endurance of a system or process, or the ability to continue a defined system or process indefinitely, or for an extended time beyond the initial life of the project. Sustainability enables stakeholders to maintain the MFL beyond the establishment phase, which

if external resources (e.g., institutional, technical, financial) are involved, may require decreasing dependency on these insecure resources.

Technical working group (TWG): A group of subject matter experts who work together to achieve a specified goal. In relation to an MFL, a TWG is an interdisciplinary group that is responsible for designing the structure and content of the MFL and facility registry service as they are being planned and established. During the maintenance phase, the TWG is responsible for determining if the structure of the MFL and facility registry service are still relevant and if any changes should be made to them.

Technological infrastructure: The composite hardware (e.g., servers, computers, data centers, switches, hubs, routers), software (e.g., operating systems, internet browser, device drivers, other programs that can run on a computer), network resources (e.g., network enablement, Internet connectivity, firewall, security) and human resources (e.g., network administrators, developers, designers and data consumers) involved in developing and supporting the facility registry service.

Unique Facility Identifier: A unique code that is used to reference a health facility in the MFL. It should also be used in other systems and surveys. There are many types of unique identifiers that can be used, each suitable for different situations, including sequential integer codes, user-friendly alphanumeric codes, and automatically-generated universally unique identifiers.

Updating (content): The process, during the MFL maintenance phase, by which the entries in the MFL are updated. The MFL content updating process includes four steps: data collection, data submission, data validation and revision, and data approval. During the process MFL entries can be added, archived, or edited. The goal of the process is to ensure that MFL content is valid and complete.

User stories: Brief statements that describe what a given user wants and why. They may be phrased as follows: “As a [type of user] I want to [insert need] so that I can [insert why].”

Validation (content): The process, during the MFL maintenance phase, by which the content of the MFL is periodically validated to ensure that *ALL* entries in the MFL are valid and complete. This process differs from MFL content updating in that during the updating process only “known” additions or changes are made. However, in some instances, the content updating and validation processes may be the same; it depends on the maintenance processes established. During the content validation process, all records are reviewed; if an entry is found to be valid and complete, it is marked as such, and if an entry needs to be added or corrected, the change is made. This process tries to ensure that all entries are reviewed at least once every 1-2 years.

Validation (structure): The process, during the MFL maintenance phase, by which the structure and functionality of the MFL and facility registry service are reviewed to determine if (1) all

data elements are needed, (2) any data elements are missing, (3) data definitions are appropriate and relevant, and (4) the facility registry service is functioning properly and without issues. The goal of the process is to ensure that the MFL structure and facility registry service functionality are relevant to data consumers' needs.