How to Include Laboratories in a Master Facility List

Preliminary Guidance

May 2020

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MEASURE Evaluation

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Photo of laboratory in Africa courtesy of Flickr Creative Commons.

TABLE OF CONTENTS

Acknowledgements iv

Abbreviations vii

Introduction 1

Background 2

Guidance Development 4

Use Cases 5

Inclusion of Laboratories in the MFL 6

- MFL Governance Structure 6
- Information to Include about Laboratories in an MFL 6
  - Signature Domain Elements 7
  - Service Domain Data Elements 8
- Data Exchange Standards for Consideration 12
- Should facility-based laboratories be their own entity? 12
  - Maintain Laboratories as Part of the Clinical Facility 13
  - Create Laboratories as Their Own Entity 13

Other Resources for Documenting Laboratory Capacity 15

Future Considerations 17

References 18

Appendix A. List of Interviewees 19

FIGURES

Figure 1. Example of a health information exchange 3

Figure 2. Example of parent-child relationship: Facility-based laboratories 14

TABLES

Table 1. MFL Resource Package signature domain data elements 8

Table 2. Proposed service domain data elements to include for laboratories in the MFL 9

Table 3. Standards for laboratory directories 12

Table 4. Resources for mapping laboratory capacity 15

ABBREVIATIONS

APHL	Association of Public Health Laboratories
ASLM	African Society for Laboratory Medicine
FHIR	Fast Healthcare Interoperability Resources
HIS	health information system
HMIS	health management information system
mCSD	Mobile Care Services Discovery
MFL	Master Facility List
SARA	Service Availability and Readiness Assessment
SPA	Service Provision Assessment
WHO	World Health Organization

INTRODUCTION

A Master Facility List (MFL) is an authoritative, up-to-date list of all health facilities in a country. The original version of the MFL Resource Package was published by the World Health Organization (WHO) in January 2018 to guide country governments and other stakeholders through the key decisions in planning, establishing, maintaining, and sharing an MFL. This document is intended to be a supplement to the MFL Resource Package to provide additional guidance on incorporating laboratories into an MFL.

BACKGROUND

In the MFL Resource Package, an MFL is defined as:

> *"The complete, up-to-date, authoritative listing of the health facilities in a particular country. It is the primary source from which other facility lists in the country are drawn and must be validated, continuously updated, and accessible. The MFL includes the data needed to accurately identify each facility, such as facility name, unique facility identifier, location, and contact information, as well as administrative data to categorize the facility, such as facility type, ownership, and operational status"* (WHO, 2018).

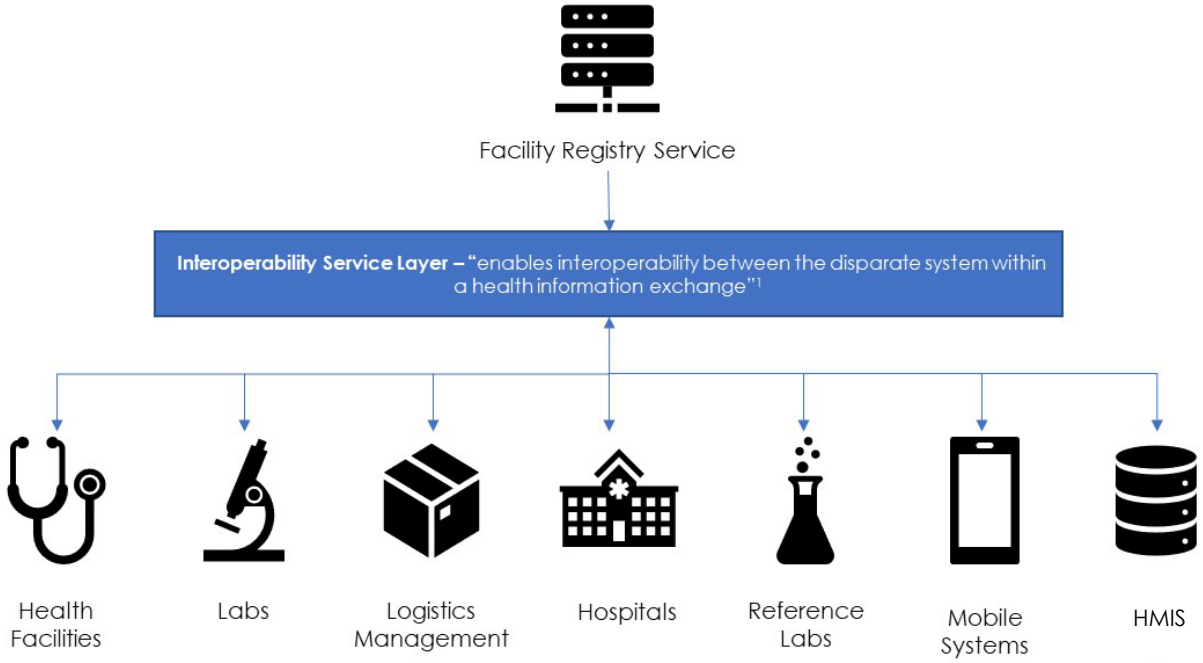
An MFL is most valuable when it is included as part of an integrated health information ecosystem and maintained as part of a facility registry service, which is a software application that allows the MFL to be maintained and shared (see Box 1 for key definitions used in this document). An authoritative list of facilities is needed for many components and functions of a health information system (HIS), such as health management information systems (HMIS), disease surveillance, and supply chain management, as shown in Figure 1. An MFL is a critical source of truth as part of a health information exchange architecture, because it allows stakeholders and components to use the same unique identifier for facilities across different systems. For more information, see "Value of an MFL" in the Introduction to the MFL module of the MFL Resource Package.

Box 1. Key definitions

- "A **Master Facility List (MFL)** is the complete, authoritative listing of the health facilities in a particular country. It is the primary source from which other facility lists in the country are drawn and must be validated, continuously updated, and accessible. The MFL includes the data needed to unambiguously 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."
- "A **Facility Registry Service** is a software solution that stores and shares the Master Facility List (MFL) data and acts as a common component of a health information exchange (HIE) and enable more complex interoperability use cases."
- "An MFL and its corresponding facility registry service are a central component of the **health information exchange** (HIE) architecture. Countries that are moving towards implementation of electronic health records, interoperable HMIS and an HIE architecture require standardized facility data to enable communication, linking or merging of data across systems. The MFL is the primary source of this standardized facility data, and must be recognized as authoritative and used by the various interlinked systems."

Source: WHO, 2018

Figure 1. Example of a health information exchange



[1] https://wiki.ohie.org/display/SUB/Interoperability+Layer+-+Use+Cases+and+Requirements

When the MFL Resource Package was published, it lacked clear guidance on how to represent laboratories in an MFL. Laboratory information systems serve as a source of truth and expertise for processing specimen orders and providing critical laboratory results data, which are then shared within the broader HIS for clinical use and secondary data uses. To understand a specimen transport network, it is important to understand the history of those data, including how they were obtained, by whom, when, and for what purpose; verify the credibility of the data as they move through the HIS; and maintain consent to release and share the data within or outside the HIS. The launch of the Laboratory Information Systems Community of Practice further highlights the increased demand for interoperable laboratory information systems within the HIS ecosystem. There is also a need to unify and collate data from disease-specific surveillance systems. Many of these contain their own facility lists, resulting in duplication of effort and inconsistency in data used to identify laboratories between information systems. Finally, the recent COVID-19 pandemic, as well as the previous Ebola epidemic, has renewed the focus on the need to rapidly assess diagnostic networks to inform capacity-building efforts in response to disease outbreaks and surveillance needs.

GUIDANCE DEVELOPMENT

To develop this preliminary guidance, we gathered input from professionals involved in the development of the original MFL Resource Package, specialists in laboratory management and laboratory information systems, infectious disease detection and surveillance advisors, and experts in One Health initiatives and global health security. MEASURE Evaluation held one-on-one interviews with key informants and obtained group feedback from the OpenHIE Facility Registry community (see Appendix A for the list of individual interviewees). OpenHIE is a global community of practice that works on developing and improving health information architectures through standards-based approaches and reference technologies (OpenHIE, n.d.). In addition, we reviewed existing standards and terminologies related to cataloguing laboratories and their services.

Box 2. Defining a laboratory

Clinical laboratories test human and animal samples and serve as an interface between patients and animal owners/keepers and the public health system. According to the Association of Public Health Laboratories, "in the broadest sense, all laboratories are capable of analyzing or referring samples that may contain microbial agents, biological toxins, chemical agents, chemical agent metabolites, or radiological agents of public health significance function as sentinels in the public health laboratory system." As such, a site that only performs rapid testing could be considered a laboratory. In this guidance, we use the term laboratory generally and leave it to country MFL implementers to determine what will constitute a laboratory in the MFL.

Source: Association of Public Health Laboratories, 2018

USE CASES

To understand what additional information is needed regarding laboratories in an MFL, MEASURE Evaluation developed the following use cases based on the key informant interviews.

Use case 1: Health information exchange
As described in the MFL Resource Package, health information exchange architecture requires standardized facility data to enable communication, linking, and merging of data from electronic health records, HMIS, logistics management information systems, and laboratory information systems. The MFL is the primary source of these facility data and must be recognized as authoritative, with the expectation of regular use by the linked systems. This will also help facilitate the provenance of data related to specimen collection, referral, and analysis as they move through the HIS. Provenance of data refers to the ability to track the origin of and edits to the data.
Use case 2: Pandemic response
During a pandemic, it is critical to able to rapidly assess laboratory networks for diagnostic capabilities and specimen logistics. It is critical to have a system that identifies lists and locations of both standalone laboratories and clinical facility-based laboratories and their biosafety levels, to quickly determine availability of diagnostic capabilities, availability of testing, need for testing equipment and supplies, testing capacity, and need for logistic support for specimen transport. An MFL can help by interlinking systems containing this information.
Use case 3: Diagnostic network assessments
Being able to routinely assess diagnostic networks will help ministries of health understand a country's capacity to provide laboratory services for both disease surveillance and routine health. Assessments analyze the diagnostic capabilities of the laboratories, population coverage, human resources capacity, and other factors. Access to a laboratory listing in the MFL, as well as data from other types of interlinked registries, provides these assessments with foundational information, such as lists of facilities and laboratories and distribution of human resources and skills.

A functional MFL should contain data that are current and verified within the last two years. In determining what additional data might be needed in an MFL to be responsive to these use cases, we asked the following questions:

- What are the needs of the data consumers?
- What data elements might be reusable across the three use cases?
- What data can be kept current without significant burden?
- What types of systems would need to interlink with the MFL that are relevant to the use cases, and what information would they need?

In addition to reviewing these questions with stakeholders, MEASURE Evaluation reviewed a number of publicly available MFLs to see what information they contained. The following section summarizes the information collected from stakeholders in response to these questions.

INCLUSION OF LABORATORIES IN THE MFL

This section describes considerations to take in including laboratories in the MFL, such as stakeholders to consult, along with the data elements that will adequately capture information about the laboratories.

MFL Governance Structure

As proposed in the MFL Resource Package, an MFL should have a well-designed governance structure and procedures that govern its design, maintenance, and use. The MFL Resource Package identifies four key elements of governance: leadership, stakeholder engagement, policy environment, and institutionalization and sustainability (WHO, 2018).

When including laboratories in an MFL, it will be important to ensure that the correct stakeholders associated with laboratory programs and laboratory informatics are part of the steering committee leading the MFL design and maintenance. For example, in some countries, there is a directorate of public health laboratories; in other countries, the national reference laboratory oversees the national public health laboratory system. It will be imperative to involve these stakeholders as soon as possible in the development of the MFL (or in any initiative to add laboratories to an MFL) so their input can be used in deciding what information will be collected about laboratories. The MFL steering committee will need to determine the definition of a laboratory, which will be used to identify laboratories in the MFL. For example, will a facility with the ability to conduct rapid tests be considered a laboratory? The definition of what constitutes a laboratory will vary from country to country. The steering committee can start by reviewing how the national laboratory strategy categorizes laboratories.

Other stakeholders should also be engaged at different stages of development, maintenance, and use of the MFL. National disease programs that rely heavily on laboratory testing, such as HIV, tuberculosis, and other infectious disease programs, should be consulted on defining MFL requirements as they pertain to laboratory data and how they would use the MFL. As the MFL steering committee plans to incorporate laboratories into the MFL, it should seek to consolidate existing lists of laboratories that might be available from current stakeholders, such as national health programs, private laboratory networks, and national reference laboratories. These lists will serve as a starting point for incorporating laboratories into the MFL, and they will need to be reviewed for completeness, quality, information captured, and discrepancies. A reconciliation tool, such as the Global Open Facility Registry, could be used to consolidate multiple lists to generate a single list of laboratories. For more information on identifying and consolidating lists, refer to the section titled "Establishing an MFL Dataset" in the MFL Resource Package.

Information to Include about Laboratories in an MFL

As discussed in the MFL Resource Package, an MFL contains data elements that provide details about each entity, or facility, in the list (WHO, 2018). To expand on the guidance provided by the MFL Resource Package on the data elements to include in the data model of an MFL, MEASURE Evaluation sought to understand what, if any, additional data elements might be needed to adequately capture laboratories in an MFL. The consensus among stakeholders was that basic identifying information about laboratories should be

captured in the MFL, and that there will likely be other repositories in which more in-depth information about laboratories is captured. This would mean that the MFL would serve as the authoritative list to uniquely identify all health-related facilities in a country, which includes listing laboratories. The structure of the MFL data content and how the data are stored, otherwise known as the data model, will be influenced by the facility registry service used. It is important to note that if a facility registry service is already in place, there might be limitations in the ability to customize the data model.

Many countries have two types of laboratories: standalone laboratories and laboratories that are based in clinical health facilities. As part of this preliminary guidance document, MEASURE Evaluation sought to learn best practices for handling facility-based laboratories: were they being listed as separate entities in the MFL or were they linked to the health facility in some way? See the section "Should facility-based laboratories be their own entity?" for more details. The data model for the MFL will vary, depending on whether facility-based laboratories are their own entities, so countries will need to decide early on how to handle facility-based laboratories in the MFL as part of determining the MFL data model. This decision will vary from country to country and should be based on country context and how health services are delivered.

In keeping with the data element categories in the MFL Resource Package, this guidance distinguishes between signature and service domains for the proposed data elements (see Box 3). Tables 1 and 2 contain the data elements a country should consider including (if not already part of the MFL) to accommodate laboratories. Please note that this is not an exhaustive list of information needed about laboratories; rather, it is intended to provide high-level information about a laboratory and its capabilities. Further resources for mapping and documenting laboratory capabilities are found in the section "Other Resources for Documenting Laboratory Capacity."

Box 3. MFL data element domains

The MFL Resource Package classifies data elements using these categories:

- The **signature domain** "contains data elements that are used to establish a "fingerprint" for a facility (MEASURE Evaluation & WHO, 2007). It includes all the information necessary to uniquely identify, locate, and contact a specific facility. These data elements should not change substantially over time. The data elements in the signature domain constitute the **minimum data content** for your MFL" (WHO, 2018).
- The **service domain** "contains data elements that describe the basic services, infrastructure, and human resources at a facility; therefore, service domain data are critical for planning and resource allocation. Compared with signature domain data, these data tend to change more frequently, so greater effort is required to keep information current. Careful consideration should be given to identifying the minimum service domain data elements to be included in the MFL" (WHO, 2018).

Signature Domain Elements

Based on this preliminary assessment, all the signature domain data elements identified in the MFL Resource Package apply to laboratories. When adding laboratories to the MFL, some of the data elements may need to be modified. These modifications are listed in Table 1. For expanded descriptions of these data elements, please reference the latest version of the MFL Resource Package.

Table 1. MFL Resource Package signature domain data elements

Signature domain data element from MFL Resource Package	Modification for laboratories
Facility unique identifier	Ensure that the identifier system used for health facilities will include laboratories and that laboratory stakeholders agree to the coding system and have adopted it into their systems. For ideas on how to handle facility-based laboratories and whether they should have a unique identifier, see the section "Should facility-based laboratories be their own entity?"
Facility name	Ensure that laboratory names follow the same specifications used for facility names; include "laboratory" in the name only if it is part of the facility's official name. See the MFL Resource Package for more details on setting data element specifications.
Facility type	Ensure that the MFL list of facility types includes "laboratory" or something similar.
Ownership or managing authority	Expand the list of potential ownership or managing authority entities to include ownership scenarios for laboratories. For example, some laboratories can be based in forensic units or universities that might not be as typical for health facilities.
Postal address	No modification from MFL Resource Package guidance
Contact information	No modification from MFL Resource Package guidance
Administrative areas	No modification from MFL Resource Package guidance
Geographic coordinates	No modification from MFL Resource Package guidance
Operational status	No modification from MFL Resource Package guidance
Record status	No modification from MFL Resource Package guidance

Service Domain Data Elements

Table 2 details some service domain data elements that a country might consider using for laboratories in an MFL. Some of these data elements are recommended by the MFL Resource Package and should be adapted to include laboratories. Table 2 provides a description of each data element and some additional rationale captured from the interviews with stakeholders. Most of these apply to both health facilities and laboratories, but the data elements "laboratory tier" and "biosafety level" are specific to laboratories. In deciding how to incorporate these data elements, it will be important to understand the functionality of the facility registry service, if there is already one in place. If a facility registry service has not yet been identified, the MFL steering committee will need to decide what functionality it should have based on the desired complexity of the MFL data model.

Table 2. Proposed service domain data elements to update and include for laboratories in the MFL

Data element	Definition	Description	Rationale and caveats
Services offered *(already recommended by MFL Resource Package)*	Types of services offered by a facility	The MFL Resource Package describes the services offered data element as: "A series of data elements listing key health services is included in the MFL; facilities are categorized as "Yes" providing the service or "No" not providing the service. Information must 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" (WHO, 2018). The services offered data element should be expanded to include laboratory as a capability so that entities that are a laboratory or have a laboratory can be marked as having this capability. Some countries may choose to expand this list to include the types of laboratory testing or disciplines available. The *Second WHO Model List of Essential In Vitro Diagnostics* provides disciplines of essential in vitro diagnostics (WHO, 2019). Countries could use these disciplines as a starting point to distinguish laboratory categories if they do not already have a classification system in place.	There needs to be a way to denote that a facility has laboratory capabilities and identify those capabilities. The data element will also be useful in distinguishing clinical facilities that have laboratories inside them; in this case, the facility type might not be designated as "laboratory." A caveat to consider when adding laboratory services to the MFL is that it will likely be too burdensome to maintain and update information on specific tests and equipment available at a laboratory in the MFL. This will need to be collected through a different interlinked system, such as an equipment registry or laboratory information system.
Laboratory tier *(add to MFL data model)*	Classification of laboratory and the services it can provide	In their national laboratory strategic plans, many countries have a tiered laboratory classification system that designates the types of services available at the laboratory, depending on its level in the healthcare system. Many countries have three to four tiers. See Box 4 for an example of how Tanzania classifies its laboratories.	Countries might consider including this data element for laboratories to quickly identify laboratories in a certain tier. There are two caveats to take into consideration: 1. Although a laboratory might be in a certain tier, its capabilities and equipment might not meet the expectations of that tier. This

Data element	Definition	Description	Rationale and caveats
			reality further highlights the need for more in-depth surveys on laboratory capabilities. 2. Private sector and nongovernmental organization-owned laboratories might not follow this tiered system.
Biosafety level *(add to MFL data model)*	Classification for laboratory capacity to handle different biosafety risk levels (WHO, 2004)	"Biosafety level designations are based on a composite of the design features, construction, containment facilities, equipment, practices and operational procedures required for working with agents from the various risk groups" (WHO, 2004). WHO specifies four levels of biosafety: – Basic: biosafety level 1 – Basic: biosafety level 2 – Containment: biosafety level 3 – Maximum containment: biosafety level 4 See the *WHO Laboratory Biosafety Manual: Third Edition* for more information on the biosafety levels. Countries might already use this classification or an adapted classification to assign biosafety levels to their laboratories.	The biosafety level of a laboratory can aid in the identification of facilities with the appropriate safeguards to handle various pathogens.
Human resources *(already recommended by MFL Resource Package)*	Number of medical personnel by type (WHO, 2018)	The MFL Resource Package describes human resources as "The categorization of health personnel is specific to the country" (WHO, 2018). When including laboratories in the MFL, countries should consider expanding this data element to include the key types of laboratory personnel as specified by the country. The African Society for Laboratory Medicine (ASLM) Survey on Laboratory Capacity includes the following human resource categories for laboratories: pathologists, microbiologists, lab technologists, lab technicians, lab assistants, and phlebotomists (ASLM, 2020).	The number of laboratory professionals can provide ministries of health with important insights when they are conducting strategic planning for laboratory human resources. Routine diagnostic network assessments use this information to understand the distribution of laboratory skills across a network. One caveat to consider with this data element is that it could be hard to maintain due to frequent personnel shifts. Countries might want to consider pulling this information from a human resources information system.

The additional information needs of diagnostic network managers and those using laboratory information to plan for outbreak response, such as tests available, accreditation standards, or equipment available, are too detailed and perhaps complex to be maintained in the MFL on a regular basis. Instead, stakeholders suggested that this information would likely be stored in separate repositories or systems, such as an equipment registry, a laboratory information system, a logistics management system, or detailed laboratory mapping exercise, which could be linked to the MFL through the unique facility identifier.

Box 4. Case study: Laboratory tiers in Tanzania

According to the United Republic of Tanzania's National Health Laboratory Strategic Plan II, the health laboratory services are organized into three levels:

- Level 1 (primary)
  - Specimen collection points (community health laboratory facilities)
  - Dispensaries
  - Health centers
- Level 2 (secondary)
  - District hospital laboratories
  - Regional referral hospital laboratories
- Level 3 (tertiary)
  - Zonal referral and specialized hospital laboratories
  - National reference laboratories and National Health Laboratory Quality Assurance and Training Center

Source: Ministry of Health, Community Development, Gender, Elderly and Children, 2016

Data Exchange Standards for Consideration

During this activity, MEASURE Evaluation identified several standards that might be useful for countries to consider when developing the specifications of their MFL. As mentioned earlier, a facility registry service is used to share the MFL data with other components of the HIS through a health information exchange. A facility registry service is a common component of a health information exchange that shares crucial facility data, such as unique identifiers, with other systems in the HIS. Therefore, countries should carefully plan the structure of their data for the MFL, taking into consideration the information that will be needed by other systems in the health information exchange. The MFL Resource Package (WHO, 2018) contains guidance for developing specifications for data elements in the MFL and additional details on establishing a facility registry. In addition, Table 3 lists several standards to consider for laboratory facility information. These standards focus the structure of the data to describe services provided by a facility and therefore would be used in exchanging information about services offered at a facility or laboratory.

Table 3. Standards for laboratory directories

Standard	Description	Website
Integrating the Healthcare Enterprise® Mobile Care Services Discovery (mCSD) Profile	This standard describes the use cases in which health care services information would be needed, standardized flows of that information, and the supporting standards, to address these flows. The mCSD profile is built on FHIR.	https://wiki.ihe.net/index.php/Mobile_Care_Services_Discovery_(mCSD)
Fast Healthcare Interoperability Resources (FHIR) HealthcareService Resource and ServiceType Valueset	The FHIR HealthcareService Resource is a building block for using FHIR in exchanging healthcare data. This resource provides information about the healthcare services offered at a location. Within this resource is the ServiceType Valueset, which offers a sample standardized list of service types and codes, which includes some laboratory services. As this valueset is only an example, it provides an illustration of how a list of service types could be documented and coded and can be adapted to the country context.	FHIR HealthcareService Resource: https://www.hl7.org/fhir/healthcareservice.html FHIR ServiceType Valueset: https://www.hl7.org/fhir/valueset-service-type.html

Should Facility-Based Laboratories Be Their Own Entity?

Most stakeholders that participated in this activity identified the need for the MFL to be able to capture both standalone laboratories and laboratories based in healthcare facilities. Many countries have district and regional laboratories located in hospitals that are used for testing by the hospital as part of its services and also used by outside clinics for testing their patient population. These laboratories are often service providers within another entity, while also acting as their own independent entity to an external customer base. These types of laboratories stretch the definition of "facility" for an MFL beyond a physical standalone entity, to be defined as an entity that operates as a standalone, regardless of whether they are physically structured in that

way. There are several options that countries can consider in ensuring that all laboratories can be easily identified as entities that provide laboratory services, as described in the following sections.

Maintain Laboratories as Part of the Clinical Facility

- **Option 1:** This option does not make facility-based laboratories their own entity; instead, it denotes laboratory capabilities through the "Services Offered" data element. To easily identify all laboratories within a facility, the country would need to ensure that all facilities, regardless of facility type, that provide laboratory services are identified by selecting "Laboratory" under "Services Offered" (or the country's specified service name for laboratory services). In this situation, even facilities with the facility type "Laboratory" will be marked as providing laboratory services, as would those clinical health facilities that contain a laboratory. A user can easily filter the MFL for those facilities providing laboratory services by using the "Services Offered" data element.

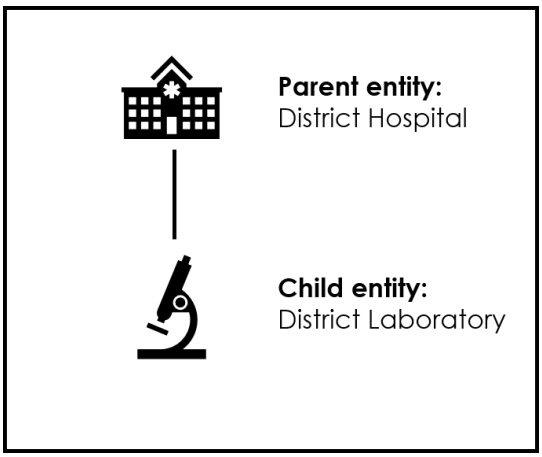
- **Option 2:** Countries could choose to allow facilities to have more than one facility type, which would allow a hospital, for example, to be identified as both a hospital and a laboratory. This option, however, could cause confusion when searching for different facility types by bringing up seemingly different types of facilities, subsequently causing mistrust in the data.

Create Laboratories as Their Own Entity

- **Option 3:** This option would form a parent-child relationship in the data model between the facility records in the MFL. In this case, a parent facility would represent a specific entity that encompasses one or more child facilities representing entities that are physically colocated but considered operating as standalone facilities. This can also be seen as setting up facilities with subfacilities that are colocated/attached but have their own unique identifier. For example, if a district hospital has an adjoining national reference laboratory, each laboratory could be assigned a unique identifier that is linked to the parent identifier of the overarching healthcare facility and facility type. This would make it easier to filter for facilities with the facility type "Laboratory." See Figure 2 for an example.

- **Option 4:** This final option is to make a facility-based laboratory its own entity in the data model that is not connected to the clinical facility where it is located. This is likely not ideal because it could cause confusion, given that the laboratory might be associated with its clinical facility for planning or commodity purchasing.

Figure 2. Example of parent-child relationship: Facility-based laboratories



These are just some examples of how to identify both facility-based and standalone laboratories, but there might be other options available. Stakeholders preferred Option 1 or Option 3, with some leaning toward Option 3, because identifying laboratories as their own entity allows for more specificity in the data associated with that entity and the ability to track the provenance of laboratory data. Option 3 will require a more complex data model in the facility registry service. Countries should consider how their health services are deployed and the features and capabilities of their facility registry solution (if one already exists) when deciding the best way to identify facility-based laboratories.

OTHER RESOURCES FOR DOCUMENTING LABORATORY CAPACITY

As mentioned in previous sections, there are many use cases that will require additional information about laboratory capacity that expand beyond what would be captured in an MFL. Many stakeholders recommended that the MFL be used as the authoritative list of laboratories in a country that could be linked to other, more in-depth repositories and information systems that contain additional information about laboratories. One such repository could be generated by a laboratory mapping survey. A laboratory mapping survey is a detailed assessment to capture in-depth information about each laboratory in a country. The data from these assessments can form repositories of information that could also be used to populate or update the laboratory information in an MFL. Before using any repository of facility data, it is important to validate the data and determine when they were last updated to avoid using outdated data. Table 4 contains additional resources for documenting laboratory capacity. Box 5 documents a use case from Kenya in which the Association of Public Health Laboratories (APHL) worked with the Kenya Ministry of Health to conduct a laboratory mapping project that was used to update laboratory information in the MFL.

Table 4. Resources for mapping laboratory capacity

Resource	Brief description	Website
ASLM Laboratory Mapping Program	ASLM has a project to map laboratories using standardized data collection tools. The Laboratory Mapping Program also has resources for collecting, managing, storing, and using these laboratory capacity data.	https://aslm.org/what-we-do/labmap/
Service Availability and Readiness Assessment (SARA)	SARA is a health facility assessment tool that collects information at the facility level on key indicators for health systems planning, such as human resource availability; infrastructure resources; availability of basic equipment, basic amenities, essential medicines, and diagnostic capacities; and the readiness of health facilities to provide basic healthcare interventions relating to family planning, child health services, basic and comprehensive emergency obstetric care, HIV, tuberculosis, malaria, and noncommunicable diseases. SARA can be used to regularly collect data on health facility service availability and readiness across a broad spectrum of health system components.	https://www.who.int/healthinfo/systems/sara_methods/en/
Service Provision Assessment (SPA)	SPA is a survey conducted in health facilities to collect information on the overall availability and readiness of facilities to provide key services, such as infrastructure, resources, and systems; child health; maternal and newborn health; family planning; HIV/AIDS; sexually transmitted infections; malaria; tuberculosis; basic surgery; and noncommunicable diseases.	https://dhsprogram.com/What-We-Do/Survey-Types/SPA.cfm

Box 5. Kenya laboratory mapping case study

In 2016–2017, APHL and Kenya's National Public Health Laboratory mapped all the laboratories in Kenya. APHL designed the laboratory survey with local stakeholders. The survey asked questions about laboratory capacity in these categories: demographics, workforce, priority communicable diseases and methods, workload and referrals, policy management, equipment management, commodity/inventory management, data management, quality management, and safety/biosafety/biosecurity. APHL provided updated geocodes to Ministry of Health staff to enable them to update the MFL. The survey data now reside at the National Public Health Laboratory and are used as a reference on an as-needed basis, for updating and developing policies and obtaining detailed capacity information on laboratories currently conducting COVID-19 testing. The National Public Health Laboratory plans to update this laboratory capacity information annually.

FUTURE CONSIDERATIONS

This document offers preliminary guidance on how to include laboratories in MFLs, and we propose several next steps to continue to move this preliminary guidance forward.

In the short term, we propose the following:

- **Document** examples of how countries are including laboratories in their MFL and update this guidance appropriately to reflect best practices and case studies.
- **Consider** developing a standardized terminology list for high-level health service categories that can be used in an MFL to designate services provided, with attention to the needs of low-resource settings.

In the long term, we propose the following:

- **Explore** how to connect zoonotic laboratories with the HIS architecture to more easily facilitate tracking of disease outbreaks across human and animal populations.

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APPENDIX A. LIST OF INTERVIEWEES

Name	Organization
Anicet Dahourou	FHI 360
Cristina de la Torre	MEASURE Evaluation, ICF
Jan Flowers	University of Washington
Reshma Kakkar	APHL
Ali Kwizera	ICF
Lucy Maryogo-Robinson	APHL
OpenHIE Facility Registry Community	none
Chana Rabiner	ICF
Rita Sembajwe	RTI
Tendai Shamu	Zimbabwe National Microbiology Reference Laboratory
Ralph Timperi	APHL
Inoussa Zabsonre	ICF

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