Results and Recommendations from Application of the HRIS Status Assessment Framework (HAF) in Madagascar

HRH2030: Human Resources for Health in 2030

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Contents

Acronyms

CBHIP	Community-based Integrated Health Project (aka MAHEFA)
CDC	United States Centers for Disease Control and Prevention
CMM	Capability Maturity Model
CSB	centres santé de bases (community health centers)
CSI	common and shared interest
DDS	Direction des Districts Sanitaires, Ministère de la Santé Publique
DEP	Direction des Études et Planification, Ministère de la Santé Publique
DHIS2	District Health Information System version 2
DIFP	Direction des Instituts de Formation des Paramédicaux, Ministère de la Santé Publiq
DQA	data quality assessment
DRH	Direction des Resources Humaines
DSI	Direction du Système d'Information, Ministère de la Santé Publique
FP	family planning
HAF	PEPFAR HRIS Assessment Framework
HMIS	health management information systems
HRH2030	Human Resources for Health in 2030
HRIS	human resource information system
iHRIS	Open Source Human Resource Information System
INSPC	Institut National de la Sante Publique et Communautaire
INSTAT	Institut National des Statistiques
IS	information system
JSI	John Snow, Inc
MAHEFA	Madagascar Community-Based Integrated Health Program (aka CBIHP)
MCH	maternal and child health
MCSP	Madagascar Maternal Child Survival Program
M&E	monitoring and evaluation
Mikolo	USAID Mikolo Project in Madagascar for reducing maternal, infant, and child morbidity and mortality
MSH	Management Sciences for Health
OGAC	Office of the U.S. Global AIDS Coordinator
ONM	Ordre National des Médecins

PEPFAR	U.S. President's Emergency Plan for AIDS Relief
PHII	Public Health Informatics Institute, a program of The Task Force for Global Health
PNDRHS	Madagascar National Plan for the Development of Health Human Resources
SG	Secretary General, Ministry of Health
SLG	Stakeholder Leadership Group, as defined by the iHRIS Foundation
TOR	terms of reference
TWG	technical working group
USAID	United States Agency for International Development
WHO	World Health Organization

Executive Summary

The Human Resources Information System (HRIS) status assessment aimed to assist Madagascar in evaluating the new multisectoral HRIS and identify gaps to address during system implementation. The Human Resources for Health in 2030 (HRH2030) Program[1] uses the HRIS Assessment Framework (HAF), a tool developed by PEPFAR which employs a semi-structured interview process in assessing both the functionality and capacity of a HRIS. Stakeholders' critical human resources for health (HRH) data needs gathered through the HAF, inform recommendations used to create a more interoperable and effective HRIS. The completion of the Madagascar HAF contributes to the global HAF implementation, providing further country comparisons and feedback for advancing the tools' utilization.

Availability and use of HRIS data has broad implications, impacting the delivery of health services including those related to family planning and HIV. In particular, a functional HRIS can improve HIV care by assisting the Ministry of Health to deploy health workers with the necessary skills to provide key populations a full spectrum of HIV prevention, diagnosis and treatment services. This same concept flows into all identified community health needs, such as those related to family planning (FP) services and maternal and child health care (MCH).

A designated HAF Assessment team gathered HAF data through stakeholder interviews over an eight-day period (September 4–12, 2017). Stakeholders spanned the Ministry of Health at central and subnational levels, the Ministry of Civil Service, the Ministry of Finance, pre-service education institutions, health professionals' regulatory bodies, professional associations, and partner organizations, among others.

The HAF application yielded a *Functional Strength* score of 1.7 and a *Capacity Strength* score of 2.3, for an overall *HRIS Strength* of 2.0 (on a scale of 1 as "least developed" up to 5 as "highly functional"). Interviews identified a host of systems being used to capture HRH data, ranging from Microsoft Excel (MS Excel) spreadsheets and workbooks to Microsoft Access (MS Access) databases, as well as systems developed to satisfy the specific HR data needs of departments, divisions, or organizations. Although some systems were functional to the internal needs of the respondent(s), no system provided evidence of interoperability or even basic data exchange. Because the interview process did not include hands-on demonstrations of the systems identified, the team did not assess the full depth and capability of each system.

The culmination of the HAF activity occurred when a broader set of HRH stakeholders gathered for a full-day dissemination and HRIS policy discussion workshop. The workshop included revolving roundtable discussions to deliberate functions and capacities as defined by the HAF tool through the use of topic areas (e.g., common systems, data sharing and data use, performance management, standards, etc.), with participants rotating among tables. Participants recorded their recommendations, selecting priority actions or areas in which to achieve a more harmonized HRIS.

According to Madagascar's Ministry of Health, this HRIS discussion was the first of its kind in country; it used the HAF results as the foundation of an open dialogue on building a functional and harmonized HRIS. Assessment results will be used to advise on the prioritization of future investment areas for strengthening the HRIS and maintaining alignment with the Madagascar National HRH Development Plan (strategy to Strengthen Information Systems, Planning, and Monitoring and Evaluation [M&E]).

Recommended priority functions included maintaining pools of trainers, career tracking in pre-service education, requiring competency monitoring and capacity building (registration, staffing gaps, in-service training), real-time data input and updates based on staff registries (personnel actions, health worker registry), and several other functions of lesser priority.

[1] Available at: https://www.hrh2030program.org.

Recommended capacity development included matching profiles with competencies (technology/infrastructure), implementing decentralized databases with access restrictions (decentralization), collaborating of the Ministry of Health and the Ministry of Labor to elaborate policies defining a health worker registry, and determining unique codes for data elements (interoperability), among others. Additional recommendations included such topics as governance, minimum data sets, data collection/dissemination roles and responsibilities, and analysis and reporting.

The HRH2030 team will supplement this report, which includes results and recommendations from HAF application in Madagascar, with a separate report summarizing broad HAF feedback, recommendations, and lessons learned. This 'lessons learned and recommendations' report will combine experiences from HAF implementation in Madagascar with those from upcoming assessments planned in Indonesia and the Philippines. The lessons learned and recommendations report will augment country-specific reports by providing actionable recommendations for global application.

Background

As part of the Human Resources for Health in 2030 (HRH2030) Program's goal of helping low- and middle-income countries develop the health workforce they need, it is essential that they have a functional human resources information system (HRIS). Guiding the medium and long-term growth of human resources for health (HRH) through evidence-based decision-making, policy makers rely on a complete and accurate HRIS, facilitating the appropriate production and distribution of health workers. Among a host of clinical cadres, the ability to coordinate education, training and skills for providers of MCH and FP services will be a critical contribution of the HRIS. HRH2030 employed the PEPFAR HRIS Assessment Framework (HAF) tool to assess the functionality and capacity of Madagascar's HRIS in light of the HRH data needs of individuals, private organizations, and the public-sector stakeholders. See Annex A for the complete HAF Excel tool.

Considering extensive investments made by PEPFAR in HRIS, an interagency task-force on HRIS[2] was formed to systematically assess and inform improvements of country HRIS that PEPFAR had been supporting. The HAF tool, available to be utilized by any country, provides a systematic format for countries to assess the developmental stage of their HRIS. The HAF accomplishes this by measuring the capacity and use of the system and the information it contains towards understanding the requirements for advancing to higher stages of development. A staged capability/maturity model (CMM) forms the basis of the HAF tool, developed to benchmark across eight components under the HRIS functionality and capacity.

The **functionality** score assesses 8 functional components of a HRIS:	The **capacity** score assesses 8 capacity components of a HRIS:
Pre-service education	Technology Infrastructure
Registration and licensure	Decentralization
Staffing gaps and needs	Use of standards
Payroll information	Data quality
Personnel actions	Sustainable financing
In-service training	Human capacity
Workforce Exit/attrition	Interoperability
Health Worker Registry	Use of data

The HAF is meant to be implemented by a small, HRIS knowledgeable assessment team who conducts a series of semi-structured interviews with key HRH stakeholders. These stakeholders are those individuals, agencies or organizations (public or private) who collect, use or disseminate HRH data within a respective country. The HAF tool, as a relatively simple Excel-based scoring platform, provides the assessment team with scoring guidelines, permitting a basis to scoring and easy calculation. While this methodology was followed in Madagascar, the HAF application can be adapted based on country context and needs.

The HAF was applied in Madagascar to assist in identifying gaps to be addressed as the nation works to build a more effective, evidence-based system to strategically improve their HRH capacities through policy and planning. Further, the results of the Madagascar HAF will not only provide additional global results comparisons, but also contributes to the experiential database to inform future global implementations.

[2] The interagency task-force comprised of staff from USAID, the U.S. Centers for Disease Control and Prevention (CDC), the Office of the U.S. Global AIDS Coordinator (OGAC), Emory University, the Public Health Informatics Institute (PHII—a program of The Task Force for Global Health), and USAID's Capacity*Plus* Project.

HAF Implementation Process in Madagascar

Scoping Trip

To spur HAF adoption and support, HRH2030 conducted a scoping trip to orient stakeholders on the activity, including the Ministry of Health Secretary General (SG), the Ministry of Health Human Resources Division director and managers and staff of the Madagascar USAID Mission, as well as various private sector organizations. HRH2030 held informational sessions to review the purpose of the HRIS status assessment and HRH2030 Program. HRH2030 used a snowball technique, permitting known stakeholders to assist HRH2030 in identifying the most inclusive stakeholder group. This scoping trip was instrumental in ensuring the HAF Assessment process had full Ministry of Health support. Through close coordination with the USAID/Madagascar Mission's senior advisor for health systems strengthening and a local consultant, HRH2030 maintained progress in the post-scoping trip period.

Compilation of Stakeholders

As part of the scoping trip, HRH2030 provided a recommended list of interview participants and organizations to the Ministry of Health SG representative. The initial inclusion criteria for stakeholders covered those individuals or organizations that either use or generate Madagascar's HRH-related data across the public and private sectors. Interview participants included representatives (twenty total participants) of a selection of Ministry of Health agencies; the Ministry of Finance; various associations; pre-service educational institutions; and external organizations providing support to Madagascar's regions, districts, and communes. (See Annex B for a list of organizations included in the interviews)

Assessment Team

Although the Ministry of Health was responsible for making final decisions related to assessment team participants, HRH2030 recommended that the Ministry of Health nominate two to three people using the following six inclusion criteria:

1. An understanding of Madagascar's healthcare ecosystem
2. Knowledge of HRH requirements
3. At least minimal involvement with components of the current HRIS
4. Ability to think critically and conduct semi-structured interviews
5. Availability to commit to seven to eight days of data collection for interviews
6. Availability to participate in the one-day assessment dissemination workshop

The final assessment team comprised a delegation of four individuals; Chef, Ministry of Health Direction des Resource Humaines (DRH); Ministry of Health DRH information technology advisor; an international HRH2030 HRIS consultant; and a local HRH2030 consultant who also provided support and translation services for French, English, and, when necessary, Malagasy.

Assessment Team Orientation and Plan

Before beginning formal HAF interviews, the assessment team participated in a three-hour HAF tool orientation session. Using a combination of didactic learning through a PowerPoint presentation and associated role play, the assessment team reviewed the HAF scoring criteria and Excel tool. The primary goal of the sessions was for participants to gain an understanding of the levels of maturity needed for functions and capacities, agree on how to score the interviews, and review (and modify if necessary) the interview schedule.

The team scheduled the interviews over a seven-day period to accommodate key informant's schedules. The local consultant, in collaboration with the Ministry of Health, crafted an agenda allowing for two to three interviews per day, each lasting approximately 1.5 hours. Post-interview debriefs occurred immediately following the interviews, at day's end or the morning after, to accommodate assessment team schedules. Debriefs included reviewing each team members' notes and discussing the scoring rationale, followed by consolidation of interview reflections for reporting.

HAF Scoring

The Excel-based HAF tool provides assessment teams with a complete set of scoring descriptions across all eight component areas across functions and capacities. HAF assessment team members can reference these descriptions during interviews and in any of the post-interview debrief sessions, assuring that the team has a uniform understanding of scoring rationales. The team utilized the HAF tool as it was written and did not modify its contents. Although scoring was discussed in debriefs, each team member provided their own score, reflecting perceptions with all scores then averaged.

Scoring for the function and capacity areas range from zero through five, with zero meaning the function or capacity does not exist, up to five meaning that the function or capacity is highly evolved. These can be fully viewed in Annex A within the HAF Tool.

The section on assessing *HRIS Functions* uniformly defines each level of implementation functional maturity:

Level	Function Description
0	Function does not exist
1	Function is not in place or not uniformly used. Paper-based systems are sometimes used instead of electronic systems. Data collection and management are ad hoc.
2	Function exists in basic form and is used or is being piloted. Limited use of computerized systems. Relevant data is collected and disaggregated by cadre, sex, geography.
3	Function is well-established and used widely. Function is fully supported using electronic systems (spreadsheets and databases). Data elements collected meet national requirements and reports are appropriately disaggregated.
4	Function is comprehensive, utility is high, and it influences the respective HRH process performance in a measurable way. The function is fully computerized and web-based applications used to ensure wide access. Data collection in HRIS is systematic and reflects compliance with national requirements and advanced queries are used to summarize and analyze HRH data.
5	Function is a professional best practice through high utility, influences HRH processes and is aligned with global standards and guidelines. The HRIS function is fully computerized, web-based and implements WHO's Minimum Data Set for HRH and other international standards (ISCO, HL7, etc). Data collected are compliant with national HRH data needs and continually improving through the use of advanced queries.

The section on the strength of *HRIS Capacity* also defines each stage on a zero to five scale, with zero indicating that the capacity does not exist at all, up to five where the capacity is highly advanced and routine. However, the definitions of each stage of capacity are more nuanced such that each of the eight capacities have varying definitions across the five stages. A complete description of each capacity stage by category is found in Annex C.

Each HAF assessment team member prepared their functional and capacity scores based on the interview responses and team discussion. These results were combined to determine overall scores for

HRIS functional and capacity areas, then used to gauge the HRIS maturity. Stakeholder interview notes were collated to determine the most targeted investments for HRIS strengthening and to provide focus concepts for use in the HAF workshop.

HAF Results Dissemination and Workshop

The HAF results dissemination workshop was a day-long session held in Antananarivo and included five roundtable sessions to discuss *Functions* and *Capacities* as defined in the HAF Tool. Topics were identified during the HAF interviews as focus concepts for consideration in improving the HRIS, some of which align directly with HAF categories and others which deviate. Many such as policies, priorities, collaboration, are more cross-cutting and do not track directly with HAF categories but were nonetheless identified as areas of importance. The topics included:

- Collaboration
- Common systems (e.g., MS Excel, MS Access, DHIS2, etc.)
- Data sharing and data use
- Data quality assurance (DQA)
- Governance (authority, committees)
- Harmonization
- Minimum data set
- Performance management
- Policies
- Priorities
- Responsible, accountable, contributing, informed (RACI) attributions
- Scheduled and frequent updates
- Shared resource materials
- Standards
- Systematization
- Training

Participants rotated between four separate tables, each with placards containing two functions and two capacities to discuss (representing the eight functions and eight capacities in the HAF), determining specific actions to improve identified HRIS functions or capacities. Each group recorded its recommendations on the assigned focus concepts using flipcharts for sharing; afterward, the entire participant group was asked to review the recorded recommendations (taped on walls) and place checkmarks next to chosen priority areas. Those priority areas were then compiled to create the summary of actionable recommendations for improving Madagascar's HRIS.

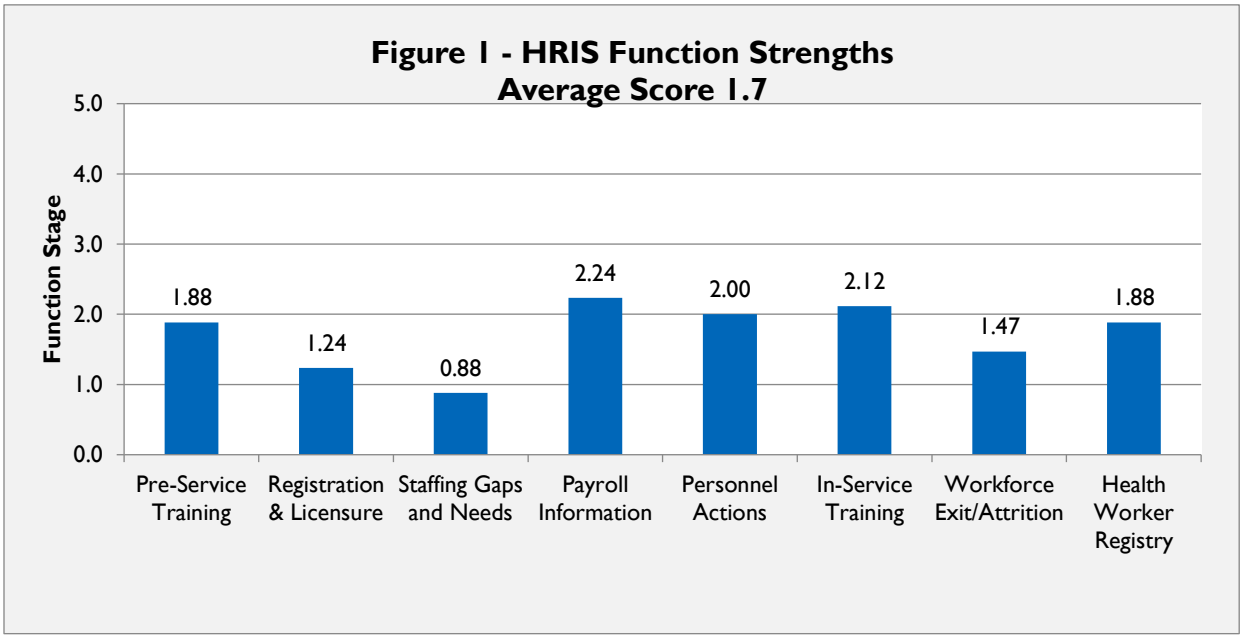
HAF Results in Madagascar

The HAF results include the quantitative scoring used to measure the status of a country's HRIS integration across the function and capacity strengths. These scores are represented through the interview team's assignment of a scoring value to each function and capacity. In deriving those scores, the interview team conducted semi-structured interviews, permitting a deeper dive into justifications and concepts behind each stakeholder's relevant HRIS component. As reported, the resulting themes are a direct product of stakeholder responses during the HAF interviews and provide deeper scoring justifications.

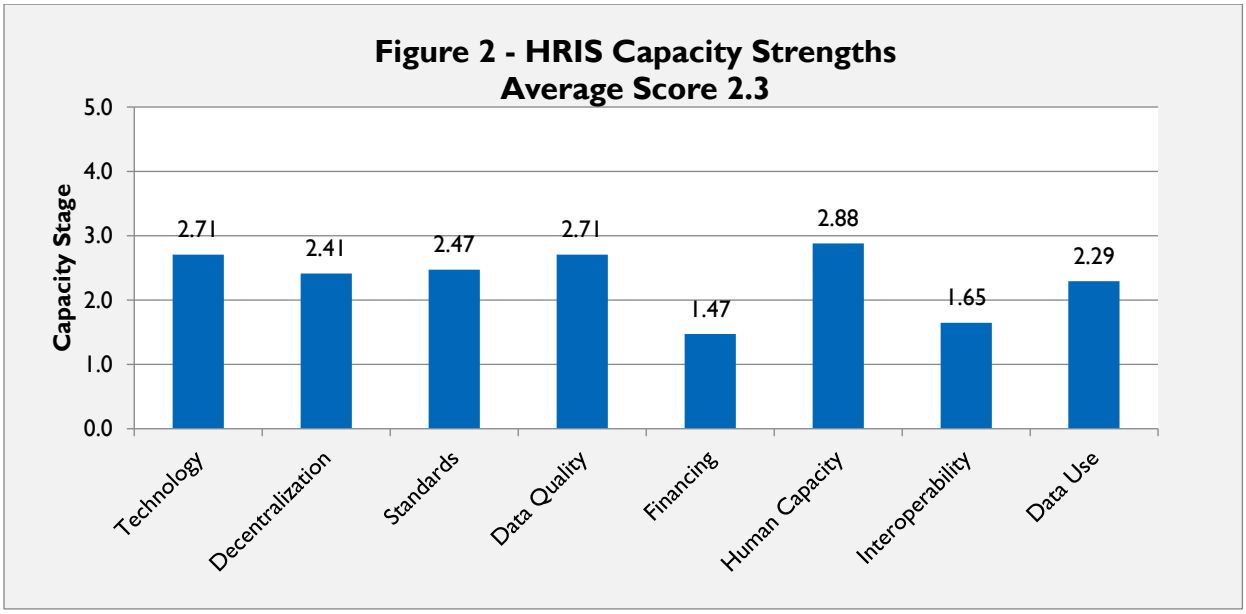
HRIS Function and Capacity Strength

The results of the HAF tool implementation in Madagascar showed an *Overall HRIS Strength of 2.0*. It is evident that Madagascar's overall HRIS evolution remains in basic form with limited use of electronic interfaces, providing an incomplete selection of demographic-related data elements and remains a relatively fragmented system.

The *HRIS Functions Strength of 1.7* reflects a slightly lower level of overall maturity with findings including paper-based systems, little uniformity of data use across stakeholders and inconsistent policies and procedures regarding data collection and management. Scores across all eight functions are found below in Figure 1.



The *HRIS Capacity Strength of 2.3* demonstrates a slightly higher score than that found for *HRIS functions*. The primary areas of capacity weakness were found in the financing (1.47) and interoperability topics (1.65), with human capacity (2.88) and technology/data quality (2.71) seeing the highest relative staging scores. Scores across all eight capacities are found below in Figure 2.



Resulting Themes

Although the HAF tool, as a gauge of HRIS progress, provides rather straightforward quantitative scoring, the interview process reveals much deeper, useful results. Notes from the HAF interviews lead to resulting HRIS themes crossing the various functions and capacities identified within the tool. These themes are beneficial to HRIS stakeholders in formulating strategy to improve Madagascar's HRIS integration. Themes may also not directly align with the stated functional and capacity areas but are rather those dominant themes based on interview feedback which may cut across multiple function and capacity areas. Where applicable, direct scoring is mentioned.

HRIS-Type Systems & Interoperability

There is a range of HRH data collection systems, spanning Excel spreadsheets and workbooks, MS Access databases, Health Management Information Systems (HMIS), and more advanced systems such as Sage HRMS. The open-source District Health Information System version 2.0 (DHIS2) software is actively being implemented in some ministry divisions, though with no active HRIS integration for reporting and analyzing HR needs. Further, the team found no instances of data or semantic interoperability between any systems. Referencing the HAF score of 1.65 shown for the capacity stage of interoperability and a corresponding staging description of "Data imported or exported routinely with at least one other system (examples, management and regulatory, or between HRIS and HMIS)", it is evident that Madagascar's needs in the area of HRIS integration are great and a topic the Ministry of Health should promote. The See Annex D for detailed listing of all HRIS data collection system names and descriptions.

Computer desktop systems and hardware access within ministries are often limited, with some staff using their personal computers in the office. The "systems," as identified in this report are, with few exceptions, inaccessible across ministry divisions or decentralized across the country, thus limiting the ability to achieve systematic data management, let alone data analysis and reporting. These localized data sets were the most common found, while This description and feedback is consistent with the HAF technology scoring of 2.71 which is described as "Health worker data is entered onto spreadsheets for easier analysis and use", although there is some use of actual databases which have pushed the score closer to 3.

Interview respondents mentioned that DHIS2 and other centralized, web-accessible systems will begin to provide the ministries and partners a more stable analysis and reporting tool set. In general, DHIS2-related data is clinically oriented but can be used to gauge productivity in health services delivery and share facility data. These systems are not integrated or interoperable across ministry divisions or partner organizations, however, leaving the data stale, incomplete, and at times inaccurate. No single organization has a complete data framework for providing the necessary HR data for a health worker registry.

Several respondents suggested that HRH data systems and related data should be integrated to allow for consistency and data accuracy, though they recognized this may not be possible, given Madagascar's current information systems and stakeholder environments. Implementing such an integrated model in the current systems framework would compound the problem of data duplication and provide few effective means of validating and maintaining such data. It is equally difficult to determine with whom to share data—from each organization's point of view, sharing data in a one-to-many fashion increases costs associated with human effort and produces lengthy reporting time periods, fractured roles and responsibilities, and incomplete or inaccurate data.

Data Quality

In terms of scoring, data quality was reported as a 2.71, corresponding with the description "DQA processes documented, but inconsistently applied". In reviewing interview notes and commentary, this seems consistent with the issues identified and the lack of data process uniformity across stakeholders. Although individual departments/divisions or organizations may have documented processes, these weren't always followed and even less so in the rare instance when data moved among entities.

There was often confusion as to which ministry division possessed the "source of truth"[3] data for health workers, with many of them possessing health worker data elements in varying forms that were considered either inaccurate, incomplete, or not collected frequently enough to warrant systematic use. For one ministry division, the frequency of processing data could mean one month, whereas in another division it could mean from three months to one year.

Not all stakeholders combined electronic data collection from paper reports (either automated or template driven), which presented another hurdle in the path of developing Madagascar's HRIS. Staff input paper records into ministry systems, allowing input errors, which surface as mistyped or misinterpreted information (e.g., garbage in, garbage out).

[3] In information systems design and theory, "single **source of truth** (SSOT)" is the practice of structuring information models and associated schemata such that every data element is stored only once. Available at: https://en.wikipedia.org/wiki/Single_source_of_truth

Data Standards and Sharing

No consistent data formats or standards exist across ministries for sharing health worker data. Each ministry designates its own format and data standards without considering their interoperability for effective data exchange. This variation was not limited to ministries; it also included other nongovernmental partner stakeholders. Although the HAF showed a data standards score of 2.4 with a corresponding staging description of "Drop-down menus are used for data elements (such as location or cadre) to ensure data entry is consistent," there was little direct documentation of the aforementioned drop-down menus from stakeholder responses. Several of the data systems mentioned in Annex D are known to have drop down menus for data input.

Data sharing is complicated by a broad array of data systems in use,[4] such as paper-based registries, MS Excel spreadsheets, MS Access databases, customized ministry systems (e.g., GESIS, GESRESS, GRHS Parfaite, or full-fledged but isolated systems like Sage HRMS). Data definition, policies, and procedures are not consistent across ministry divisions, thus providing little to no data exchange capability.[5] Madagascar's DHIS2 implementations are proceeding without the coordination needed to address interoperability between ministry divisions or partners and without the capabilities and functions required to populate health worker registries.

The frequency and reliability of data exchange and reporting present barriers to effective HRIS. Most stakeholders have adapted localized requirements and needs for data and reports by augmenting them through use of custom data sets or vigorously maintaining "in-house" data quality and validation processes. Because these data quality assessment (DQA) procedures are developed and utilized internally, little knowledge is available regarding how to maintain data across divisions and organizations.

It is worth mentioning that the Ministry of Health does have HRH policies and guidance on data sharing, as laid out in the National Plan for the Development of Health Human Resources (PNDRHS)[6] for Madagascar. The Ministry of Health initiated the plan as of September 2017, but implementation specifics seem unknown to stakeholders. It remains to be seen how this policy will be translated into data collection and management policies, and how it will influence minimum data set and data exchange standards and dissemination.

Governance

The creation of health worker registries and data exchange processes are further impeded by the lack of a central point of control within the Ministry of Health. Essentially, there is no single ministry division or committee from which authority emanates for data management dissemination policies or processes. Many respondents said that a central governance mechanism would enable the creation and implementation of a more effective data-sharing policy.

[4] See Appendix 2: Systems in Use.
[5] Based on cursory discussions, with little technical information provided during the interviews. A more comprehensive systems scan and analysis would be required to understand the full functionality provided.
[6] Plan National de Développement des Ressources Humaines en Santé à Madagascar (PNDRHS), September 2015.

The team found that many ministry divisions operate autonomously regarding data collection and reporting; however, a recently established HR Observatory Committee may change this dynamic. This committee plans to coordinate the broader HR systems and data needs for public sector agencies and general staff HR information. It is uncertain as to how this approach may affect health worker registries and their respective data.

Human Capacity – Roles and Responsibilities

With staffing rather fluid, it is often difficult to ascertain who is managing various portions of the data collection, data validation, and data reporting pipeline. Human capacity demonstrated a score of 2.88 with a corresponding staging description of "Data collection and entry routinely performed by trained local staff". Interviewees from ministry divisions (apart from DEP[7]) noted how difficult it is to determine who to contact to request HR-related health worker data at the national level or update existing national data from the field. Without the Ministry of Health having a centralized HRIS, but rather fragmented contributions and responsibilities across departments/divisions, accessing data will continue to be labor intensive and create capacity issues. Many of the stakeholders interviewed echoed the suggestion of maintaining a national coordinating body for health worker data and data standards (detailed in the Governance section above).

Madagascar Recommendations and Results from Stakeholder Roundtable Discussions

Using the results of the HAF implementation, stakeholders gathered to discuss the scores and resulting themes as reported above. During the dissemination and validation workshop, participants proposed recommendations to strengthen the functionality and capacity components (see Annex E for the complete list of recommendations and priorities.) Tables 1 and 2 highlight the recommendations prioritized by the stakeholders (defined as receiving five or more votes). The matrix provides areas/topics of functionality and capacity, accompanied by corresponding details of recommended data or information to be produced in each area.

Table 1. Stakeholders' Prioritized Recommendations by Functional Area

Function (HAF Score)	Prioritized Recommendations
Pre-service education (1.88)	▪ Provide a trainer pool directory ▪ Create a training program content master listing ▪ Provide detailed HRH cohort information ▪ Demonstrate longitudinal career tracking
Registration and licensure (1.24)	▪ Periodically adjust competency requirements to reflect changes in clinical practice ▪ Document competencies monitoring and capacity certification
Staffing gaps and needs (.88)	▪ Document current staffing needs ▪ Periodically re-evaluate staffing needs in redeployment, capacity building, recruitment
Personnel actions (2.0)	▪ Document and integrate job descriptions within future HRIS system ▪ Implement staff evaluation systems

[7] DEP (Direction des études et Planification, Ministére de la Santé Publique) has its own process for collecting data from the field, though these data can be out of date or incomplete and are not routinely shared with other divisions.

Function (HAF Score)	Prioritized Recommendations
In-service training (2.12)	▪ Identify continuous capacity-building needs based on data and staff job descriptions ▪ Make information on training resources and scheduled trainings available
Workforce exit/attrition (1.47)	▪ Input real-time data to inform the departure/loss of staff ▪ Proceed with a mapping of staff skills to needs by geographic area
Health worker registry (1.88)	▪ Develop a common database to reflect health workers in practice and provide accurate HRH statistics

Table 2. Stakeholders' Prioritized Recommendations by Capacity Area

Capacity (HAF Score)	Prioritized Recommendations
Technology/infrastructure (2.71)	▪ Develop job descriptions for technology, matching competencies to job profiles
Decentralization (2.41)	▪ Implement decentralized access to data and apply access restrictions
Use of standards (2.47)	▪ Enhance collaboration between the Ministry of Health and Ministry of Labor to define standards and data definitions
Data quality (2.71)	▪ Define data quality standards and validation controls under the auspices of a technical working group
Interoperability (1.65)	▪ Define unique codes for each structure and create a committee at the Ministère de la Santé Publique—DSI level
Data use (2.29)	▪ Build capacity of information systems (IS) managers on data use

Additional Madagascar Recommendations

Provided below are additional recommendations of the HRH2030 HRIS consultant, supplying supplemental direction to the HRIS process. These are intended to give the Ministry of Health and Madagascar's various HRIS stakeholders tools to move the proposed HRIS prioritized actions forward. The recommendations are provided after the stakeholder workshop, allowing for further advancement of Madagascar's HRIS through this report.

Governance

Creation of a governance body to provide direction to agencies and partner organizations on their common and shared interests, visions, and criteria for health worker registries and systems. An example list of common and shared interest criteria (CSI) is provided in Annex F. CSI aid in coordinating the development of HRIS systems and processes, clarify committee priorities and working groups, and establish clear authority for HRIS across ministries and divisions.

Establishment of a technical working group (TWG) to carry forward a common vision for HRIS development. The TWG will work on design and validation of a minimum data set for data exchange and harmonization of systems and their purposes, as well as aid in streamlining a cost-effective use of staff time and infrastructure regarding potential shared systems (at a minimum,

within ministries and divisions). Alternatively, The Open Source Human Resource Information System (iHRIS[8]) serves as a useful governance model for HRIS management. iHRIS is a globally implemented software used to track and manage health workforce data. For Governance purposes, the iHRIS model utilizes a Stakeholder Leadership Group which directs the HRIS development process. See Annex F for governance details.

Data Sharing Agreements

Data sharing represents a critical component of an effective HRIS. As evidenced in the HAF results and workshop recommendations, Madagascar should strive to maximize data resources through centralized data sets. As data is held not only within various Ministry of Health departments and divisions and other non-governmental organizations, each has special interests and liabilities with holding data sets. To facilitate the exchange of data, the Ministry of Health should pursue the establishment of data sharing agreements. Data sharing agreements protect the agency providing the data from data misuse, prevents miscommunication between sharing parties and contribute to a collaborative data use understanding. See Annex G for further points on data-sharing agreements.

Minimum Data Sets

Establishment of HRIS data set standards, as outlined by the WHO, will facilitate the storage and data sharing of common health workforce registry data. Setting these common standards enables interoperability among data sets, helping to ensure consistency. A health workforce registry requires multi-stakeholder engagement and decision-making processes for all stages of development and implementation.

Conclusion and Next Steps

As evidenced within the HAF results, Madagascar's efforts towards an operational HRIS can be initiated using many of the recommendations identified in the workshop and through the work of the HAF assessment team. HRH2030's collaborative efforts with the Ministry of Health on the HAF implementation has provided the groundwork and initiated HRIS discussions seminal to Madagascar's HRIS development. The results further contributed to dialogue with country counterparts around availability and utilization of HRH data for decision and policy making. As HRIS capabilities are measured and improved, populations will benefit through better data across those health professionals providing critical MCH, FP, HIV care and the full spectrum of HRH.

Specific findings of the HAF provide priority areas for Madagascar's Ministry of Health to make targeted HRIS investments, essentially providing an agenda for change through the SLG. As a straight-forward tool to provide the status of an HRIS at any point in time, the HAF can and should be administered on an annual basis. By doing so, partners can identify changing HRIS priorities and celebrate those areas where achievements have been made.

[8] iHRIS, available at: https://www.ihris.org.

Annex A. HAF Tool

See attached Excel file titled 'HRH_HRIS 2015 PEPFAR HRIS Framework Tool.'

Annex B. HAF Interviewees

The following organizations participated in the HAF Assessment interviews.

Public Sector:

- Faculté de Medecine Antananarivo
- Faculté de Medecine Fianarantsoa
- Institut National de la Santé Publique et Communautaire (INSPC)
- Institut National des Statistiques (INSTAT)
- Ministère de la Santé Publique—Direction Régionale de la Santé Atsinanana Toamasina
- Ministère de la Santé Publique—Direction des Instituts de Formation des Paramédicaux (DIFP)
- Ministère de la Santé Publique—Direction des Resources Humaines (DRH)
- Ministère de la Santé Publique—Direction des Districts Sanitaires (DDS)
- Ministère de la Santé Publique—Direction des Études et Planification (DEP)
- Ministère de la Santé Publique—Direction du Système D'information (DSI)
- Ministère des Finances et du Budget (Ministry of Finance)
- Ordre National des Médecins

Partner Organizations:

- John Snow Inc. (JSI) Community-Based Integrated Health Project (CBIHP)/MAHEFA
- Marie Stopes Madagascar
- MCSP/ Jhpiego
- Mikolo/Management Sciences for Health (MSH)
- WHO Country Office for Madagascar, Managerial Processes and Planning

Annex C. HAF Capacity Staging

Instructions: Indicate the level of HRIS capacities for the assessed system in one of five stages. A capacity level of '0' indicates the function does not exist at all. The level of maturity of an HRIS capacity must be **fully** accomplished. For example, if levels one and two are fully accomplished, but level three is only partially accomplished, the function should be counted as level two.

	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
Technology Infrastructure	A combination of paper forms and spreadsheets are used for health workforce information systems	Health worker data is entered onto spreadsheets for easier analysis and use	Health worker data is entered into a simple database (such as Access)	Data is entered into an advanced database (such as SQL)	Data is entered into a web-based advanced database accessible at all levels
Decentralization	System only exists in one site (such as a single office or school) in one institution	System is accessed in more than one site or institution	System is accessed in 50% of relevant sites and institutions	System is accessed in 90% of relevant sites and institutions	System is routinely accessed at all relevant sites and institutions
Use of Standards	Information systems have few to no drop-down menus - data is largely recorded freehand	Drop-down menus are used for data elements (such as location or cadre) to ensure data entry is consistent	Choices in drop-down menus are based on standards agreed upon by stakeholders	At least one health workforce data element is harmonized with international standards (i.e. ISCO classifications supported by ILO)	All possible data elements are aligned with appropriate national and international standards
Data Quality	No or minimal data quality processes are in place.	Periodic data quality checks conducted but not documented	DQA processes documented, but inconsistently applied	DQA processes documented and consistently applied based on an established protocol	Commitment to quality evident in consistently documented quality reviews based on a national protocol
Sustainable Financing	Little or no direct financing by host country institutions	Sustainable plan in place for joint financing	HRIS activities are jointly funded by host country institutions and external sources	Local institutions are the primary funder	Key HRH stakeholders have a long-term plan including sustainable HRIS financing

	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
Human Capacity	Most staffing and support for the system comes from expatriates and external TA	Data collection and entry routinely performed by trained local staff	Most staffing and support comes from local staff employed by local staff employed by international organizations	Bugs fixed, and development support provided by local development team	New functionality routinely provided by local developers. System is supported entirely by local staff employed by local organizations
Interoperability	Data exchange between systems is being planned, but is not yet functional	Data imported or exported routinely with at least one other system (examples, management and regulatory, or between HRIS and HMIS)	Interoperability is automated, routine and consistent between at least two national information systems	Health workforce information policy and architecture defining component systems (e.g. management, regulatory and training systems) & information exchanged	Interoperability with all appropriate systems is routine and consistent, guided by a larger national e/mHealth architecture
Data use	HRIS is used solely to look up individual records	HRIS is used to support basic management functions such as retirement planning and vacancy analysis	Data from the HRIS is routinely reviewed by an intersectoral stakeholder leadership group (e.g. national health workforce observatory)	HRIS data is used to inform HRH policies such as training and deployment of special cadres based on disease burden and distribution	HRIS is routinely used to inform more sophisticated HRH functions such as health workforce planning and advocacy & routinely consulted to inform key management and policy decisions

Annex D. Systems in Use—Methods of Data Collection by Different Entities for Individual Purposes

System	Description	Organization
CommCare	Open-source mobile data collection platform that enables anyone to build mobile apps. Available at: https://www.commcarehq.org/home/	Declared as a potential future application framework for Madagascar; no implementation yet
DHIS2	DHIS2 is a national health information system product that includes data management and analysis, health program M&E, facility registries and service availability mapping, logistics management, and mobile tracking of pregnant mothers in rural communities. DHIS2 application in HRH is very limited. Available at: https://www.dhis2.org/.	▪ DEP ▪ DDS (view only) ▪ DSI ▪ MAHEFA/JSI ▪ Ministry regions (edit/view) ▪ Jhpiego
EMaEval	MAlable Environment for EVALuation. EMaEval is used by the Faculté de Médecins for the design, organization, execution, observation, and control of various degree certification phases. It allows the management of a large-scale process by distributing the resources, services, and digital tools to stakeholders through learning scenarios (evaluation, validation, and certification). Available at: https://www.researchgate.net/publication/228521832_EMaEval_un_systeme_pedagogique_integre.	Faculté de Médecins
Escola Virtual	Virtual school platform. Available at: http://www.escolavirtual.pt.	Faculté de Médecins
Excel	MS Excel spreadsheet application software used for managing records of health workers, physicians, and staff.	▪ DDS ▪ DIFP ▪ DRH ▪ DSI ▪ INSPC ▪ Faculté de Médecins ▪ Marie Stopes ▪ Ordre National des Médecins (ONM)
GESIS	Maintaining lists of Centres de Santé de Base (CSBs) and community health volunteers (CHVs) at the district level	▪ DDS ▪ MAHEFA/JSI (provides paper reports to CSBs for entry into GESIS)
GESRESS	Used to annually record the equipment and supplies inventory for CSBs and district offices. Districts receive paper reports from CSBs and enter data manually into GESRESS. Plans are to migrate away from GESRESS to DHIS2. GESRESS has additional HR functions as defined in the HAF Assessment, but the ministry lacks implementation capacity. Data are received in Excel and paper form from DDS, DSI, DRH, districts. Other organizations sending data are MAHEFA/JSI, Mikolo, MCSP, and Marie Stopes.	DEP
GRHS Parfaite	Internally developed HMIS system used by all ministry divisions (except DSI) to collect various HR data points.	▪ DSI ▪ INSPC

System	Description	Organization
		▪ FIN
Joomla/Moodle (training)	Used for students of the Faculté de Médecins to access curricula and courses. Includes student/practitioner names and completed courses Joomla website is available at: https://www.joomla.org/. Moodle website is available at: https://moodle.org/.	Faculté de Médecins
MS Access database	Database to manage the association's physician registration records. Not currently sharing; paired with paper records using internal codes but no scanned images.	Ordre National des Médecins
Sage HRMS	HR solution used internally by Marie Stopes to manage local Madagascar staff. (Using only HR functionality in Sage, not payroll functions.)	Marie Stopes
TraiNet	TraiNet is USAID's official training data management system; it is accessed from a web browser and the entry point for data about training programs and participants in their country of origin, a third country, or for potential exchange visitors who will come to the United States on a USAID J-1 visa. Available at: https://trainet-vcs.usaid.gov/.	MAHEFA/JSI
WHO Diseases Surveillance	Used by MAHEFA to strengthen district-level surveillance and response for priority diseases. Available at: http://www.who.int/countries/eth/areas/surveillance/en/.	MAHEFA/JSI

Annex E: Workshop Recommendations and Priorities

1. HRIS Functionalities

Functionalities	Recommendations and Priorities	Priority Score
Pre-service Education	System should provide information to users on the following: • Pool of trainers • Training program content • Cohort information per year • Career tracking	**8**
	Ensure each position has a profile in the database	
	Make pre-service and continuous training available for national, regional, district, and CSB staff	
	Proceed to a personal interview before recruitment	
	Have a standardized recruitment test	
Registration and Licensure	Make periodic competency adjustments	**8**
	Harmonize data across systems and organizations	
	Keep the database updated	
	Verify registration at the national "ordre"	2
	Monitor competencies and capacity certification	5
Staffing Gaps and Needs	Inform DRH leadership of staff redeployment	
	Develop staff retention policy	
	Perform Job analysis of HRIS managers	
	Perform initial characterization of existing norms	**8**
	Evaluate needs in redeployment, capacity building, recruitment	**7**
Payroll Information	Provide available and useable payroll information based on position and level	3
	Establish a standardized salary grid	2
	Reinforce need for sharing and cooperation between Ministry of Health, Ministry of Labor, and Ministry of Finance	
	Oversee career and promotion management	
	Provide staff with information on their status	
Personnel Actions	Assign job descriptions against positions in the HRIS	**8**
	Make job descriptions available across ministries to create standardized job profiles	
	Ensure alignment between staff profile and position	
	Implement a staff evaluation system	**6**
	Develop performance indicators for each type of training	2
In-service Training	Identify needs of continuous capacity building based on the information provided by the IS and staff terms of reference (TOR)	**8**
	Encourage online training	
	Make available information on training resources and scheduled trainings	**8**
	Integrate HR training policy and make it sufficient to match the job TOR	3
Workforce Exit/Attrition	Provide updates on CSB staff information to stakeholders who require it to provide services	
	Harmonize HR databases and data classes/types between institutions	
	Make regular database updates to reflect the departure/loss of staff	
	Implement a staff retention system	
	Ensure that the system prevents favoring relatives or friends in filling vacant positions (e.g., nepotism)	3
	Proceed with mapping to monitor staffing changes	**10**
Health Worker Registry	Develop a harmonized database	1
	Update the database according to staff registry	**7**
	Supply hard copies of usable data	

2. HRIS Capacities

Capacities	Recommendations and Priorities	Priority Score
Technology/Infrastructure	Develop database interoperability between ministry divisions	2
	Carry out a national IS reorganization	
	Match profile with competencies	**8**
	Encourage online training (video conference)	2
Decentralization	Implement and reinforce a decentralized database	**6**
	Make database available via role-based access	5
	Encourage staff deployment according to the CSB staff region of origin	3
Use of Standards	Code available information to facilitate analysis of staff geographic distribution	
	Foster collaboration between Ministry of Health and Ministry of Labor to elaborate labor policies	**11**
	Provide norm dissemination via trainings and monitoring of the software/apps	
Data Quality	Integrate data quality under the IS system and the TWG	5
	Have HR manager implement norms, profile, and resources system for DQA standards	2
Sustainable Funding	Pool IS financial resources across department projects and programs	2
	Introduce alternative sources of health system funding through taxes (e.g., alcohol, tobacco)	1
Human Capacity	Develop a standard for adequate profiles and positions in HR (e.g., job descriptions)	4
	Encourage performance and motivation through HR policy	
Interoperability	Define a unique code for each data element (e.g., data dictionary)	**7**
	Create a committee at the level of DSI	
	Conduct an elaboration of database training	1
	Institutionalize data sharing	2
	Conduct data sharing and information dissemination during meetings or email data	
	Conduct interoperability profiles workshops	3
	Inform each ministerial level of data updates	
	Foster collaboration between ministries and national associations (e.g., nursing, medicine) to ensure validated data updates in HR registries	
Data Use	Develop capacity building of IS managers on database use	5
	Promote database usage as regular practice	
	Integrate a data quality policy at the TWG and IS committees	3

Annex F: Governance

The Open Source Human Resource Information System (iHRIS[9]) serves as a useful governance model for HRIS management. iHRIS is a globally implemented software used to track and manage health workforce data; its governance model is described below.

Stakeholder Leadership Group (SLG) [10]

In the iHRIS model, the steering committee for HRIS governance is the Stakeholder Leadership Group (SLG), which comprises representatives from all stakeholders that produce and use HRH information. According to the iHRIS Foundation, establishing the SLG is an essential first step when implementing an HRIS. This group will initiate, lead, and monitor all activities for HRIS strengthening.

In Madagascar, the governance function most closely resembling the SLG may be the newly instituted Government of Madagascar HR Observatory. It is unclear whether the HR Observatory will provide a more detailed TOR or framework for developing an HRIS strategy.

The following sections on the SLG are drawn from the iHRIS Implementation Toolkit, which functions as a reference for discussion purposes on the recommended governance support for building a functioning HRIS.

iHRIS Stakeholder Leadership Group: Who Are the Stakeholders?

A participatory and inclusive approach is the key to the SLG's success. Efforts should be made to identify and invite representatives from all government and nongovernment groups producing and using HRH data.

Think broadly when considering whom to invite as stakeholders, asking the following questions:

- Who provides HRH information?
- Who uses HRH information?
- Who are the HRH decision makers?

Ministry departments (especially personnel, information technology, and payroll units), licensing and registration/certification bodies, private sector organizations, hospitals and health facilities, scholarship boards, and training institutions all may be stakeholders. Ideally, the SLG should include experts in health workforce planning and information systems. Depending on the scope of HRIS development, health staff may be invited to ensure that individual-level data remain accurate and access to necessary information is possible. Community leaders and volunteers may also be stakeholders in certain contexts.

The Role of the SLG

The SLG's roles are to **lead, coordinate, and provide oversight for all HRIS-strengthening activities.** In these roles, the SLG manages the following activities:

- Establishing consensus on the SLG mission and purpose
- Agreeing on operating principles and TORs for organizing the SLG

[9] iHRIS, available at: https://www.ihris.org.
[10] Available at: https://www.ihris.org/toolkit/tools/slg.html.

- Developing policy and management questions to inform data needs and HRIS functions
- Defining indicators to monitor the health workforce status via the HRIS
- Identifying existing HRH systems, including infrastructure, databases, forms, and collection mechanisms at all levels
- Prioritizing HRIS requirements
- Selecting an appropriate HRIS software package (or packages) to meet requirements
- Determining timelines and meetings for HRIS-strengthening activities, including key decision makers and quorums for decision making
- Addressing issues pertaining to data confidentiality, privacy, and ownership and policies for data sharing
- Establishing data-sharing agreements with partners and collaborators
- Sharing findings and tools with other ministries, sectors, countries, and regions

SLG Principles of Operation and TOR[11]

Principles of Operation

The SLG should consider several questions while discussing the principles of operation. Although the following list of questions is not exhaustive, it provides a starting point for the group's discussion:

- Logistics
  - ✓ Are all necessary groups represented in the SLG, including internal and external groups?
  - ✓ What is the group called?
  - ✓ When and how often will meetings be held?
  - ✓ Where will meetings be held? Is a neutral location preferable?
- Group roles
  - ✓ Who will facilitate and lead the meetings?
  - ✓ Is there a smaller guiding committee of the SLG?
  - ✓ Are there critical participants without whom the meetings cannot take place?
- Decision making
  - ✓ How will decisions be made? By consensus? Majority rule? [What constitutes a quorum?]
  - ✓ Does the group comprise primary and secondary stakeholders, or are all members of the SLG equal?
  - ✓ How are agendas decided?
  - ✓ How is activity ownership determined? Is activity ownership uniform for each area of HRIS strengthening, or does it vary according to the area of focus?
- Communication
  - ✓ How will data be shared? What policies or agreements need to be drafted to address issues of data sharing?
  - ✓ What meeting documentation will be produced, maintained, and distributed?
  - ✓ Is there a feedback procedure?
- Membership rules
  - ✓ Are others welcome to attend or join SLG meetings?
  - ✓ What attendance record is acceptable?
  - ✓ Are all members expected to contribute to the work?
  - ✓ Are all members expected to act as resources for one another?

[11] Available at: https://www.ihris.org/toolkit/tools/principles.html.

TOR

After the SLG established principles of operation, it should discuss the TOR describing the group's purpose, vision, and goals. In addition, the TOR should clarify the specific activities to be undertaken, which team members are responsible for each activity, and when projects should be accomplished.

The final TOR document should reflect the SLG's goals and needs, organized into the following format:

- Background
  - ✓ Describe the country's current HRIS system.
  - ✓ Why was the SLG formed?
- Purpose
  - ✓ What is the overall mission and vision of the SLG?
  - ✓ What are the SLG's specific goals as related to the stated mission (e.g.—to link data from existing systems to ensure stakeholder access to those data)?
  - ✓ What are the major obstacles to accomplishing these goals? How will these obstacles be addressed?
  - ✓ Does the SLG have any other specific duties?
- Structure and composition
  - ✓ To whom is the SLG accountable?
  - ✓ Who are the chairperson, secretary, and other positions that need to be established?
  - ✓ Are there any smaller working groups within the SLG? Who are their members? What are their functions?
- Operations
  - ✓ What is the SLG's scope?
  - ✓ What does the SLG intend to accomplish over what timeline?
  - ✓ What are the expected functions of the group?
- Policies
  - ✓ Who will own and/or have access to the SLG's outputs (e.g., the HR information system)?

Once the principles of operation and the TOR have been drafted, they should be maintained as reference documents. These documents provide a record of the roles, expectations, and goals of SLG members, and should guide the group's subsequent work.

Annex G: Data Sharing Agreements

A data-sharing agreement is a formal contract clearly documenting what data are being shared and how the data can be used. Such an agreement serves three purposes:

1. Protects the agency providing the data from data misuse
2. Prevents miscommunication between data-sharing parties
3. Contributes to collaborative understanding on data use

Sample contents of a data-sharing agreement:

- Period of agreement
- Intended data use
- Data use constraints
- Data confidentiality
- Data security
- Methods of data sharing
- Financial costs of data sharing

Applicable links for examples of data-sharing agreement:

- https://www.contractstandards.com/public/contracts/data-sharing-agreement
- https://www.staffordshire.gov.uk/community/InfoShare/Templates/Information-Sharing-Agreement-template.doc
- https://www.cdc.gov/cancer/ncccp/doc/sampleinteragencydatasharingagreement.doc

Annex H: Common and Shared Interest Criteria

CSI Selection Criteria	Description
1. Is a Madagascar health sector priority	▪ Identified in the current iteration of an Ministry of Health Strategic Plan or "Service Plan" ▪ Identified in the current iteration of HRIS Enabling Strategy or Work Plan
2. Is a Madagascar-wide solution	▪ Proposed as a national solution
3. Is an interoperable solution	▪ Needed to achieve part of an interoperable Madagascar health information element/infrastructure within the health sector
4. Is changing or setting a data or data nomenclature standard	▪ Champions the implementation of data (or data nomenclature) standards within the Madagascar health sector ▪ Triggers the potential change of an existing data (or data nomenclature) standard within the Madagascar health sector
5. Is identified as high risk or high visibility	▪ Identified as high risk or high visibility by any one of the following: the Ministry of Health, health agencies, HR Observatory
6. Is funded by multiple cost contributors	▪ Funded by more than one health sector stakeholder ▪ Funded by one health sector stakeholder and has the potential to be on-boarded by more stakeholders through additional cost contributions
7. Is identified as a GHISA system	▪ Identified as a "system" within the General Health Information Sharing Agreement (GHISA) between the Ministry of Health and the health agencies ▪ Defined in GHISA as "electronic information systems used to facilitate the sharing of data amongst two or more parties for a healthcare delivery and related purpose"
8. Is a technology priority	▪ Identified as a technological priority within the current iteration of the health service plans(s)

Annex I: List of Workshop Participants

Date: September 15, 2017 | Workshop Location: Hotel Colbert, Antananarivo

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