Timor-Leste
Data Analysis Capacity Assessment

Local Health System Sustainability Project
Task Order 1, USAID Integrated Health Systems IDIQ

Local Health System Sustainability Project

The Local Health System Sustainability Project (LHSS) under the USAID Integrated Health Systems IDIQ helps low- and middle-income countries transition to sustainable, self-financed health systems as a means to support access to universal health coverage. The project works with partner countries and local stakeholders to reduce financial barriers to care and treatment, ensure equitable access to essential health services for all people, and improve the quality of health services. Led by Abt Associates, the five-year project will build local capacity to sustain strong health system performance, supporting countries on their journey to self-reliance and prosperity.

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Acknowledgments

Acronyms

CHC	community health center
DACA	data analysis capacity assessment
DHIS2	District Health Information System 2
FY	fiscal year
HIS	health information system
HMIS	health management information system
HR	human resources
HRIS	human resources information system
M&E	monitoring & evaluation
MOH	Ministry of Health
NHSSP	National Health Sector Strategic Plan
PRISM	Performance of Routine Information System Management
RHIS	routine HIS
RSETL	Registo Saude Electronico Timor-Leste
TIC	Timor-Leste Ministry of Technology, Information, and Communication
TLHIS	Timor-Leste HIS
TWG	technical working group
USAID	United States Agency for International Development
WHO	World Health Organization

Executive Summary

Timor-Leste's National Health Sector Strategic Plan (NHSSP) 2011–2030 sets forth an ambitious, 20-year operational document to promote more multidisciplinary teamwork, decentralize decision-making, and strengthen partnerships and community development. Strengthening Timor-Leste's in-country capacity and leadership to perform data analysis and use data is a critical component in improving evidence-based decision-making and supports the National Health Sector Strategic Plan.

As part of the USAID Health Systems Sustainability Activity's efforts to strengthen health governance, Abt Associates conducted a data analysis capacity assessment (DACA) in March and April 2022. The purpose of the DACA was to assess: the Ministry of Health (MOH) data use and data quality processes; the opportunity and capacity of different levels of the health system to analyze data; health management information system (HMIS) governance; electronic HMIS deployment; the state of interoperability, and COVID-19 data capture. Based on the findings, the report provides recommendations on how to address the issues identified.

The activity team based the DACA methodology on the Performance of Routine Information System Management (PRISM) Series and Framework, which offers a comprehensive set of resources to design, strengthen, and evaluate routine HIS (RHIS) performance. Using representative questions from the PRISM's RHIS overview tool and performance diagnostic tool, the team interviewed 32 subnational-level participants in purposively selected municipalities, community health centers (CHCs), and health posts. Ten interviews were conducted with central-level directorates and departments. The team conducted the DACA in close collaboration with the National HMIS Department and validated preliminary findings and recommendations in a workshop with key central and subnational MoH stakeholders, most of whom also participated in the interviews.

The DACA is organized into six sections, each of which is connected to strengthening data analysis and use: HMIS and health information system (HIS) governance; information, products, and dissemination; HIS management and interoperability; data entry and data management; data quality; and data analysis and use. Each section presents findings and a summary of recommended actions.

While data quality was a recognized issue and potential barrier to broader data use efforts, all subnational health posts in which we conducted interviews had kept exceptionally meticulous paper reports, and there were high levels of HMIS completeness and timeliness of submitted reports. Of all municipalities reporting into the HMIS, 100 percent of facilities submitted complete reports. Nine facilities had seven- to eight-day delays, and four municipalities submitted their reports on time.

While the use of RHIS data was limited, subnational-level interviewees indicated that they needed standard methodologies, increased training opportunities, supportive supervision efforts, strengthened feedback loops, and routine forums on use of data.

The Recommended Actions were co-created with and validated by the country's HMIS Department. A summary of recommended actions is presented in each section and a detailed list with sub-activities appears in Annex A. The Recommended Actions provide a step-by-step

guide on prioritized activities that correspond to each of the six sections. These actions address the DACA findings and will strengthen digital capacity, ultimately strengthening Timor-Leste's capacity to analyze data for improved decision-making.

1. DACA findings on **HMIS and HIS governance** revealed the considerable degree of influence external stakeholders currently hold in governance of the Timor-Leste HIS (TLHIS) and HMIS. The HMIS Department needs training and resources to enable them to lead TLHIS systems administration. The HMIS department needs a commonly shared interoperability roadmap with internal MoH stakeholders and external governmental and non-governmental stakeholder organizations for integrated data analysis for improved decision-making.

2. Findings related to **information, products, and dissemination** suggest that while there is a strong centrally led vision for data analysis and use, guided by the Timor-Leste One Plan, One Budget, One Monitoring & Evaluation initiative, subnational stakeholders often do not act in alignment with this vision. This is because of lack of availability and/or knowledge of standard operating procedures; guidelines being out-of-date and not incorporated into workflows; and the need for standardized training and supervision methodologies.

3. The findings related to **HIS management and interoperability** as it relates to strengthened data analysis confirmed limited progress on HIS interoperability. At the time of the DACA interviews, interoperability between the TLHIS and other HISs was limited and the TLHIS had no known data exchanges with other systems or software. All integrated data analysis was performed manually. The DACA also revealed parallel or "shadow" HMIS systems, requiring duplicate data entry. Recommendations include pathways to improve coordination and country ownership and create a well-defined, actionable Interoperability Roadmap.

4. DACA findings around **data entry and data management** to support strengthened data analysis indicate there is a robust, paper-based HMIS data entry and reporting process. HMIS trainings by the national level tend to focus on data entry, reporting, and data quality. Despite limited resources at the subnational level, health posts and CHCs are generally keeping well-maintained paper HMIS records, and the paper-based HMIS reporting process is well understood. Recommendations focus on transitioning from paper to electronic TLHIS reporting, creating updated guidelines and supervision processes for HMIS reporting channels, and transitioning the TLHIS server ownership to the MoH for strengthened country ownership and sustainability.

5. The DACA confirmed that at the subnational levels, **data quality** is an area that receives significant attention and feedback from supervisors. Supervision of and feedback to subnational levels often focus on data timeliness and accuracy, but the focus on data quality can overshadow conversations on data use and feedback on health post or CHC performance or trends. Subnational interviewees also emphasized their need for clear, accessible guidelines on data quality and data use, as well as training opportunities and

reinforcement mechanisms. Recommendations focus on ensuring an updated HMIS data dictionary with definitions of data elements and indicators, data validation rules, and reporting specifications readily accessible and promoted. Institutionalizing Routine Data Quality Assessments will help ensure that data quality reviews are performed systematically, which in turn will provide adequate space and time for data analysis and use. Additionally, the many questions from subnational interviewees regarding data reconciliation and data review processes indicate a need for training through a workshop.

6. Lastly, DACA findings on **data analysis and use** revealed low or limited systematic use of data at subnational levels, but also promising examples of data use and data sharing, particularly between health posts and communities. Some health posts and CHCs are using aggregated service delivery data on vaccinations as a community advocacy and planning tool for vaccination drives and health campaigns, but knowledge on how to do this is limited. DACA interviewees indicated a strong desire to have more opportunities to initiate or further these activities. Some interviewees suggested that questionable data quality prevented broader data use efforts.

While the DACA interviews confirmed there are active processes, forums, and directorate-level meetings to inform policy-making at the central level, efforts at subnational levels are limited and ad hoc. There is limited awareness of guidance and standard operating procedures on data analysis and use. Data visualizations at subnational facilities are self-initiated but frequently reflect outdated information. Data analysis and data visualization methodologies that reflect Timor-Leste's limited digital resources at subnational levels must be considered. Recommendations focus on how to develop data visualization resources that are both paper-based and Excel-based, as well as capacity-strengthening methods for program divisions at the national and subnational levels.

Introduction

Since gaining independence and subsequently emerging from a civil war in 2002, Timor-Leste has invested substantial resources into its Health Management Information System (HMIS) to collect and monitor the monthly treatment and attendance records from health posts and Community Health Center (CHCs), and Municipal level facilities in the country. The Ministry of Health and the international donor community have made significant investments to strengthen health information systems for improved analysis and data used in support of the National Health Sector Strategic Plan (NHSSP) 2011-2030 Towards a "Healthy East Timorese People in a Healthy Timor-Leste." The goal of this vision is that the National Health Strategic Plan will influence "all health sector processes toward more multi-disciplinary team working, decentralized decision-making, partnership working, and community involvement."[1]

There are ongoing activities designed to deliver well-coordinated, multidisciplinary efforts to strengthen the Timor-Leste health system and strengthen data use. Despite the investments made in subnational health facilities, there is currently relatively poor data coverage, meaning that at subnational levels, data are rarely used to generate reliable evidence for decision-makers. There is an important opportunity to strengthen data analysis and use, both at the national and subnational levels, in support of the National Health Sector Strategic Plan. While opportunities for standardization and scale exist at the national and subnational levels, encouraging efforts toward analysis and use of data are being organized organically and initiated at the community and health post levels.

As part of the USAID Health System Sustainability Activity, the DACA offers a broad analysis of different critical areas related to data analysis and data use. The activity team conducted the assessment in close coordination with the MoH HMIS Department and hope the findings will serve as a basis to present recommended activities to address the findings, which have also been co-identified with and validated by the MOH.

Objective

The purpose of the DACA was to assess MoH data use and data quality processes to understand the opportunity and capacity of different levels of the health system to analyze data. The DACA also examined HMIS governance, electronic HMIS deployment, the state of interoperability, and COVID-19 data capture.

The DACA sought to assess behavioral, technical, and organizational determinants affecting HMIS performance, in particular as it relates to strengthening data analysis and data use. Based on the findings, the DACA presents recommendations for interventions to strengthen areas needing improvement.

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[1] Ministry of Health, *National Health Sector Strategic Plan 2011-2030: Towards a Healthy East Timorese People in a Healthy Timor-Leste* Taliti, 2011 https://cdn.who.int/media/docs/default-source/searo/timor-leste/national-health-sector-plan.pdf?sfvrsn=70870918_2
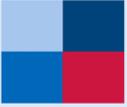
Preliminary recommendations were validated in a national-level workshop, which was conducted on April 5, 2022. Detailed recommendations were further validated in meetings with members of the MoH HMIS Department, who also assigned priority levels to recommendations.

Overview

Methodology

The Timor-Leste DACA methodology was based on the PRISM Series and Framework, which was developed by the MEASURE Evaluation, which was funded by USAID. The PRISM Series is a comprehensive set of resources to design, strengthen, and evaluate RHIS performance. It includes the following tools: the RHIS Overview Tool, Performance Diagnostic Tool, Electronic RHIS Performance Assessment Tool, Management and Assessment Tool, Facility/Office Checklist, and Organizational and Behavioral Assessment Tool.

PRISM seeks to evaluate RHIS linkages to produce better-quality data and continuous use of information, which lead to better health system performance and ultimately to better health outcomes. The PRISM Series asserts that RHIS performance, meaning better-quality data and continuous use of information, is a function of better RHIS processes and behavioral, technical, and organizational determinants. It also emphasizes the strengthening of RHIS performance through a system-based approach that sustains improvements in data quality and use. Understanding the barriers to optimal data quality is critical to assessing the capacity requirements to analyze the data.

The PRISM questionnaire was modified for the DACA to reflect Timor-Leste's context. The DACA used representative questions from the PRISM RHIS Overview Tool and from the Performance Diagnostic Tool, which determines the overall level of RHIS performance in terms of the data quality and use of information. The DACA also incorporated select questions from the Human Resources Information System (HRIS) Strengthening Implementation Toolkit.[2]. Questions were adapted to reflect Timor-Leste's context and reflected the additional facets requested for exploration. As discussed in the Study Limitations section, the DACA was intended to be a general assessment versus an in-depth assessment. Questions selected from PRISM were modified to respond to time and budget constraints; some separate questions in the PRISM were consolidated.

The questionnaire was configured using the KoBo Toolbox, and electronic data capture was completed using the same platform. Qualitative responses were analyzed and aggregated in a Microsoft Word document.

The interviewers were members of the USAID Health System Sustainability Activity. The interviewers included a USAID Health Systems Sustainability DACA technical advisor and the

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[2] Capacity Plus. 2011. *HRIS Strengthening Implementation Toolkit.* Capacity Plus. Retrieved February 2, 2022 from https://www-test.capacityplus.org/hris-toolkit/tools/assessment.html.

activity's data manager, health governance and finance lead, and monitoring and evaluation (M&E) director, as well as the HMIS department head and HMIS national data manager.

Thirty-two subnational-level participants were interviewed. At the municipal level, interviewees included the director of municipality health service and the district public health officer. At the CHC level, interviewees included the CHC HMIS officer and the CHC manager. Interviews were also conducted at each health post with the person in charge.

Table 1. Sample Size of Sites and Participants Interviewed in the Study

Total DACA Interviewees by Position/Role				Total
Director	4	Health post doctor	3	7
District public health officer	4	Midwife	1	5
CHC HMIS officer	4	Expanded Program for Immunization	8	12
CHC manager	4	Surveillance officer	4	8
Total	16		16	32

Municipality					
	Director	District Public Health Officer	Expanded Program for Immunization	Surveillance Officer	Total
Ainaro	1	1	1	1	4
Baucau	1	1	1	1	4
Bobonaro	1	1	1	1	4
Dili	1	1	1	1	4

CHCs				
	CHC HMIS Officer	CHC Manager	Expanded Program for Immunization	Total
Ainaro Villa	1	1	1	3
Venilale	1	1	1	3
Balibo	1	1	1	3
Becora	1	1	1	3

Health Post			
	Health Post Doctor	Midwife	Total
Cassa (Ainaro)	1	0	1
Bercoli	1	0	1
Batugade	1	0	1
Hera	0	1	1

Ten interviews were conducted at the central level to understand the department's vision and strategy as it relates to data analysis, data use, and using routinely collected HMIS and HIS data. The team deliberately selected directorates and departments based on their degree of involvement with HMIS data collection, management, analysis, reporting, and use of data in the TLHIS/HMIS for decision-making. Some directorates and departments were selected based on their involvement with information, communication, and technology human resources, policy, and coordination as it relates to health system strengthening.

Table 2. National-Level MoH Interviewees

Director of Cabinet of Policy, Planning and Cooperation in Health
Director of disease control
Director of human resources
Head of Nutrition Department
Head of Expanded Program for Immunization Department
Head of Maternal and Child Health Department
Director of Saude Na Familia
Head of HMIS Department
Head of M&E Department
Head of Surveillance & Epidemiology Department

The Activity interviewed the Timor-Leste Ministry of Technology, Information, and Communication (TIC) in coordination with the HMIS Department. The TIC's mission is to implement the policy and strategy adopted in the field of information and communication technologies, managing the computer network of the government and other public bodies.[3] The DACA interviews sought to explore how the MoH could potentially collaborate with the TIC and leverage the TIC's skillsets to broaden access to data for decision-making. See Annex D for pictures.

Municipality Selection Process

Purposive sampling was used for the DACA's municipal, CHC, and health post sites for interviewing. Purposive sampling was based on HMIS performance in terms of data entry and punctuality in reporting. The MoH HMIS Department confirmed municipalities and data collection site selection. Selected municipalities represent one each with above-average performance, average performance, lower-than-average performance, and low performance municipality. The municipalities also represent the country's geographic diversity, as sites

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[3] TIC Timor. 2022. *TIC Timor: About TIC TIMOR*. TIC Timor. Retrieved May 2, 2022 from https://www.tic.gov.tl/en.

included representation from the east (Baucau), north (Dili), south/central (Ainaro), and west (Bobonaro).

MOH HMIS Department Engagement during the DACA

The role of the MOH's National HMIS Department was critical throughout the DACA process. Questionnaires were shared with the MOH, and key HMIS stakeholders (HMIS head of department, HMIS data manager) were present during all subnational and national-level interviews. The participation of key HMIS stakeholders during subnational interviews helped reinforce technical capacity on how to conduct a modified PRISM assessment and allowed them to hear responses firsthand regarding data use and HMIS performance at subnational levels. The HMIS Department was closely engaged to analyze results and design and present at the DACA validation workshop. The HMIS Department was also closely engaged to develop the prioritized list of activities in response to the DACA, which is included in Annex A, as well as reviewing the report before publication.

Preliminary DACA Validation Workshop with the MOH

The Health Systems Sustainability Activity held a workshop on April 5, 2022, to share preliminary DACA findings with key central-level MoH stakeholders, external stakeholders, and subnational interviewees. External stakeholders included the World Health Organization (WHO) Country Office, Catalpa International, and the United Nations Children's Fund. Remarks were given by the cabinet director for policy, planning and cooperation in health, national director for human resources, head of policy, planning, and M&E Department, as well as the health information head of department. The workshop included break-out discussions, during which small groups discussed the findings and shared their insights on how to address the issues. The suggestions and ideas that emerged from the group discussions are reflected in the findings and recommendations in response to the DACA, presented in Annex A. The USAID mission director for Timor-Leste shared closing remarks, and the director of the Cabinet of Planning and Cooperation officially closed the workshop.

Recommendations

In each of the six sections, the DACA recommendations are directed toward the HMIS Department, the USAID Health System Sustainability Activity, and other implementing and local partners. All recommendations were co-identified and reviewed with the HMIS Department.

Study Limitations

The DACA is not intended to be an exhaustive PRISM assessment in any of the focus areas, but a general assessment focused on strengthening data analysis and data use. Thus, the study limited the number of PRISM questions.

Though questionnaires were translated from English into Tetum for national and subnational interviews, often additional detail in Tetum needed to be shared verbally to ensure understanding, so the understanding of the questions among respondents was not always uniform.

The presence of the MoH HMIS Department members helped facilitate the coordination process, co-development, country ownership, and sustainability of the DACA. However, the presence of MoH HMIS Department senior members may have resulted in interview bias, particularly among the municipal-level District Health Information System 2 (DHIS2) officers who are directly under the MoH HMIS Department members' supervision.

Results

HMIS and HIS governance

Background

A strong country HIS should enable stakeholders at every level to access high-quality data that come from multiple, interoperable data sources. Improved data access should lead to strengthened data use to guide national policies and improve health system performance, service delivery, and resource allocation. HMIS and HIS governance is a critical component of the enabling environment for data use and can be used to plan, promote, and deliver the integration and harmonization of systems across different health areas to improve data collection, management, analysis, and use at national and subnational levels.

High-quality HISs are designed to improve evidence-based decision-making. Ensuring that a country's HIS remains nationally led and within the organizational structure of the MoH is the most efficient way to guarantee good-quality health data and sustainable leadership. The HMIS Department should achieve this in close coordination with key internal and external stakeholders, implementing well-structured capacity development initiatives.

To identify strategic priorities and ensure coordination between internal and external stakeholders, a global best practice is to create HIS and HMIS technical working groups (TWGs). HIS and HMIS TWGs, including HMIS and HIS Core Teams and Stakeholder Working Groups, are important forums for critical internal MoH and external stakeholders to meet routinely to discuss HIS and HMIS strategy design and planning, coordination, and interoperability needs for strengthened analysis, among other topics.

HMIS and HIS governance in Timor-Leste

The DACA interviews at the central level confirmed that HMIS and HIS governance was led by a strong, national-level vision that was grounded in Timor-Leste's One Plan, One Budget, One M&E initiative. This initiative, led by the central government of Timor-Leste, promotes coordination between all government departments and activities. It intends to achieve improved harmonization and unified, well-planned efforts between different ministries, ministerial departments, and internal and external stakeholders by operating under one plan and framework.

Central-level directors and department heads hold routine quarterly meetings to discuss performance against nationally established targets, which periodically lead to discussions about HIS and HMIS governance needs. For example, on a monthly and quarterly basis, the HMIS

Department shares performance results on indicators with the M&E Department. The M&E Department then shares the information with the Ajencia Nasional ba Planeamentu, Monitorizasaun no Avaliasaun (National Agency for Planning, Monitoring, and Evaluation). The HMIS Department also shares an annual report with the director of the cabinet of policy, planning, and cooperation in health. While a vision exists for increased ownership for Timor-Leste's HMIS Department to lead HMIS and HIS governance, important opportunities remain to strengthen operationalization for sustainability and MoH ownership.

Currently, the HMIS Department is led by the HMIS head of department and is closely supported by the HMIS data manager. The HMIS head of department and the HMIS data manager work with a national-level team of seven other HMIS managers. The data manager and HMIS managers supervise HMIS managers based in municipalities, review reported data, and provide feedback about data entry and data quality. Additional details are outlined in the section on Data Entry and Data Management to Support Strengthened Data Analysis.

The WHO has invested significantly in the DHIS2-based TLHIS and its development and maintenance, and played a vital role in efforts to design the TLHIS in 2013. The guidelines were published in 2014 in preparation for the implementation and official launch of the TLHIS in 2015. Since the TLHIS's inception, the WHO has initiated upgrades to new versions of the TLHIS and the expansion and enhancements of modules. The WHO has been responsible for leading the administration and maintenance of the TLHIS, ranging from performing basic tasks, such as adding new data elements and indicators, to more intermediate and advanced tasks, such as configuring new data validation rules and creating new programs.

Figure 1: Relationship of the TLHIS, HMIS Department, and HIS Ecosystem in Timor-Leste
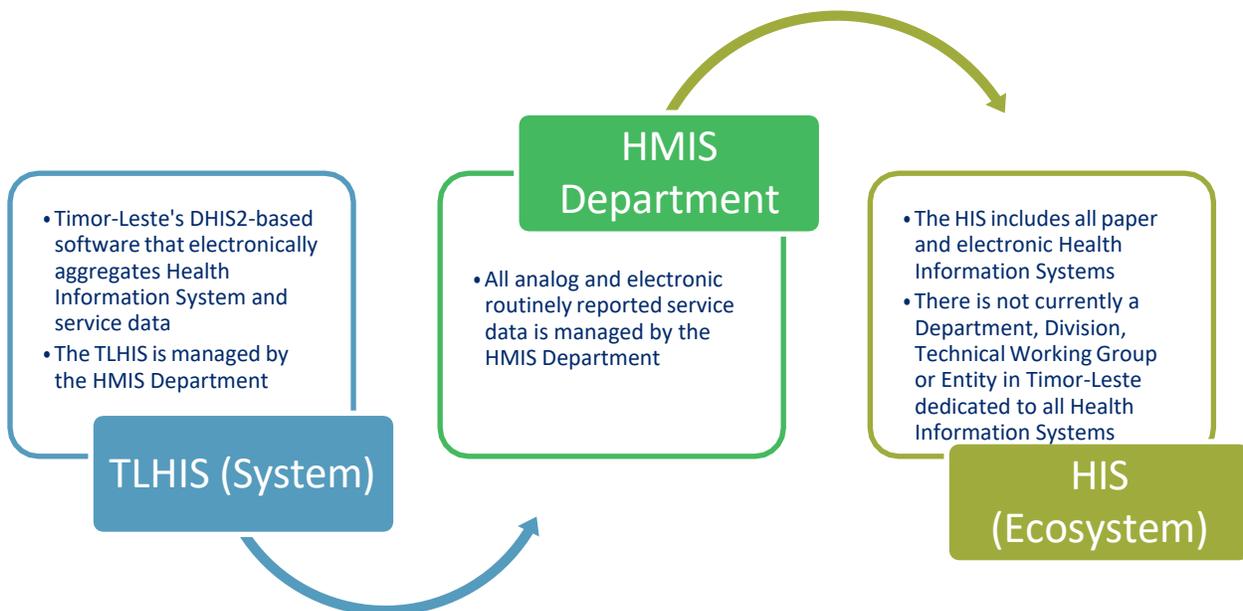
The TLHIS forms part of Timor-Leste's broader network of databases and software that comprise the country's HMIS. For example, the electronic software used for Saude na Familia and Liga Inan are part of the country's holistic HIS. The country's HIS is a broader ecosystem of systems, software, and databases that includes, but is not limited to, the DHIS2-based TLHIS. Timor-Leste has an active Health Information System with many different systems, types of software, and databases, which technically comprise its HIS. However, national-level interviews with departments and directorates indicated that the governance of Timor-Leste's HISs was considered synonymous with TLHIS governance in the DHIS2 software and did not consider the full range of software and systems.

Capacity-Building Initiatives on HMIS Relating to Data Analysis and Use

Since the introduction of TLHIS in 2013, the WHO has supported many workshops to train the MoH HMIS Department on TLHIS data entry, administration, and maintenance, and to share updates on TLHIS progress. Both the WHO and the MoH have organized HMIS Department capacity-building initiatives, as well as study tours to India and Sri Lanka for the HMIS Department to experience on-site DHIS2 capacity-building initiatives in international settings.

In most MoH DHIS2 deployments globally, ministries of health have in-house "Superusers," which is a generic technology or computing term for a network account that has special administrative privileges or user rights beyond those granted to basic user accounts. Basic accounts in the DHIS2 are usually restricted to data entry, report creation, and data visualizations. In DHIS2, Superuser privileges typically include the ability to build new data elements, indicators, data validation rules, and programs.

While it is a global best practice for MoH "Superusers" to have special privileges, the MoH HMIS Department's TLHIS Superusers remain limited in their abilities to perform basic DHIS2 administrative and maintenance tasks. The TLHIS administrator, whose title is HMIS data manager, and other MoH TLHIS Superusers in the HMIS Department experience extensive restrictions on TLHIS administrative and management privileges. The restricted Superuser settings limit HMIS Superuser ability to administer and manage the TLHIS effectively.

HMIS Department members expressed a desire to build their department's internal capacity and increase their autonomy to perform basic and intermediate system administration and management tasks, and, in the long term, more-advanced administrative functions like DHIS2 upgrades.

Figure 2. Relationship of HMIS TWG and HIS TWG

HIS TWG

- TWG would be led by HMIS Department
- Internal MOH representatives and external stakeholders would be engaged
- Would strengthen existing ad-hoc meetings, ensuring conclusions are documented, actionable, and shared with internal and external stakeholders
- Would be responsible to identify and plan technical upgrades, improving data quality, and data use using HMIS data
- Would report to the HIS TWG

HMIS TWG

- TBD Department or Division lead
- Would coordinate with the HMIS TWG, engage internal MOH representatives and external stakeholders
- Would strengthen, bring greater accountability to existing ad-hoc meetings on inter-departmental interoperability and data use between all health information systems in Timor-Leste (ex: TLHIS, Saude na Familia, Liga Inan, COVID-19 tracker)
- Would encourage improved coordination, planning so data from different systems is readily accessible for data use

HMIS TWGs

It is a global best practice to have a country-led TWG that is responsible for the design and roadmap to capture and provide essential core data for planning and monitoring health system performance, maximizing opportunities for data use. The HMIS TWG would be responsible for overseeing the strategic growth and development of the TLHIS and other HMIS data.

The HMIS Department is responsible for reporting relevant updates to other national MoH departments about departmental performance. In Timor-Leste, the WHO leads periodic national-level meetings on TLHIS progress, including on data quality and completeness, in which key national-level HMIS stakeholders participate. Separate meetings held with the WHO discuss technical upgrades needed to the TLHIS. While there are different meeting forums to discuss HMIS and HIS needs as they relate to data analysis and use, the MoH does not have any formally established TWG related to HMIS or HIS. Additionally, meeting outcomes affecting the TLHIS and strategic planning are not transparent or communicated to affected stakeholders.

A well-organized HMIS TWG would strengthen existing ad hoc processes, giving a formal mechanism and accountability measure to plan meetings and HMIS developments and communicate conclusions. The HMIS TWG would encourage more-holistic engagement, communication on HMIS needs, and planning, with both MoH and external stakeholders reporting into the TLHIS, including nongovernmental organizations.

HIS TWGs

Complementary to HMIS TWGs, HIS TWGs are designed to ensure that all health information and data needed for policy development and the delivery of health care are readily available and used. HIS TWGs often seek to address siloed HISs, limited point-to-point integration, key architectural gaps, and limited governance of individual systems, so health information can be more broadly used. The HMIS is one of several HISs that should be included in the HIS TWG planning.

Discussions around HIS needs, and, in particular, interoperability, typically occur in meetings between departments. Discussions reflect the vision set forth in the One Plan, One Budget, One M&E initiative and the National Health Sector Strategic Plan, but outcomes and plans are not necessarily documented or broadly disseminated, or reflected in a broader, coordinated HIS plan. There is not an organized entity dedicated to overseeing the well-planned growth of Timor-Leste's various HISs, ensuring its design and expansion reflect data use needs.

Ad hoc meetings among all relevant HIS stakeholders across different MoH departments occur as needed to discuss interdepartmental data analysis and data use needs. During the meetings, interoperability needs are discussed, as well as data quality issues and reporting trends. More information about interoperability planning for data analysis is presented in the section HIS Management and Interoperability to Support Strengthened Data Analysis.

In the case of Timor-Leste, establishing an HIS TWG would also strengthen and streamline existing meetings and initiatives to address interoperability and data use needs between the TLHIS, Saude na Familia, Liga Inan, the COVID-19 tracker, and other digital and manual HISs. The HIS TWG would also encourage improved coordination, accountability mechanisms, and planning to achieve a robust HIS in which data from different systems are readily accessible.

TLHIS Roadmap

A country's HIS roadmap is an important component of an MOH's strategy to yield better-quality data for effective health system planning and for timely responses to disease outbreaks. An HIS roadmap also helps ensure indicator harmonization, strengthens data quality, and complements efforts to strengthen data use.

In Timor-Leste, the WHO, in coordination with the HMIS Department, has led the delivery of TLHIS (DHIS2) platform enhancements that helps contribute to the country's enabling environment for strong HISs. The TLHIS's development and expansion has been historically organized and led by the WHO in coordination with the MoH HMIS Department, however interviews confirmed there is not a known, documented roadmap for the TLHIS's development or expansion. Ownership of the roadmap has been predominantly held by the WHO, and the MoH HMIS Department is informed of updates and new features. The MoH HMIS Department asks the WHO to incorporate certain features, enhancements, and modifications to the TLHIS,

which the WHO then incorporates and reflects in its TLHIS roadmap. Modifications may include changes to TLHIS validation rules, the ability to review and change indicator formulas, and upgrading to a new version of DHIS2. The WHO is also responsible for implementing the requested changes. The HMIS Department is not involved in TLHIS upgrades to new versions of DHIS2. If an upgrade is required, the HMIS Department sends a request to the MOH, and once that has been approved, the WHO leads the implementation work and completes the upgrade in the TLHIS without the involvement of the HMIS Department.

While a documented TLHIS roadmap for upgrades and expansion likely exists, the HMIS Department was unaware of the physical existence of the document and was not able to produce this upon request. The existence and knowledge of a shared document outlining a TLHIS roadmap is important for strategic and operational planning and stakeholder alignment.

Recommendations on HMIS and HIS Governance Relating to Data Analysis

For the full detailed list of MoH validated recommended activities and SMART sub-activities to achieve them, please see Annex A.

- **Organize and activate HMIS TWG.** The TWG will address the need for strengthened coordination between internal and external stakeholders. The TWG will provide a regular forum to discuss HIS and HMIS strategy design and planning, coordination, and interoperability needs for strengthened analysis, among other topics, in which outcomes will be documented and available to internal stakeholders.

- **Advocate for the creation of an HIS TWG.** While ad hoc discussions are under way between departments to identify interoperability needs, the HIS TWG would establish a formal forum for internal and external stakeholders to agree and document interoperability priorities and review progress to deliver on these interoperability priorities. The HIS TWG would help ensure that international best practices are applied to, for example, those from the Healthcare Information Management Systems Society and Open Health Information Exchange communities. The HIS TWG may be a sub-technical working group of the Health Systems Strengthening TWG.

- **Update the Timor-Leste Interoperability Roadmap and Action Plan.** The Timor-Leste Interoperability Roadmap would provide a technical pathway for HISs to exchange electronic health information to be used for analysis and used to improve the health and well-being of individuals and communities. Efforts should also include awareness and dissemination. This recommendation relates to governance; however, it is also presented in the HIS Management and Interoperability Section.

- **Mentoring support: Connect MoH HMIS Department with senior DHIS2 expert for TLHIS mentorship.** This continued, targeted mentorship for the HMIS Department would be structured to accelerate efforts to achieve greater autonomy and country ownership of administrative and maintenance functions for the TLHIS.

Information, Products, and Dissemination To Support Strengthened Data Analysis

Standards and Guidelines

Standard operating procedures, including standards and guidelines, are a written description of procedures required for effective data collection, management, analysis, and use, as well as for practices related to coordination, monitoring, and HMIS and HIS supervision. Standard operating procedures are a foundational component of data governance structures, as they ensure replicability and transparency. The goal of standard operating procedures and guidelines for HMIS is to provide well-documented, user-friendly processes for the MoH and its implementing partners, to strengthen data accuracy, correctness, completeness, integrity, and replicability in the HMIS, and ultimately to increase use and analysis of data in decision-making and planning. The standard operating procedures and guidelines for HMIS are closely linked to the M&E guidelines, which provide guidance on data use and analysis against nationally established targets. HMIS policies should be designed to support and further HMIS and HIS standard operating procedures.

The Timor-Leste HMIS guidelines include instructions for HMIS reporting forms, which are standard documentation on the HMIS/TLHIS, as well as indicator numerator and denominator definitions. The HMIS guidelines have not been updated since 2013. They need to be updated, and their indicator definitions, guidelines on data analysis, and data use should be reviewed and harmonized with the M&E Department's instructions for sub-national data analysis and data use. HMIS guidelines should be updated every one or two years to reflect system upgrades, and form content and should be led by the HMIS TWGs.

The HMIS Department confirmed that the HMIS guidelines were shared electronically with subnational MoH members when they were receiving training, including videos on how to access the TLHIS. However, DACA interviews at subnational levels indicated there was no recall regarding these materials and resources or their use. No DACA interviewee at the subnational level was aware of the existence of the HMIS guidelines or that documentation related to HMIS governance existed. The HMIS Department indicated during interviews that the guidelines are an important opportunity to reinforce standard expectations, present standard operating processes, and provide updated guidance. The head of the HMIS Department indicated the need for the updated HMIS guidelines to be in Tetum, the most widely used local language, to encourage broader understanding at subnational levels.

Information Access, Dissemination, and Reinforcement

Having documented standards, guidelines, and protocols provides all users with the same information and directions. Strengthening access and training on the informational products ensures that all users have the same opportunities to learn and benefit from the resources.

M&E trainings are led by the national M&E team during in-person visits to subnational sites. The national M&E team periodically organizes refresher trainingsd at the municipal level, particularly to help onboard new subnational HMIS members at the municipal, CHC, and health post levels. The HMIS Department confirmed that they seek to deliver trainings based on their annual plan and availability of funding, and that refresher trainings are held two or three times per year for

the HMIS and program officers. Training topics align with the M&E guidelines and include reporting format, data entry, and Civil Register andVital Statistics (CRVS).

New subnational MoH employees reporting into the HMIS are trained on the job. Onboarding trainings and refresher trainings include interpersonal meetings and events. Presentations are created when there is a training need. Electronic and paper-based guides and manuals are used during initial and routine training programs to onboard new health workers and to reinforce knowledge during periodic trainings.

The HMIS Department confirmed that the HMIS guideline was shared electronically with subnational MoH members when they were receiving training, including videos on how to access the TLHIS. However, DACA interviews at subnational levels indicated there was no recall regarding these materials and resources or use. No DACA interviewee at the subnational level was aware of the existence of the HMIS guideline or that documentation related to HMIS governance existed.

While documented HMIS guidance and manuals exist at varying stages of up-to-dateness at the central level, interviewees at the subnational level were not aware of where or how to access guidelines, standards, or new developments about the HMIS. This finding suggests that the resources and guidelines are not used regularly during supervision processes. The existence of standards and expectations is communicated verbally to subnational levels during periodic meetings led by the central level with the municipalities. Subsequently information is cascaded verbally to CHCs and health posts.

There are currently no formally established channels or knowledge management platforms to communicate plans, updates, or standards to external stakeholders or subnational levels.

Certain guidelines and manuals were available only in English; for example, the HMIS guidelines. While the awareness of the resource was low, there was also a language barrier, as most users, particularly at the subnational level, were most proficient in the country's national language, Tetum, and in other national languages and dialects.

Recommendations on Information, Products, and Dissemination Relating to Data Analysis

For the full detailed list of MoH validated recommended activities and SMART sub-activities to achieve them, please see Annex A.

- **Update HMIS guidelines on HMIS reporting channels (data flow, reporting process, data entry, data verification, feedback loops, and data use)**. The updated HMIS guidelines would provide standard operating procedures on critical processes and would address the need for updated, standard guidance. The HMIS guidelines would be complemented by a robust dissemination plan to ensure subnational users are aware of the existence of the new guidelines, and supervisors would reinforce the use of the guidelines during supervision visits or phone calls.

- **Develop an online knowledge management hub for HMIS and M&E.** As the majority of subnational DACA interviewees were unaware of where to access resources, an online

knowledge management hub would provide an accessible, protected space where all resources could be electronically housed and accessed.

- **Ensure all educational materials, guides, manuals, and job aids are available in Tetum.**

HIS Management and Interoperability To Support Strengthened Data Analysis

Timor-Leste's interoperability is envisioned in the One Plan, One Budget, One M&E initiative, encouraging a holistic analysis of data not only between different MoH departments but also more broadly with other ministries. While there is a vision and desire to achieve greater interoperability between different software and systems, MoH national departmental leadership expressed a particularly urgent need for increased interoperability between key systems. For example, MoH Directors showed interest integrating the TLHIS and the Registo Saude Electronico Timor-Leste (RSETL). Interoperable HISs enrich data analysis and provide better insights into the health system, as well as facilitate analysis of the linkages between different departments. This increases the ability to holistically analyze the HIS and plan accordingly.

Current Interoperability Efforts

At the time of the DACA interviews, interoperability between the TLHIS and other HISs was limited and the TLHIS had no known data exchanges with other systems or software. All integrated data analysis was performed manually.

There were reported plans to integrate the TLHIS with the HRIS in June 2022, which is an initiative led by the WHO.

Interoperability with the community-level Saude Na Familia (Family Health) Department's electronic data capture platform, Registo Saude Electronico Timor-Leste,RSETL is a key, under-pursued opportunity. By exchanging data between the Saude Na Familia's database and the TLHIS, the MoH would be able to monitor community-level trends more effectively and analyze these in light of the TLHIS data.

Interoperability between Different DHIS2 Servers

DHIS2 has different use cases in Timor-Leste for aggregate and tracked reporting. Desktop research shows that in 2018, the Sri Lanka HIS program provided support to the MoH to introduce a separate Malaria Information System, which is on a separate server from the TLHIS.[4] It is unknown whether the Malaria Information System in DHIS2 is still in use. The TLHIS currently captures aggregated malaria data that is not connected to the Malaria Information System.

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[4] https://hisp.lk/international-projects/ and https://community.dhis2.org/t/digital-solutions-for-malaria-elimination-cop-virtual-meeting-2020/41314

The WHO introduced the DHIS2-based COVID-19 tracker in 2020, which is in a separate DHIS2 environment from the TLHIS and the Malaria Information System. The COVID-19 tracker requires logging in with different credentials than the TLHIS on a different website. In both cases, data are entered into different DHIS2 servers and there is no interoperability between the Malaria Information System, the COVID-19 tracker, and the TLHIS. At the time of the DACA interviews (March and April 2022), there was no interoperability or data exchange between the TLHIS and other software.

Interoperability Planning

The Timor-Leste One Plan, One Budget, and One M&E initiative promote integrated analysis and improved coordination between technical departments. The M&E guidelines indicate that "The health systems approach is central to national M&E as it measures the performance of the whole system, rather than individual components or programs. The idea of the system approach is that it measures connections between sub-systems [to] achieve overall health system performance."[5]

Using the WHO's health system building blocks and universal health coverage's three dimensions, population coverage, service availability, and financial protection, the national M&E framework was developed to measure the progress of the National Health Sector Strategic Plan Nand evaluate whether the plan achieved its objectives. To do this, the M&E guidelines propose that thinking systematically and across the health sector performance is needed, not just for individual programs.

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[5] M&E Guidelines, page 14.

Figure 3: Timor-Leste M&E Guidelines Adaptation of the WHO Health System Building Blocks

With this integrated vision in mind, different HISs should either exchange data or be interoperable. While an Interoperability Roadmap may exist, currently, there is no known, formally documented Interoperability Roadmap created by the HMIS Department, though people at senior levels of the MoH are exploring this.

As there are efforts to strengthen data analysis, and in particular surveillance to prevent the next disease outbreak, the timing is ideal to reinvigorate coordination and awareness between MoH and external stakeholders and to create a Timor-Leste Interoperability Roadmap and Action Plan that the MoH owns. This Plan would be based on shared data standards, a Master Facility List, and documented architectural frameworks. Standards must also be created for data sharing.

Recommendations for Interoperability Relating to Data Analysis

For the full detailed list of MoH validated recommended activities and SMART sub-activities to achieve them, please see Annex A.

- **Update the Timor-Leste Interoperability Roadmap and Action Plan.** See additional information in the previous section.

- **COVID-19: Configure the weekly vaccine summary distribution list into the TLHIS COVID-19 Tracker**. This solution would minimize duplicative or shadow systems and double data entry.

- **Explore merging the COVID-19 DHIS2 tracker into the TLHIS**. Depending on how the COVID-19 tracker is configured, there may be an opportunity to merge the COVID-19 tracker with the TLHIS. This would minimize the need for subnational enumerators to record data in multiple data sources and would facilitate the ability to have improved integrated analytics.

Data Entry and Data Management To Support Strengthened Data Analysis

Timor-Leste offers a robust, paper-based HMIS reporting system that is active at all levels (health post, CHC, and municipality). Ultimately, the HMIS data are used for decision-making and planning, primarily at the national level. The DACA explored data entry and HMIS data management processes as they relate to strengthening data analysis and a culture of data use, particularly at subnational levels. All subnational levels reported memorized knowledge of data collection processes and there was limited access to on-site guides and job aids. The TLHIS uses the DHIS2 for aggregated electronic data capture of paper records.

In terms of reporting into the TLHIS, Health Posts, which are the MoH facility closest to the community level and report to CHCs, typically do not have internet and as of the report's publishing date, are not yet entering data into the TLHIS due to the lack of internet access. CHCs oversee Health Posts, and CHCs are usually the first subnational level or point that enters data electronically to the TLHIS. CHCs is usually the first subnational MoH level entering data into the TLHIS because this is usually the first MoH level the internet is available. Municipalities are usually able to connect to the internet, and the national level can reliably access the internet.

Data Reporting Process

Representing national trends, all eight facilities (health posts and CHCs) interviewed record service data at the time of service delivery, on paper-based registers. In health posts, facility-based doctors, midwives, and assistants are responsible for compiling the monthly HMIS report. The HMIS report is reviewed by the Health Post doctor in charge. At CHCs, nurses and doctors are responsible for compiling reports and the CHC manager is responsible for reviewing the report.

Health Post Data Reporting

Each health post and CHC must report monthly using approximately 24 different HMIS reporting formats, and each has a corresponding paper-based register to record the relevant services. All eight of these facilities submit HMIS monthly data on the third of each month to the CHC HMIS manager. These are paper reports, submitted by hand. Facility staff complete three copies of each HMIS report. One paper copy is kept at the facility and the other two copies are submitted to the CHC HMIS manager.

Health posts may or may not have the ability to provide services for tuberculosis, HIV, and certain other conditions. In situations where the health post does not offer treatment for a condition, patients are referred to the CHCs. Health Posts do not submit reports for which they are not providing services. For example, if a Health Post is not offering services for TB patients, they will not submit a report for TB services.
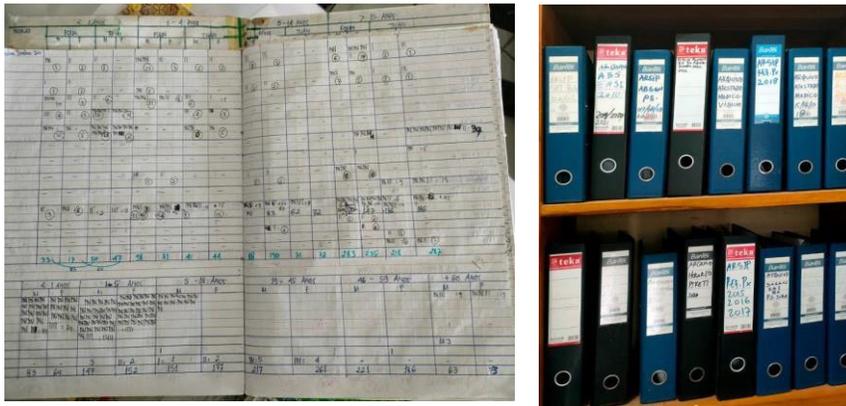
CHC Data Reporting

The CHCs use both paper and electronic data reporting platforms. The doctor, midwives, and nurses on site are responsible for the paper-based report. Paper-based reports are submitted to

the CHC HMIS manager for data aggregation and quality assurance checks. The CHC manager submits the hard copy to the municipality. In CHCs where electronic data entry is active, the CHC HMIS manager is supposed to use the paper-based report to enter the data as needed into specific online platforms. Interviews revealed that only one interviewed CHC recorded services on electronic registers.

CHCs that report on paper and electronically use different online platforms like the Registo Saude Electronico Timor-Leste, and Liga Inan to record services such as OPD registration maternal and child health, immunization, and family planning. Submitted paper-based HMIS reports are reviewed by the HMIS District Public Health Officer at the municipal level.

Picture 1: During DACA interviews, there was visual verification of paper recordkeeping. Despite electronic resources not being readily available at all levels, paper records were well-kept and organized.

Municipality Data Reporting

The municipalities are responsible for reviewing and approving paper-based and electronic data entries for health posts and CHCs within their catchment area. Municipalities are not responsible for service data entry, as this is captured at the health post and CHC level and will only report equipment and supplies that have been used. Examples of reported equipment and supplies include vaccines provided to hospitals in the municipality catchment area.

Data reporting into TLHIS

The DHIS2-based TLHIS was launched in 2013. Software configuration and development were led by the WHO in close collaboration with the MoH HMIS Department. Currently, aggregated data from 24 different categories are entered into the TLHIS and are reflected in the table below.

Table 3: TLHIS Data Entry Categories

Environmental health	Human resources	Malaria (quarterly)	Newborn care	Reproductive health and family planning

Eye care	Immunization	Maternal and child health	Noncommunicable diseases	Saude Na Familia
Filariasis and other neglected tropical diseases	Integrated management of childhood illnesses	Mental health	Nutrition	Tuberculosis (quarterly)
Health promotion	Laboratory services	Monthly surveillance	Oral health	Weekly surveillance
HIV (quarterly)	Leprosy (quarterly)	Mortality data	Outpatient department and inpatient department	

At subnational levels, six out of eight interviewed sites are reporting into the TLHIS and indicated they use the TLHIS as a data entry tool and do not access dashboards, data visualizations, or reports from the TLHIS. TLHIS reporting and completeness rates vary significantly by CHC and municipality.

While the WHO and HMIS Department have led discussions to transition from paper to electronic data entry in the TLHIS, the reported barriers at the subnational level include the question of how robust current offline data capture is in the TLHIS as it is currently configured. There are also concerns of losing data if entered in an offline environment, and the environmental factors of limited internet access in rural areas of Timor-Leste.

Standards and Guidelines for Data Entry

Instructions for HMIS reporting forms were created in 2013. The HMIS guidelines are designed for subnational data entry leads and provides procedures to be used for data collection, processing, use, reporting, and feedback. The purpose of the guidelines is to ensure uniformity and consistency in understanding the TLHIS formats and data items/elements to be captured and to facilitate standardized compilation and calculation.

The HMIS guidelines document data entry processes as well as expected feedback channels. Last updated in 2013, the guidelines include 14 components, which were the TLHIS components as of 2013. The current TLHIS captures 23 different components.

While it is helpful that the HMIS guidelines exist, no interviewee at the subnational level was aware of the existence of the HMIS guideline. The 2013 HMIS guidelines are available only in English, which creates a significant barrier for users at the subnational level who speak Tetum or other languages.

COVID-19 Data Entry

Data reporting varies for COVID-19, which is predominantly electronically reported into a separate DHIS2 instance (the COVID-19 tracker) that is managed by the WHO. It is unclear why the COVID-19 tracker was created as a separate DHIS2 instance, and whether there are plans to merge it with other health areas that use the DHIS2 tracker, or with the TLHIS.

Data reporting on COVID-19 starts at the health post level. The WHO-configured COVID-19 tracker captures daily data. In theory, if there is no daily COVID-19 data, the facility sends daily reports on COVID-19 vaccination. If no vaccinations occur on that day, facilities are required to submit a report indicating there is no data. However, interviewees at the national and facility level said that this report is typically not sent. In theory, vaccination and COVID-19 epidemiological data are entered into the COVID-19 tracker at the CHC level. Of the sites interviewed, two CHCs confirmed that HMIS officers are entering COVID data directly into the TLHIS COVID-19 tracker.

At the municipality level, two municipalities reported entering data directly into the COVID-19 tracker in the DHIS2. In theory, all CHCs are supposed to enter their respective data into the COVID-19 tracker. Different people may do that, and interviews confirmed that COVID-19 data entry may be completed by HMIS managers or doctors responsible for the Expanded Program for Immunization.

At the CHC, an HMIS officer accesses health post COVID-19 reports through a WhatsApp group. In the CHCs, the person responsible for the Expanded Program for Immunization enters the data in Excel, takes a picture of their screen, and subsequently shares a picture of the report with municipalities through a WhatsApp chat. While this is a practical solution for sharing data quickly, it requires manually entering the data twice because the data is entered into Excel at the CHC level and then re-entered and aggregated at the national level into a different database. This double data entry consumes time and creates opportunities for error. While there is a configured program in the COVID-19 tracker to enter vaccination data, it was unclear why an Excel form is being used, which creates a parallel or shadow system, and why data entry does not happen directly by CHCs in the COVID-19 tracker.

Trainings on COVID-19 data entry were led by the national-level MoH team, in coordination with the WHO. While a limited number of subnational interviewees received guidelines on routine data entry, one interviewed municipality indicated they had received COVID-19 vaccination reporting guidelines, and three municipalities were trained on COVID-19 data reporting. One interviewed municipality received training on data entry in the DHIS2-based COVID tracker.

Roles and Responsibilities for Data Entry

All facilities had multiple persons responsible for aiding in the compilation of the HMIS reports. At the health post and CHC levels, the doctor in charge of the facility, in addition to the manager, is responsible for validating the reported data.

The DACA asked questions to uncover how respondents understood their roles and responsibilities as they related to data entry. In six out of the eight facilities interviewed, interviewees indicated there were no clearly defined roles and responsibilities related to reporting and data entry. One CHC indicated that data entry and reporting are reflected in the terms of reference of HMIS officers. upon employment.

Interviews with national level stakeholders indicated that roles and responsibilities were primarily communicated verbally and reinforced informally during meetings with other health post staff.

Training and Onboarding

The central-level departmental lead for M&E indicated that subnational MoH staff receive orientation training and periodic refreshers on M&E guidelines and indicators. However, for HMIS data entry and analysis, there are no formally established orientation or onboarding trainings for subnational staff members; they have to learn on the job.

At all interviewed facilities, all persons responsible for compiling reports said they had not received training on data definitions. The central-level departments indicated that trainings were offered on data quality and COVID-19 vaccination reporting. However, at the health posts, all interviewees (doctors, nurses, midwives) indicated they had not received formal training on the monthly routine data reporting process, although they were responsible for entering data. Training for CHCs and municipalities on the TLHIS was led by the municipalities, with national MOH-level support and in coordination with the WHO.

Refresher trainings on data entry are periodically conducted at subnational levels and focus primarily on reinforcing data entry expectations and data quality. Trainings are delivered verbally and via Microsoft Powerpoint presentations.

Recommendations on Data Entry and Data Management Relating to Data Analysis

For the full detailed list of MoH validated recommended activities and SMART sub-activities to achieve them, please see Annex A.

- **Action plan to transition from paper-based reporting to TLHIS**. Transitioning fully to electronic reporting, starting at the CHC level, would significantly reduce the reporting burden for CHCs. Time can be re-purposed for strengthened data quality reviews and data analysis and use.

- **Update HMIS guidelines on HMIS reporting channels (data flow, reporting process, data entry, data verification, feedback loops, and data use).** This is a shared recommendation in the HMIS Governance; details can be found there.

- **Transition of TLHIS server ownership to MOH.** Transitioning the TLHIS server ownership would further country ownership of the electronic HMIS, require additional capacity-building to manage server hosting, and would promote sustainability efforts as the MoH would need to routinely budget for the server cost, administration, and maintenance.

Data Quality To Support Strengthened Data Analysis

The concern of data quality is very present at all facilities interviewed, and interviews revealed that discussions on data tended to focus on data quality. However, data quality checks were performed differently at each site. There were no systematic data quality checks at the health post, CHC, or municipality level, and limited training opportunities. Most facilities are receiving feedback if there are discrepancies in the data.

Of DACA respondents, four out of four (100 percent) of health posts and three out of four (75 percent) of CHCs reported performing a routine data quality check. No municipalities interviewed reported having conducted a formal data quality assessment, however, some

municipalities reported having provided feedback to CHCs regarding data quality, and some CHCs reported receiving feedback on data quality via phone calls.

While there was a high percentage of reported data quality checks, each site had a different way of conducting a data quality check. In seven of the eight interviewed facilities, health personnel manually cross-checked the data from paper tally sheets and registers.

Data Quality standard operating procedures

While electronic versions of the HMIS guidelines are shared during routine trainings, which include a section on data quality, there was low awareness and recall about data quality guidelines. No interviewed sites were aware of a standard operating procedure to review data quality, indicating that the trained staff do not read the resources provided to them during the training. All eight health posts indicated they had not received guidelines from the municipality to assess data quality. There are data quality standards in the 2013 HMIS Guidelines and the M&E guidelines; however, it is not clear whether the written process is understandable or user-friendly for subnational users.

Seven out of eight health posts (88 percent) were not aware of the existence of the national-level M&E-issued data dictionary that defines data elements that form indicators used for data entry. One interviewed health post reported knowing of the existence of a data dictionary, but it was not physically or electronically present at the site.

At subnational levels, interviewees echoed the need for standard operating procedures. One interviewed CHC manager connected these to improved data quality, and when asked about standard documentation of processes, volunteered that "We need standard operating procedures so everybody follows the same rule and have standardized recording format so data can be recorded in a standard way and entered the system in a timely manner."

Data Quality Training

Interviewees indicated there were limited opportunities to receive training on the guidelines: In all eight health posts, the person responsible for compiling data confirmed they had not received training on reviewing data quality. One municipality HMIS manager stated that "Staff is not trained on data quality. They got training on TLHIS but not tally sheets. We need training on how to fill the paper report."

As one health post-level data entry officer noted, "We receive the form and registers from the CHC without any guidance on how to fill them out. If we received proper instructions, then data quality will improve" and confirmed that "we (health post) are currently filling the form based on experience" and not written standards.

Feedback and Frequency of Data Quality Checks

While there was high awareness of the need to improve data quality, no data quality and accuracy checks were planned or were occurring routinely. The most commonly cited measure (seven out of eight responses, or 87.5 percent) was that health posts and CHCs were manually cross-checking data in paper registers to conduct data quality reviews on data that is reported monthly.

A municipality HMIS manager suggested the importance of strengthening data quality initiatives at all levels and that "to improve data quality, improvement must come from health post level not only at [the] municipality level."

The flowchart illustrating the different steps in data collection, analysis, transmission, and feedback for HMIS data, including data quality, exists in theory in the HMIS guidelines and the M&E guidelines. If the HMIS flowchart were operationalized, data would not only be flowing up to the national level, but there would be systematic points for feedback, data, trends, and analysis to be shared with subnational levels.

Figure 4: HMIS Flowchart
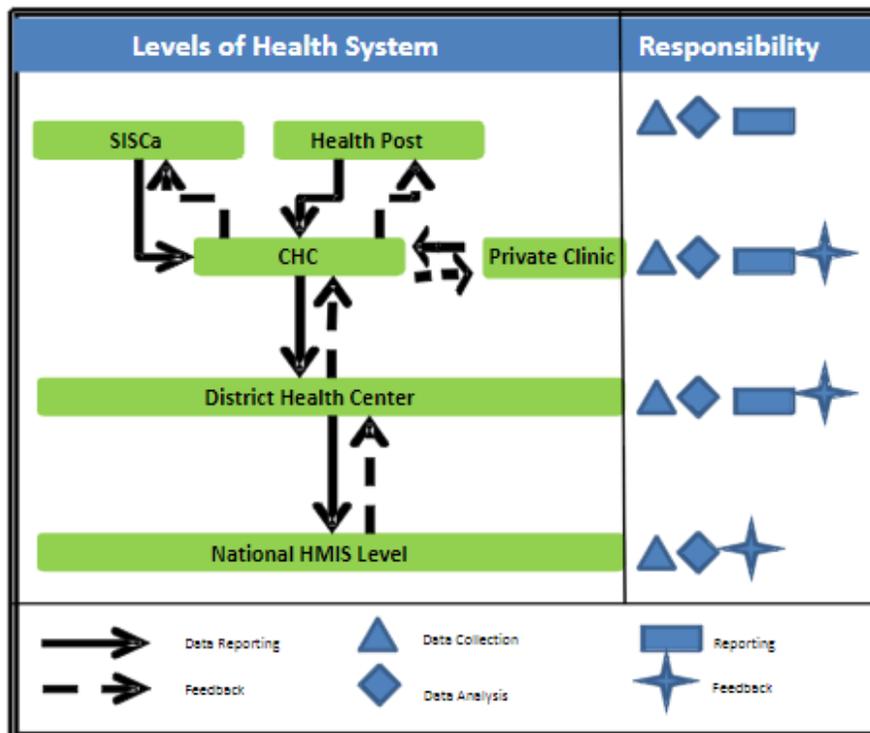
While there was a lack of guidance and known standard processes, most (six out of eight) health posts reported receiving feedback if a data discrepancy was identified in a report. Health posts and CHCs reported receiving phone calls from their respective supervisors to investigate and resolve data quality issues.

A frequently cited challenge, not only in Timor-Leste but globally, is that health post-level data entry officers are juggling multiple tasks and priorities, which can affect data quality. As one officer indicated, "health post and CHC personnel do not understand data definitions. Also, due to our extra workload, we do not have sufficient time to spend on reporting and hence we make mistakes."

Qualitative suggestions to improve data quality from health post-level interviewees suggested their need for greater structure, training, guidance, and access to resources. For example, a

health post-level officer offered that "if we receive proper instructions then data quality will improve. Currently, we are filling the form based on [our practical, on-the-job] experience."

Recommendations on Data Quality Relating to Data Analysis

For the full detailed list of MoH validated recommended activities and SMART sub-activities to achieve them, please see Annex A.

- **Update HMIS data dictionary for 24 existing reporting forms of TLHIS**. A data dictionary provides up-to-date data set and reporting specifications, namely data elements indicators, and data validation rules. A data dictionary provides a picture of the metadata in the database and its connection across programs and datasets. Additionally, the HMIS data dictionary would provide a detailed explanation of how each data element (or numerator and denominator) is defined and the source. The HMIS data dictionary would be harmonized with the M&E guidelines and would help improve data quality, as all users would be operating with the same understanding of how numerators and denominators are calculated.

- **Support the MoH in its efforts to institutionalize regular Routine Data Quality Assessments at municipality and CHC levels.** A Routine Data Quality Assessment is designed to verify "the quality of reported data and assesses the underlying data management and reporting systems for standard program-level output indicators."[6] The Routine Data Quality Assessment would help ensure routine, systematically performed data quality reviews at subnational levels, ensuring adequate space and time for data analysis and use.

- **Support a data reconciliation and data review workshop to improve data quality.** As subnational members have a limited understanding of the data reconciliation process to improve data quality, the purpose of this workshop would be to review submitted data, answer questions, reconcile potentially incorrect data, and strengthen data review processes for the future.

Data Analysis and Use

A central objective of the DACA was to evaluate the culture of data analysis and data use, and the HIS and HMIS-related factors that either encourage or impede data use. The DACA adapted questions from the PRISM Framework to analyze the opportunities for data use and how data use was currently in place, particularly at subnational levels. While some facilities are using data to inform decision-making, it is often done informally and the focus, particularly during supervision, is on data quality.

The M&E Guidelines for the Timor-Leste health sector are connected to the One Plan, One Budget, One M&E initiative. The M&E guidelines present a thorough framework and a common platform to monitor the progress of the National Health Sector Plan, and to help to link health

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6 https://www.measureevaluation.org/resources/publications/ms-17-117.html

plans at each level of the health system with evidence. The M&E Plan indicates that District Progress cards should be used quarterly, with results presented at District TWGs meetings and at the national level at biannual and annual health system review meetings. The M&E Guidelines also indicate that the M&E Working group should give feedback quarterly to districts after presenting it in Council of Directors meetings.

The National Health Sector Strategic Plan 2011–2030 has 320 health Indicators, which are required for reporting purposes. The M&E guidelines identified 87 key performance indicators: 35 for the national level, 32 for the municipality level, and 20 for CHCs and health posts. The national-level M&E Department generates key performance indicator results on a quarterly and annual basis to share with the Minister of Health and other program divisions.

At the subnational level, the M&E guidelines strongly recommend each program "should continue to monitor the progress regularly based on their respective M&E framework."[7] However most of the program divisions/departments track program indicators provided by the HMIS Department every quarter. Divisions ask the HMIS Department to provide additional program indicators on an as-needed basis. See Annex C for a list of indicator areas.

Data Use by MoH Divisions, Departments at the National Level

Reported data use was particularly strong at the central level, where data are used routinely for departmental planning and coordination. All national-level interviewees indicated that data collected by the HMIS Department are shared with program divisions, and the program divisions used the data to track the progress of their programs. All national-level departmental heads indicated that decisions about their department are informed by data. Progress against the key performance indicators is evaluated nationally, and the M&E Division in particular is responsible for sharing data to with the director general (chair of the cabinet for policy and planning) and the minister of health.

The HMIS Guidebook's workflow map (see figure above) suggests there should be a two-way flow, meaning data should flow up from communities, health posts, CHCs, and municipalities to the national level, and feedback and insights should be systematically cascaded back down to all reporting levels. However, in Timor-Leste, there is a tendency for the data and trends to stay at the national level; they are not regularly shared with municipalities, CHCs, or health posts. As a result, there are limited opportunities for information and insights to be systematically cascaded from the central level downward.

The Nutrition Department reported publishing a quarterly bulletin with relevant data for its department, which is shared at the central level with ministers and other national-level stakeholders.

Data collected and reviewed by the HMIS Department are shared every quarter with program department leadership. All program heads confirmed they are using the data to track the progress of their program and to inform planning, making decisions informed by data. However, there were varying examples of data use in action. The data is also shared with the M&E Division, and it is subsequently shared with the Director General and the Minister of Health. The

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[7] M&E Guidelines, page 17.
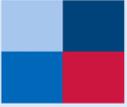
frequency of data use varied by department, ranging from monthly to quarterly and annual. The exception was the Surveillance Department and Directorate of Disease Control, which indicated that decisions are made using data on a daily basis.

The Nutrition Department reported publishing a quarterly bulletin with relevant data for its department, comparing performance against the National Health Sector Strategic Plan, which is shared at the central level with ministers and other national-level stakeholders.

Methodologies and approaches for data analysis and use varied significantly by department; however, a commonality among all departments is that data was used to track municipality progress against projections. The Maternal and Child Health, Immunization, and Nutrition Departments confirmed they were routinely tracking municipality progress against national-level projections. Examples of data use included that if municipality coverage for immunizations was low, the central level would design a plan to respond to the need to increase immunization coverage. As the Surveillance Department uses routinely collected data daily, the national director of disease control confirmed there were systems in place for the national level to track epidemiology data as part of its daily workflow. This process results in a daily analysis of outbreaks, and decisions on how to respond based on incidence and prevalence rate. Subsequently, the Surveillance Department informs the health minister, MoH directors, and other stakeholders about outbreaks. Similarly, the Directorate of Disease Control analyzes epidemiology data and subsequently structures responses based on the data. In situations where there are emerging needs or disease outbreaks, the Directorate of Disease Control will make more-extensive plans, and potentially allocate a larger budget for municipalities with higher caseloads.

The Director of Disease Control shared a specific example of its use of malaria epidemiology data for planning. The current director and her national-level members would categorize municipalities into different strata and would create a more extensive plan based on classification strata and allocate additional budgetary resources in Stratum 1, or high-priority municipalities, such as Bobonaro, Covalima, and Dili.

The Saude na Familia uses data from its own electronic platform, however it is relatively limited in terms of the reports it can produce. The Saude na Familia program director indicated he envisions his team having strengthend capacity to analyze the community-level and municipal-level trends and use the data to make program decisions related to primary health care and implementation of policies.

Target Creation and Tracking

Targets are created nationally and then cascaded to subnational levels. Municipalities share projections with all health posts. As of April 2022, the projections and targets for 2022 had not yet been shared. A few facilities suggested that the way that targets are created must be reviewed, as the denominators did not always represent their catchment area's reality. This results in indicators appearing to be over 100 percent, which compromises data quality and limits the motivation to analyze the indicator.

Data Use at Subnational Levels

Data analysis and use processes varied significantly by facility. One health post and two CHCs reported that they hold monthly meetings to review facility-level data. Another health post reported having a quarterly data review meeting, and another CHC indicated that data review meetings were held on an ad hoc basis.

For sites reporting using data, data use varied. For example, one CHC reported using data to track its performance. If performance scores are low, then they request support from the municipality and/or national level. Other CHCs are using data for supervision purposes to monitor health post performance. Another CHC reported using data to track vaccination coverage and to plan vaccination drives. Similarly, health posts indicated they were primarily tracking performance to projections, particularly for vaccination. Data is also shared with community leaders to build trust and gain support for community health promotion activities.

Interviewed health post and CHCs volunteered examples of how they were sharing data with communities and using data to advocate for changes or improved coordination for health promotion activities. For example, a Health Post doctor shared that "I share data with the community and with *suco* leaders to provide updates on the health situation and progress vs targets. This builds trust and gains support for health promotion activities [and] vaccination sweeping drives." A CHC manager indicated that "I conduct advocacy with community leaders and coordinate health promotion activities."

Nearly all subnational interviewees indicated they would appreciate more feedback related to data analysis and use, as feedback is primarily concentrated on data quality. For example, an HMIS manager suggested "I would appreciate feedback from the Municipality on my performance and achievements of [my] CHC." A CHC HMIS manager indicated they would like to send feedback and analysis more proactively to health posts, indicating "I would like to send feedback on achievements of health posts [in my catchment area]."

Data Visualization and Display at subnational Levels

Seventy-five percent of health posts displayed data visualizations of services delivered in 2021 versus projections or targets, particularly for maternal and child health and neonatal health. One health post displayed data about diseases reported at their facility. Several health posts displayed outdated visualizations (e.g., 2010–2011), suggesting the data visualizations were not in regular use. Out of all sites interviewed, only one CHC prepared data visualizations each quarter. This particular CHC presented In this case, the most updated data visualizations of quarterly data, and the visualizations were as created by hand and with graph paper versus using printed reports or visualizations.

Picture: Data visualizations varied significantly in each facility. The most up-to-date visualizations (i.e., with data within the last six months) were hand-drawn.

Data displayed	Number of health facilities displaying data from any time period	Displaying all visualizations with updated data (in the last 16 months)
4 health posts	3 health posts
2 CHCs	1 CHC

Among health posts and CHCs displaying data (n = 6), the most commonly displayed indicators were maternal health and immunization indicators.

COVID-19 Data Use

According to the Multilateral Leaders Task Force on COVID-19, 49.5 percent of the total population are fully vaccinated.[8] The data from this task force is from the WHO, World Trade Organization, Gavi, the World Bank, the United Nations Children's Fund, the International Monetary Fund, and Our World in Data.

Health posts and CHCs had informally established COVID-19 data use procedures, in which staff used data to ensure maximum vaccination coverage. None of the interviewed facilities indicated they had received training to analyze COVID-19 data. In most (five) of the interviewed facilities, COVID-19 vaccination data is used in review meetings to help inform vaccination campaigns, to follow up more effectively with patients requiring a second vaccine, and

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[8] Multilateral Leaders Task Force on COVID-19. (2020) *Timor-Leste.* World Bank. Retrieved May 31 2022 from https://data.covid19taskforce.com/data/countries/Timor-Leste

determine supply chain needs. All interviewed health posts and CHCs reported receiving feedback when there is a discrepancy in COVID-19 vaccination data.

Most interviewed health posts and CHCs indicated that COVID-19 data was being used to inform community outreach and vaccination planning, but access to and use of data at the municipal level varied. Municipalities can access national COVID-19 Vaccination Indicators at the COVID-19 Timor-Leste Dashboard. One municipality reported accessing national-level COVID-19 indicators via a Facebook page. Municipality-level interviewees indicated that COVID-19 vaccination data is reviewed routinely in meetings by directors, CHC managers, and other relevant internal and external stakeholders. Only two municipalities interviewed gave specific examples of how COVID-19 data was being used: one indicated that it uses data to identify patients requiring a second COVID-19 vaccination, and for planning vaccination drives. Another indicated they use COVID-19 data to identify COVID-19 patients and for contact tracing and polymerase chain reaction testing, but it was not clear how they were able to trace and contact the patient.

While there were some examples of data use on COVID-19 at the municipal level, there were challenges impeding broader data use initiatives. For example, some interviewed municipalities indicated they can receive data that a patient has received a positive COVID-19 PCR test but did not receive identifiable data about the patient, so they were unable to trace or contact the patient effectively via a phone number or address. Municipalities also indicated they faced challenges in identifying people who still need COVID-19 vaccination.

At the national level, the WHO plays an important role in data capture, dissemination, and coordination, as it is responsible for updating the Timor-Leste National COVID-19 Dashboard. The WHO is also responsible for sharing daily COVID-19 data with the Timor-Leste National COVID Secretariat, as well as other periodic COVID-19 reports. The WHO regularly shares COVID-19 data with other MoH stakeholders, including the director of policy, planning, and cooperation in health. In coordination with the WHO, the MoH COVID-19 response efforts include regularly organized meetings to analyze COVID-19 rates, vaccination coverage, the supply chain, and vaccine delivery issues.

Recommendations on Data Analysis and Use

For the full detailed list of MoH validated recommended activities and SMART sub-activities to achieve them, please see Annex A.

- **Update HMIS data dictionary for 24 existing reporting forms of TLHIS, ensuring alignment with the M&E Indicator Dictionary.** The description is shared in the data quality highlighted recommendations.

- **Create a paper-based and Excel-based data visualization template**. To promote having more-updated visualizations readily available at subnational levels, templates in Excel with sample data visualizations that have fields where data is ready to be enumerated can be made immediately available. However, access to printed documents, computers, or laptops should not be a barrier to having up-to-date visualizations. As many facilities do not have a computer, paper-based templates can also be created. Each template should be accompanied by clear directions on how it should be completed.
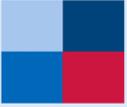
- **Capacity-building support to program divisions at national and subnational levels for data analysis, visualization, interpretation, and use for decision-making.** While the HMIS Department currently delivers a strong emphasis to focus on data quality, similar routine capacity-building efforts should be held in coordination with the M&E Department for data analysis and data use.

- **Build and promote a culture of data use through quarterly data use workshops at the national and subnational levels**. Quarterly workshops would offer a time to pause and reflect on performance versus targets; share data analysis, best data analysis, and data use practices; and promote a culture of data use.

Discussion and Next Steps

While the DACA interviews suggest low or limited levels of systematic data use at subnational levels, there were examples of data use and data sharing that are currently happening, and there is a strong desire to have more opportunities to initiate or further these activities. Some interviewees suggested that questionable data quality prevented broader data use efforts. Data accuracy was affected by the absence of standard operating procedures for HMIS data entry, both paper and electronic, and the lack of training and reinforcement on proper data entry techniques. Low knowledge of data quality methods and the lack of standard methodologies also affected data quality.

While data quality was a recognized issue and potential barrier to broader data use efforts, all interviewed subnational health posts had exceptionally meticulously kept paper reports, and there were high levels of HMIS completeness and timeliness of submitted reports. Of all municipalities reporting into the HMIS, 100 percent of facilities achieved reporting completeness. There were between seven to eight days delays for nine facilities, and four municipalities submitted on time.

While the use of RHIS data was limited, subnational-level interviewees indicated their need for standard methodologies, increased training opportunities, supportive supervision efforts, strengthened feedback loops, and routinely held forums for data use. Health posts generally offered the strongest examples of data use for coordination with communities.

Data use at subnational levels may be affected by limited feedback and performance information shared with CHCs and health posts. Feedback and performance reviews at the subnational level do not routinely occur. Data visualization and data displayed in facilities suggest that printed visualizations may get outdated quickly, especially if printing resources are not readily available. The most up-to-date visualization was a graph paper-based visualization that was completed manually, with data completed on a quarterly and annual basis. While trainings are held for subnational teams, trainings on data use do not frequently occur, and generally trainings are not cascaded down to CHCs and health posts.

The Recommended Actions in Response to the DACA, which were co-created and validated by the HMIS Department, are presented in Annex A, and provide insights on how to address the

DACA findings and ultimately strengthen Timor-Leste's capacity to analyze data for improved decision-making.
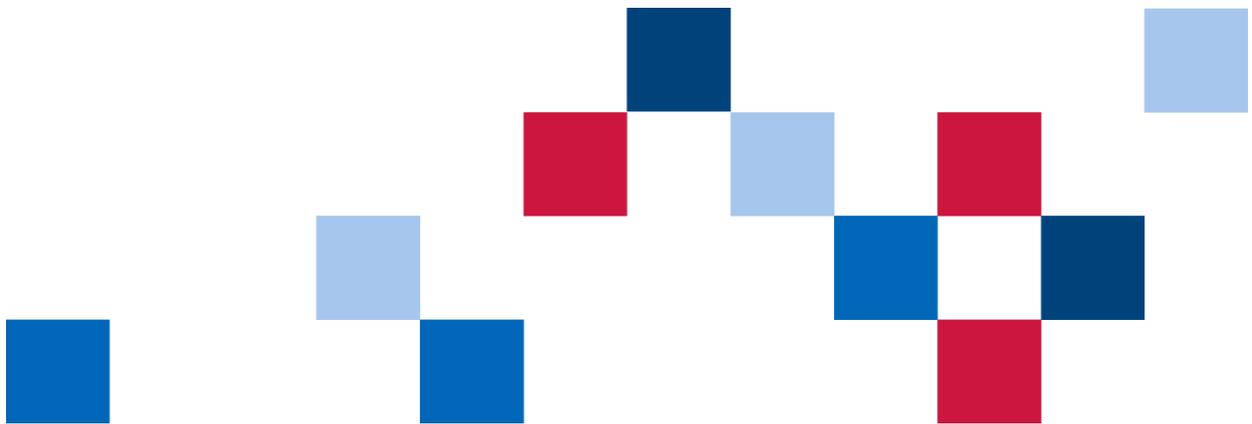
Annex A: Recommended Activities in Response to the DACA

	Activities To Achieve DACA Recommendations	Rationale	Assumptions and Dependencies	Suggested Timeline	Priority Level	Deliverable(s) or Means of Verification
Section 1: HMIS and HIS governance						
Recommendation 1.1: Activate HMIS TWG.						
1.1.1	Review or create the HMIS TWG scope, roles, and responsibilities.	The MoH has a significant governance, leadership, and stewardship role. Stakeholders must coordinate strategies and investments to ensure interconnected and interoperable health information platforms across the public and private sectors to facilitate the use of data in managerial and policy decisions.	MOH HMIS division willingness and commitment to reactivate the TWG. Dependency: HMIS TWG meeting must convene first with the revised scope and new members.	Q4 fiscal year (FY) 2022 (Jul–Sep 2022)	High	Circulation of TWG meeting minutes with stakeholders
1.1.2	Identify members from different departments of MoH and development partners. Assign a group leader and a notetaker. Establish meeting frequency.					
1.1.3	Schedule routine meetings or incorporate them into appropriate existing meeting spaces.					
1.1.4	Ensure meeting notes are documented and available. Share them with secondary stakeholders (internal and external to the MOH).					
1.1.5	Ensure coordination of HMIS TWGs with the eHealth Steering Committee.	The establishment of an eHealth Steering Committee was identified in the Timor-Leste eHealth Strategy. If this committee exists, the HMIS TWG should operate in coordination with it.	eHealth Steering Committee is operational. HMIS TWG to meet with the eHealth Steering Committee and identify how to coordinate.	Q1 FY 23 (Oct–Dec 2022)		Convene a joint meeting of HMIS TWGs with the eHealth Steering Committee.
Recommendation 1.2: Advocate for the creation of an HIS TWG.						
1.2.1	Identify internal and external stakeholders who should form part of the HIS TWG.	There is currently no formally established HIS interoperability planning TWG or actionable roadmap.		Q1 – Q4 FY 23 (Oct 2022–Sep 2023)	Moderate	Interoperability roadmap and action plan
1.2.2	Schedule routine meetings or incorporate them into appropriate existing meeting spaces.					

1.2.3	Ensure meeting notes are documented and available. Share notes with secondary stakeholders (internal and external to the MOH).					
1.2.4	Ensure coordination between HIS TWG and HMIS TWG with the eHealth Steering Committee.					
Recommendation 1.3: Capacity-building and mentoring support: Connect MoH HMIS Team with senior DHIS2 expert for TLHIS mentorship.						
1.3.1	Identify and partner with a regional DHIS2 specialist who can provide ongoing support and guidance to the MoH HMIS team to troubleshoot, mentor, and coach to strengthen TLHIS/ DHIS2 capacity.	The MoH HMIS team has limited Superuser skills and system access. For sustainability and strengthened national ownership, TLHIS administration and management should ideally be led from within the MOH.	MOH HMIS division's willingness for mentoring support in addition to WHO support	Q1 – Q4 FY 23 (Oct 2022– Sep 2023)	Moderate	Transition TLHIS governance to HMIS Superuser at MoH HMIS Team.
Recommendation 1.4: Develop a replicable, scalable training and continuous education program for health posts, CHCs, municipalities.						
1.4.1	Review and update existing in-person training agenda, training materials, and trainer resources and guides on data entry and reporting (paper and TLHIS), data quality, and data use. All materials must be in Tetum.	A standard HMIS trainings agenda is missing. Trainings are conducted on an ad hoc basis. Most of the interviewees are not trained on data definition, data quality, indicators, and data use.	Coordination with the HMIS division, M&E Department, and WHO, and other key stakeholders	Q3 FY 23 (Apr–Jun 2023)	High	Updated training plan, training agenda, and training material for competency-based cascade trainings
1.4.2	Develop a competency-based training plan for cascade mode training that identifies the skill sets and level of competencies for different levels of HMIS officials and health facility officials.	HMIS officials and health facility staff involved in HMIS reporting need different skill sets as per their role. For example, doctors and nurses responsible for reporting need to understand data definitions and reporting forms. CHC HMIS managers need additional training in competencies like TLHIS data entry and the data validation module.				

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1.4.3	Based on updated training materials, develop short modules for each topic (e.g., data entry for a particular form) that can be easily shared via commonly used communication platforms, like WhatsApp. Each module should be converted into a short audio and video format.	MOH experiences the impact of attrition and personnel changes. Relying on in-person trainings can be expensive, time-consuming, and potentially disruptive for service delivery. Additionally, it can be difficult to follow up with trainees post-training, which is critical for reinforcing training concepts.	Updated training material and resources	Q4 FY 23 (Jul–Sep 2023)		Updated training material and resources, training modules
1.4.4	Deploy refresher trainings and short audio/video courses for CHC and municipal-level HMIS officers on the use of TLHIS.		Knowledge hub to post and share short audio/video courses	Q4 FY 23 (Jul–Sep 2023)		
Recommendation 1.5: Continue study tours for HMIS governance and DHIS2-based data use						
1.5.1	Identify key stakeholders to participate in the study tour. Certain participants should focus on DHIS2 administration and maintenance, focusing on understanding the leadership role the MoH must take to administer and maintain its DHIS2 instance.	Study tours to Sri Lanka have already taken place for key HMIS members. Continued study tours would be useful to continue promoting professional growth and bringing international best practices to Timor-Leste.	Identify optimal DHIS2 site for visit	Q3 FY 23 (Apr–Jun 2023)	Low	Post-visit competency test of participants of the study tour
Section 2: Information, Products, and Dissemination for Data Use						
Recommendation 2.1: Update HMIS guidelines on HMIS reporting channels (data flow, reporting process, data entry, data verification, feedback loops, and data use)						
2.1.1	Jointly review and update the HMIS guidelines on reporting channels with the MoH HMIS division. Guidelines have sections on HMIS reporting, data management, HMIS data quality, and data use.	Addresses the need for standard processes for both paper-based and TLHIS reporting channels (data entry, reporting, data quality, feedback loops, data use).	Coordination with the HMIS division, M&E Department, WHO, and other key stakeholders	Q1 FY 23 (Oct-Dec 2022)	Moderate	An approved version of HMIS guidelines on reporting channels
2.1.2	Design a graphic to depict the TLHIS workflow throughout the data value chain and incorporate it into the HMIS Guideline.	The Timor-Leste MoH team depends heavily on memorized processes on what is supposed to happen at what point. A unifying visual to understand the general process and what needs to happen would help ensure alignment and				

		clarity on the process and expectations for each level.				
2.1.3	Create a new section in the HMIS guidelines to include standard operating procedures on data management. HMIS guidelines include data management standard operating procedures, including data validation and data recovery, data review and data use, including feedback loops.	Currently, the process for data validation is primarily conducted by memory for paper-based reporting, and documented processes are not used. There are data validation rules in the TLHIS but there is not a standard operating procedure on how they should be deployed.				
2.1.4	Review existing feedback loops with HMIS and M&E Department and create educational materials and job aids to facilitate feedback loops defining what information should be incorporated into the feedback at each level.	Feedback loops technically exist in the HMIS data flow; however, they rarely happen, or if they do, feedback is delivered in different ways by different people, and there is not a clear standard of what should be incorporated into feedback.				
2.1.5	Obtain approval of TWG on updated HMIS guidelines on reporting channels (data flow, reporting process, data entry, data verification, feedback loops, and data use).	Existing guidelines are outdated, are not well known, and the circulating copy still appears as a draft and has not been formally published.	Reinstation of HMIS TWG	Q1 FY 23 (Oct-Dec 2022)	Moderate	
2.1.6	Disseminate HMIS guidelines in Tetum with internal and external stakeholders using scalable training approaches.	Existing guidelines are in English and have limited readership.	Approval of TWG on updated HMIS guidelines on reporting channels	Q2 FY 23 (Jan–Mar 2023)	Moderate	Use of HMIS guidelines in trainings
Recommendation 2.2: Develop an online knowledge management hub for HMIS and M&E.						
2.2.1	Develop or refresh an appropriate, existing online site where subnational staff can readily access resources related to HMIS and M&E. Resources should be able to be easily downloaded and shared.	HMIS team at the subnational level are not familiar with where to access resources, such as the M&E manual or HMIS Guideline.	Identification of MOH-owned site/platform for resource sharing	Q4 FY 23 (Jul–Sep 2023)	Low	HMIS resources developed in Phase 1 and 2, like HMIS guidelines, data dictionaries, and Indicator dictionaries, shared through MoH owned site/platform
Section 3: Interoperability for Data Use						
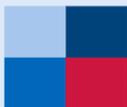
Recommendation 3.1: Update the Timor-Leste Interoperability Roadmap and Action Plan.

3.1.1	Identify critical stakeholders and convene interoperability TWG.	The vision for the Timor-Leste Interoperability Plan exists in the country's One Plan, One Budget, One Monitoring and Evaluation initiative, as well as in the eHealth Strategy. However, there has been limited success in operationalizing this vision. Work is under way in June and July by the WHO to achieve interoperability between the HRIS and TLHIS. However, there is a need to accelerate efforts to achieve improved interoperability and to address holistic interoperability needs.	Collaboration among MOH, other government agencies development partners, and other stakeholders	Q1 FY 23 (Oct–Dec 2022)	High	Timor-Leste Interoperability Roadmap and Action Plan
3.1.2	Validate the revised interoperability roadmap with key stakeholders and with a Health Information Exchange expert to accelerate interoperability between identified systems and align with global best practices.					
3.1.3	Receive technical assistance from a Health Information Exchange expert to implement an interoperability roadmap.					

Recommendation 3.2: COVID-19: Configure the weekly vaccine summary distribution list into the COVID-19 DHIS2 instance.

3.2.1	Configure or update the weekly vaccine tracker in DHIS2 (COVID-19 instance).	There is currently a shadow system in Excel that is being used to report weekly vaccine distribution. This is creating additional work, as subnational levels need to report using both the Excel and COVID-19 tracker in DHIS2.	There may be a program in DHIS2 that is already configured to capture and report this data; however, this needs to be confirmed and updated. Collaboration with WHO	Q1 FY 23 (Oct–Dec 2022)	High	Vaccine tracking data entry module in TLHIS COVID-19 application
3.2.2	Import historical COVID-19 data.					

Recommendation 3.3: Explore merging the COVID-19 DHIS2 tracker into the TLHIS.

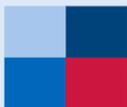|						
3.3.1	Meet with the WHO to understand why there was a deliberate separation between the COVID-19 tracker and the TLHIS	Currently, the COVID-19 DHIS2 tracker is housed in a separate DHIS2 instance than the TLHIS. The reason why the WHO separated the COVID-19 tracker from the TLHIS during the original configuration is unknown. This	This activity must be coordinated with the WHO as the original developers of the COVID-19 tracker in DHIS2, the MoH COVID-19 department, and the HMIS department.	Q1 FY 23 (Oct–Dec 2022)	High	Integrated TLHIS with COVID-19 tracker
3.3.2	If appropriate, create a plan to merge the COVID-19 tracker into TLHIS.					
3.3.3	If approved, provide technical assistance to					

configure and transition the tracker into TLHIS.	confuses subnational-level data entry officers on why there are two different DHIS2 instances. It would also potentially streamline data entry at subnational levels if the COVID-19 tracker were merged into the TLHIS. Replicable trackers could also be created for other communicable diseases and for vaccinations within the DHIS2.					
Section 4: Data Entry and Management						
Recommendation 4.1: Create action plan to transition from paper-based reporting to TLHIS.						
4.1.1 Internal workshop with MoH HMIS team outlining specific steps needed to transition from paper to electronic reporting, timelines, and milestones	TL's HMIS depends heavily on paper-based reporting, which is affecting data quality (completeness, timeliness, and accuracy). The pathway and timeline for a full transition to electronic data entry in the TLHIS from the CHC level and above are unclear. Unreliable internet connection at CHCs is a problem.	Coordination with the MoH and WHO for technical support on TLHIS	Q1 FY 23 (Oct–Dec 2022)	High	Approved roadmap and action plan to transition from paper-based reporting to TLHIS
4.1.2 The plan includes technically feasible options for offline reporting in TLHIS, like a mobile module or web-based offline reporting.					
4.1.3 HMIS TWGs meeting to validate roadmap and action plan to transition from paper-based reporting to TLHIS		Reinstation of HMIS TWG			
4.1.4 Provide technical assistance to MoH HMIS Department to implement the action plan to transition from paper-based reporting to TLHIS		HSSA team members work closely with the MoH HMIS team as embedded staff	Q1 – Q4 FY 23 (Oct 2022– Sep 2023)		100 percent facilities reporting on TLHIS
Recommendation 4.2: Transition of TLHIS server ownership to MoH						
4.2.1 Explore with TIC (along with the information communication technology division of MoH opportunities to deliver TLHIS hosting support and information technology support.	The TLHIS server has been and is currently hosted by a third-party server. For sustainability purposes and strengthened MoH ownership, the TLHIS server should be transitioned to the MOH.	MOH HMIS division in-house capacity to troubleshoot and maintenance of TLHIS. TIC capacity to provide server maintenance support. Support from the MoH Information, Communication, and Technology division	Q4 FY 23 (Jul–Sep 2023)	Low	The transition of TLHIS server to TIC server / ICT division of MoH server

Section 5: Data Quality					
Recommendation 5.1: Update HMIS data dictionary for 23 existing reporting forms of TLHIS					
5.1.1	In collaboration with the program, the division updates the HMIS data dictionary which defines all data elements of 23 TLHIS reporting forms. Their data source and guidelines for recording. Translate HMIS data dictionary in Tetun	Doctors, nurses, and midwives who record the data in the recording register and compile the HMIS report every month have limited understanding of data definitions which leads to inaccurate data reporting	Collaboration with different program divisions Example: for tuberculosis and HIV from collaboration with the Directorate of Disease Control, for monthly and weekly surveillance form collaboration with the Surveillance Department	Q4 FY 22–Q1 FY 23 (Jul–Dec 2022)	High	Updated HMIS data dictionary
5.1.2	Disseminate HMIS data dictionary (Tetun) with internal and external stakeholders using replicable training approaches	Existing data definitions are in English. Not understood by the majority of persons responsible for report compilation	Consensus on data definitions and guidelines from each concern program division.	Q1 FY 23 (Oct-Dec 2022)		Use of HMIS data dictionary in trainings
Recommendation 5.2: Support the MoH to institutionalize regular Routine Data Quality Assessments at Municipality and CHC level					
5.2.1	Jointly customized existing Routine Data Quality Assessment tools for specific target audiences (ex: HMIS manager at CHC and municipal levels), and at which specific point the tool should be used to assess HIS management including data quality and data use	The existing Routine Data Quality Assessment tool is not in use by HMIS managers at CHC and municipal levels	Routine Data Quality Assessment is included in the JD of HMIS manager at CHC and municipal levels	Q3 FY 23 (Apr-Jun 2023)	Moderate	Revised Routine Data Quality Assessment tool for HMIS manager at CHC and municipal levels
Recommendation 5.3: Support a data reconciliation and data review workshop to improve data quality					
5.3.1	Quarterly workshop conducted by MoH HMIS team for municipality HMIS officers, subsequently by municipality officers for CHC HMIS managers. In these workshops, HMIS officers get acquainted with standard operating procedures of data validation and data recovery and data review. Participants will discuss potential reasons for data	Currently, data quality issues and data discrepancies are managed by CHC and HMIS officers individually on a case-by-case basis. The data reconciliation workshop will promote the use of SOPs and peer learning from each other's experience	Approved standard operating procedures of data validation and data recovery, data review	Q2–Q4 FY 23 (Jan–Sep 2023)	High	One day Workshop (ongoing activity every quarter) Municipality action plan to improve data quality Meeting minutes of quarterly data reconciliation/review workshop

	discrepancy and ways to address it.					
5.3.2	In the workshop, municipalities will share Routine Data Quality Assessment findings and formulate an action plan to improve the data quality.	There is an expressed need to convert Routine Data Quality Assessment findings into action to improve data quality	Routine Data Quality Assessment completed by HMIS managers of CHC and Municipality			

Section 6: Data Use

Recommendation 6.1: Update HMIS Indicator Dictionary for 23 existing reporting forms of TLHIS

6.1.1	Update the HMIS Indicator dictionary for data elements collected through 23 reporting forms of TLHIS. The dictionary will identify the feasible mathematical formula, periodicity, levels, and denominators for the indictors.	M&E guidelines have a list of key indicators and program indicators. However, more than 75 percent of data elements are not converted into indictors and hence not used	Consensus on indicator definition and mathematical formula from each concern program division.	Q1 FY 23 (Oct-Dec 2022)	High	Use of HMIS Indicator dictionary in training on data use
6.2.2	Create the data elements and indicators of "HMIS data dictionary" in TLHIS	The list of indicators in TLHIS is incomplete	MOH has user rights to create indicators in TLHIS	Q1 FY 23 (Oct-Dec 2022)		Complete list of indicators in TLHIS

Recommendation 6.2: Create a paper-based and Excel-based data visualization template

6.2.1	With the guidance of the M&E Department, create, disseminate, train, and supervise the use of Excel-based data visualization templates for the national level (Program divisions) subnational teams (municipalities, CHCs, health posts) can begin using them immediately every month. If Excel is not available at the facility, there should be a paper template that uses aggregated data from paper registers.	TLHIS has a data visualizer module that can be used to generate charts and graphs. Data in TLHIS cannot be used for data visualization as it is incomplete. Excel-based templates help to build data visualization and use culture.	Availability of data/ program indicators to be used in a template	Q4 FY 22 – Q4 FY 23 (Jul 2022 - Sep 2023)	High	Ongoing activity transitioned from Excel to TLHIS data visualizer as the data quality improve overtime

Use of data visualization template by program divisions and subnational teams (municipalities, CHCs, health posts) |

Recommendation 6.3: Capacity-building support to program divisions at national and subnational levels for data analysis, visualization, interpretation, and use for decision-making

6.3.1	Design and deliver capacity-building support to each program division (maternal and child health/ Immunization/ Family planning/ disease control etc.) for the analysis of relevant program indicators	Data use is limited at the national and subnational levels. Data analysis is done on an ad hoc basis and shared in a review meeting. Data interpretation and use	Coordination with program division heads. Engagement of program directors in the municipality	Q4 FY 22 – Q4 FY 23 (Jul 2022 - Sep 2023)	High	Use of data by program divisions in decision-making

	using a data visualization template. Assist the program teams in data interpretation of data and using data decision-making and planning.	in planning and decision-making are minimal due to a lack of data interpretation skills.				
6.3.2	Identify and constitute a team at municipalities that include HMIS managers and program directors to build synergy on data use. Capacity-building support to the team on the analysis of program relevant indicators, and data visualization. Assist the team with the interpretation of data and use of information for tracking the progress of CHCs, planning, and resource allocation.					
Recommendation 6.4: Strengthen and promote a culture of data use through quarterly data use workshops at the national and subnational levels						
6.4.1	Quarterly Workshop at the national-level for municipality HMIS managers, directors, and program managers to discuss indicators, municipality analyzed data, and experience sharing on how they are using the data for decision-making	Data use is occasional. It is critical to build a culture of data use and promote peer learning	MOH HMIS division will lead the workshop	Q3 FY 23 (Apr-Jun 2023)	Moderate	One day workshop (Ongoing activity) Monthly activity plan of CHCs and health posts based on data
6.4.2	Quarterly workshops at the municipality level for CHC managers and health post in charge of interactive sessions in which they used their facility data to make a monthly activity plan for their respective facilities					
6.4.3	Identify and facilitate quarterly data use champions- at health post, CHC, and municipality levels in these workshops. This person should be recognized with a photo and caption in the HMIS bulletin, highlighting what they did specifically to improve data quality or data use on their respective site.					

6.4.4	Support MoH HMIS team to initiate and disseminate HMIS quarterly bulletin which has updates on activities conducted to promote data use, best practices, success stories, and facilitation of champions	It can be helpful and motivational for the HMIS department to share key advances and highlight data use champions in a bulletin that is shared with national and subnational stakeholders.	Regular quarterly workshops on data quality and data use	Q3 FY 23 (Jul–Sep 2023)	Ongoing	One day workshop (Ongoing activity) Publication of quarterly bulletin

# Annex B: DACA Questionnaire

Health Post and CHC Level Questionnaire

<table>
<tr><td colspan="2" align="center">**Timor-Leste – Data Analysis Capacity Assessment**
Health Facility Questionnaire</td></tr>
<tr><td>Date of Survey</td><td></td></tr>
<tr><td>Name of the Facilitator/Interviewer</td><td></td></tr>
<tr><td>National/region/state/province</td><td></td></tr>
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<tr><td>Location of the health facility</td><td></td></tr>
<tr><td>Name of person interviewed</td><td></td></tr>
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Good day! My name is _____. We are here on behalf of Abt Associates' Timor-Leste Health System Sustainability Activity. We are conducting a survey to help the government know more about the performance of the RHIS in Timor-Leste. Your health facility was selected to participate in this study. We will be asking you questions about various health services and routine reporting. This information may be used by the MoH and by the Health Systems Strengthening Activity, organizations supporting health services, and researchers, to plan service improvements or to conduct more studies of health services. Neither your name nor the names of any other respondent participating in this study will be included in the data set or in any report. We are asking your help to ensure that the information we collect is accurate. You may refuse to answer any question or choose to stop the interview at any time. However, we hope you will answer all of the questions, which will benefit the clients you serve and the nation. If there are questions that would be more accurately answered by someone better informed of any specifics we ask about, we would appreciate if you would introduce us to that person to help us collect any missing or incomplete information.

<table>
<tr><td colspan="2">**Data reporting and data flow**</td><td></td></tr>
<tr><td></td><td>How does the facility record services provided?</td><td>1. Paper
2. Digital (if yes, indicate by email or TLHIS)
3. Both
4. Services are not recorded</td><td></td></tr>
<tr><td></td><td>What is the mechanism for submitting a Report to municipality /CHC?</td><td>1. By hand
2. Email
3. TLHIS</td><td></td></tr>
<tr><td></td><td colspan="2">Please share what registries you are reporting</td><td></td></tr>
<tr><td>**Purpose (type of information recorded)**</td><td>**Yes/No**</td><td>**Name of register**</td><td>**Frequency**
If respondent doesn't immediately know, skip question</td></tr>
</table>
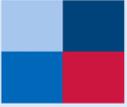
1. General outpatient department (outpatient department) services			a. **W**eekly b. **M**onthly **Q**uarterly **A**nnual Ad hoc
2. Inpatient services			
3. Immunization services			
4. Family planning (family planning) services			
5. Maternal health services			
6. Child health services			
7. Tuberculosis (TB)			
8. HIV/AIDS			
9. Malaria			
10. COVID-19			
11. Other specific disease(s)			
11. Nutrition services			
12. Notifiable diseases/ integrated disease surveillance and response (IDSR)			
13. Financial information			
14. Medicines, vaccines, contraceptive stock/supply			
15. Human resources (HR)			

16. Equipment				
17. Capital assets				
18. Vital events				
Other:				

Data quality			
	Does this facility have a designated person responsible for entering data/compiling reports?	1. Yes 2. No	
	What is the title of the designated person for entering data/compiling reports?	Comments/free text	
	Is this person trained on data definitions and data recording processes?	1. Yes 2. No	
	Is there a documented directive or guidelines from the municipality on how to assess data quality?	1. Yes 2. No 3. Not sure	
	Did the person responsible for reporting receive training on data quality (on validation checks, accuracy, completeness, timeliness)?	1. Yes 2. No 3. Not sure	
	What checkpoints are in place to review and improve data quality?	Comment/free text:	
	How frequently do you check data quality and accuracy?	1. Weekly 2. Monthly 3. Quarterly 4. Annually 5. Every time I enter data	
	Do you receive feedback from the Senior Management at the municipality office on the data quality of the reports (accuracy, completeness, and Timeliness)?	1. Yes, Regularly 2. Yes, Randomly 3. No	
	Do you think data quality can be improved?	Yes (if yes, comment on how) No	
Governance			
	Do you know if there is a data dictionary that defines indicators or data entry fields?	1. Yes 2. No	

	Do you have clearly defined roles and responsibilities as they relate to reporting and data entry?	Yes No	
	Does a procedure manual for reporting and roles and responsibilities exist? (i.e. M&E guideline)	1. Yes 2. No	
	Do you know how to access the document is that describes your role & responsibilities within the HMIS?	2. Yes 3. No	
	Have you ever been trained on facility-level roles and responsibilities as they relate to HMIS?	1. Yes 2. No	
	Do you enter data directly into Timor-Leste HMIS (i.e. electronically)?	1. Yes 2. No	
	If yes, what do you do when you cannot access TLHMIS (DHIS2)?	Comment/ free text	
Data use and analytics			
	Do you have any facility-related targets?	Yes; Internally established by health facility Yes; Municipal-issued targets No	
	Do you receive prepared data visuals showing achievements toward health targets?	Yes, paper or electronic copies of data visuals observed No – skip next four questions	
	If yes, what type of information is captured in the data visuals?		
	COVID-19	Yes, observed (confirm what software) No	
	Maternal health care	Yes, observed (confirm what software) No	
	Neonate and child health care	Yes, observed (confirm what software) No	
	Top causes of morbidity and mortality	Yes, observed (confirm what software)	

		No	
	Other (specify)		
	How often does your facility meet to review facility-level data?	*Can select multiple options* Daily Weekly Monthly Quarterly Annually Ad hoc	
	What kinds of program decisions are made in your team where you use data?	Comments/free text	
Questions for Facility Director			
	How do you use this data to improve the facility's performance	Comments/free text	
	There may be decisions related to where to provide services or how to allocate resources or plan for new activities. How are decisions like these made in your facility?	Comments/free text	
Interoperability			
	Other than the data you enter into the HMIS, is there any other data that you would like to see, analyze, or learn from? (ex: disease surveillance vs facility use, supply chain)	Comment/free text:	
COVID-19 questions			
Reporting			
	Does this facility record and share COVID-19 related services provided at the facility and outreach?	1. Paper 2. Digital 3. Both 4. Services not recorded	
	How often are the COVID-19 reports sent to higher-level MoH offices (CHC/municipality)?	Daily Weekly Fortnightly Monthly Ad hoc	
Governance			

	Is there a designated person who compiles and sends the COVID-19 report?	Yes No	Title:
	Is this designated person for COVID-19 reporting the same as the person responsible for HMIS reporting?	Yes No	
	Is there a procedure manual or written guidance for COVID-19 data collection/definitions?	Yes No	
	Is the designated person trained on COVID-19 data definitions and data recording procedures?	Yes No	
Data quality			
	Is the designated person trained on data quality for COVID-19 related data?	Yes No	
	Did the facility Manager receive feedback from the Senior Management municipality office on the data quality (accuracy, completeness, and timeliness)?	1.Yes, Routinely 2.Yes, Randomly 3.No	
Data use			
	Are there specific meetings where COVID-19 related data is analyzed?	Yes No	
	How is COVID-19 data used (respond in the areas below)?		
	Identification of people who need vaccination	Yes No	
	Planning for vaccination drive	Yes No	
	Identification of COVID-19 patients	Yes No	
	Contact tracing	Yes No	
	PCR Testing	Yes No	
	Has training been provided by the municipality on how to analyze or use COVID-19 related data?	Yes No	
	What kind of training would you like to receive on analyzing or using COVID-19 related data?	Comment/free text	

Municipal-Level Questionnaire

<table>
<tr><td colspan="2" align="center">**Timor-Leste – Data Analysis Capacity Assessment**
Municipal Questionnaire</td></tr>
<tr><td>Date of Survey</td><td></td></tr>
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Good day! My name is _____. We are here on behalf of Abt Associates' Timor-Leste Health System Sustainability Activity. We are conducting a survey of municipalities to help the government know more about the performance of the RHIS in Timor-Leste. Your municipality was selected to participate in this study. We will be asking you questions about various health services and routine reporting. This information may be used by the MoH and by the Health Systems Strengthening Activity, organizations supporting health services, and researchers, to plan service improvements or to conduct more studies of health services. Neither your name nor the names of any other respondent participating in this study will be included in the data set or in any report. We are asking your help to ensure that the information we collect is accurate. You may refuse to answer any question or choose to stop the interview at any time. However, we hope you will answer all of the questions, which will benefit the clients you serve and the nation. If there are questions that would be more accurately answered by someone better informed of any specifics we ask about, we would appreciate if you would introduce us to that person to help us collect any missing or incomplete information.

Assessment review months	
Enter the three review months that will be used during this assessment	
Month 1	List month, year
Month 2	List month, year
Month 3	List month, year

Data reporting and resources for data assessment		
	How many facilities does this municipality cover?	Hospitals: Health facilities: Private clinics:	
	How many facilities are submitting paper reports?	Hospitals: Health facilities: Private clinics:	
	How many facilities are reporting electronically?	Hospitals: Health facilities: Private clinics:	
	How many facilities are enrolled in the TLHIS?	Hospitals: Health facilities: Private clinics:	

	Does the municipality have a designated person responsible for entering data/compiling reports from health facilities?	Yes No	
	Does the municipality have a designated person to review the quality of compiled data prior to submission to the next level, e.g., to the national HMIS?	1. Yes 2. Partly (the data are reviewed but no one is designated with the responsibility) 3. Not at all	
	Does the municipality have written guidelines for Data entry/compilation?	Yes No	
	Does the municipality have written guidelines for Data review and quality control?	Yes No	
	Are designated staff trained on Data entry/compilation?	1. Yes (staff have received training in the past two years) 2. Mostly (all staff have received training but not in the past two years) 3. Partly (some staff have received training) 4. Not at all	
	Are designated staff trained on Data review and quality control?	1. Yes (staff have received training in the past two years) 2. Mostly (all staff have received training but not in the past two years) 3. Partly (some staff have received training) 4. Not at all	
	Does the municipality receive feedback from national HMIS office on the data quality of the reports (accuracy, completeness, and Timeliness)?	1. Yes, Regularly 2. Yes, Randomly 3. No	

Data quality – Completeness of health facilities reporting to districts			
	Does the district keep copies of monthly HMIS reports (paper-based or electronic) sent by the health facilities?	1. Yes, paper-based copies only 2. Yes, electronic copies only 3. Yes, both paper-based and	

		electronic copies (all health facilities submit both types of reports) 4. Yes, mixed (some health facilities submit paper-based reports; others submit electronic reports) 5. No	
	If health facilities are not submitting monthly RHIS reports, what are the possible reasons for this?	1. Storage or archiving problems 2. Staffing issues 3. Absence of reporting forms 4. Transportation issues 5. Internet connectivity issues 6. Presence of other vertical reporting requirements 96. Other (specify)	

Data quality - Timeliness			
	Is there a deadline for submission of the monthly RHIS report by the health facilities?	Yes No (skip to next question)	
	If yes, what is the reporting deadline?		
	If yes, how many facilities reported on time (before or on the deadline)?		
	Does the municipal office keep a record of its submissions of monthly aggregated HMIS reports to regional and/or national offices?	Yes No	
	For the last 3 months, have routine HMIS reports been submitted on time?	Yes No	
	If not, why was there a delay in submission	1. Storage or archiving problems 2. Staffing issues 3. Absence of reporting forms 4. Transportation issues 5. Internet connectivity issues	

		6. Presence of other vertical reporting requirements	

Data quality			
	Does the municipality have written guidelines on routine health data quality assessment/assurance? (OBSERVE)	1. Yes, observed 2. No	
	Is there a written procedure to address late, incomplete, inaccurate, and missing reports from the facility level?	Yes No	
	Does the municipality conduct data quality assessments at health facilities?	1. Yes 2. No (skip questions in this section)	
	Does the municipality maintain a record of health facility data quality assessments conducted in the past 12 months? (OBSERVE)	1. Yes, observed 2. No	
	Does the municipality maintain a record of feedback to health facilities on data quality assessment findings? (OBSERVE)	1. Yes, observed 2. No	
	Do you think data quality can be improved?	Yes (if yes, comment on how) No	
	If respondent answered yes, what do you think are the greatest barriers to achieving improved data quality?	Comment/free text	

Governance			
	Do you know if there is a data dictionary that defines indicators or data entry fields?	Yes No	
	Do you know if a RHIS TWGs exists at the national level?	Yes No	
	Do you know how to access the document is that describes your role & responsibilities within the TLHIS?		
	Have you ever been trained on Municipal-level roles and responsibilities as they relate to TLHIS?		
	If the TLHIS is not working, what kind of support do you receive?	None Phone call WhatsApp or chat	

		In-person support Other:	

Data use and analytics			
	Do you have any municipality and facility-related targets?	Yes, municipal-established targets Yes, centrally established targets No	
	Does the municipality have access to analyzed HMIS data (ex: summary tables, charts, maps)?	Yes, observed paper-based Yes, observed electronic No	
	Does the municipality produce any report or bulletin (annual, quarterly) based on the HMIS analysis? *Exclude monthly summary/aggregate reports submitted to national level*	Yes, observed No – skip following questions	

Title of report	**Number of times this report should be issued per year**	**Number of times this report was actually issued in the last 12 months**	**Target audience**	

	Do any reports or bulletins contain discussions and decisions/recommendations based on key performance targets and based on HMIS data? Examples:		
	Hospital/health center performance indicators	Yes No	
	Disease data (ex: top ten diseases)	Yes No	
	COVID-19 data	Yes No	
	Identification of emerging issues/epidemics	Yes No	
	Medicine stock outs	Yes No	
	Sex-disaggregated data	Yes No	
Feedback to facilities			

	Did the municipality send feedback reports using RHIS information to health facilities in the past three months?	Yes No	
	If yes, indicate the types of feedback reports		
	Feedback on data quality (data accuracy, reporting timeliness, and/or report completeness)	Yes, observed No	
	Feedback on service performance based on reported RHIS data (ex: appreciation/acknowledgment of good performance, resource allocation/mobilization)	Yes, observed No	
	What kind of information or reports would you like your municipality to share with facilities that is currently not being shared?	Comment/free text	
	What is the barrier to delivering this information or report to the facility?	Comment/free text	
Routine decision-making forums and processes at the municipal office			
	Does the municipality have a performance monitoring or management team?	Yes No	
	Does the municipality have routine team meetings to discuss performance monitoring and management?	Yes No	
	If yes, How often are performance review/management meeting supposed to take place?	Weekly Monthly Quarterly Biannually Annually No schedule	
	If yes, How many times did the performance monitoring/management meetings take place during the last three months?	More than four times Four times Three times Two times One time Not once	
	If yes, Were minutes or meeting notes recorded during these meetings?	Yes No	
	If yes, were there discussions on RHIS management, such as data quality, completeness, or timeliness?	Yes No	
	If yes, have they made any decisions based on the discussions of RHIS	Yes No	

	related issues (including no interventions required at this time)?		
	If yes, Were performance review/management meeting minutes circulated to all members of the M&E team?		
Annual planning			
	Does the municipality have an annual plan for the current year?	Yes No	
	Does the annual plan use data from the RHIS for problem identification and/or target setting?	Yes No	

Data use and analytics			
	Are you analyzing data from different data sources (ex: TLHMIS, logistics, surveillance, etc.)?	Yes No	
	Is there data that could be integrated into the TLHMIS that would be useful for your work?	Yes (share examples): No	

COVID-19			
Reporting			
	How many facilities in the Municipality /CHC must send COVID-19 related reports?	Number:	
	How frequently should facilities be sending COVID-19 related data?	Daily Weekly Monthly Biannually Annually	
	How often does this municipality send COVID-19 related data to the national level?	Weekly Monthly Biannually Annually	
	How does the municipality send COVID-19 related reports to the national level?	By hand Email TLHIS (DHIS2) Other (Describe):	
Governance			
	Is there written guidance on how COVID-19 related data should be reported and sent (ex: data dictionary, reporting guidance)?	Yes No	
	If yes, Have all facilities received the COVID-19 reporting guidance?	Yes No	

	Has this municipality provided training to all facilities on COVID-19 related reporting?	Yes No	
	Have you received training on TLHIS (DHIS2) COVID HMIS reporting?	Yes No	
	Do you provide regular feedback to facilities to plan COVID-19 related activities based on reports and TLHIS data?	Yes No	
Analysis and use			
	How do you receive COVID-19 dashboards and/or indicators from the national MOH?	Paper reports Emailed documents (ex: Excel) TLHIS Other (describe)	
	Do you find the current COVID-19 dashboards easy to use and analyze?	Yes No (describe desired improvements)	
	Are there specific meetings where COVID-19 related data is analyzed by your municipality?	Yes No	
	If yes, list which meetings		
	How is COVID-19 data used (respond in the areas below)?		
			Has training been provided?
	Identification of people who need vaccination	Yes No	Yes No
	Planning for vaccination drive	Yes No	Yes No
	Identification of COVID-19 patients	Yes No	Yes No
	Contact tracing	Yes No	Yes No
	PCR Testing	Yes No	Yes No
	Has training been provided by the municipality on how to analyze or use COVID-19 related data?	Yes No	
	What kind of training would you like to receive on analyzing or using COVID-19 related data?	Comment/free text	
	What are the challenges you face in using COVID-19 related data for patient tracking?	Comment/free text	
	How would you like to use COVID-19 related data for planning?	Comment/free text	

National-Level Questionnaire

Date of Survey	
Name of the Facilitator/Interviewer	
central/region/state/province	
Name of person interviewed	
Title of person interviewed	
Department or division of person interviewed	

1. **Data flow and data entry**
   1. How does the national HMIS share registers and reports to municipalities and facilities?

   2. How are municipalities and facilities trained on new reports and registers?
      - Probe: How often are trainings conducted?
      - Probe: what resources and trainings do new data entry officers receive

   3. What guidance or manuals exist so facilities and municipalities know what data collection standards, expectations, and roles and responsibilities are?
      - Probe: where can these be accessed?

   4. Is there a specific person at the national level who is responsible for data / compilation and verification?
      - Probe: What is the title/responsibility of that person?

   5. How does the national HMIS receive data from municipalities?
      - How many are reporting using paper forms?
      - How many are reporting electronically?

   6. Are there ways you would like to improve the way data is collected from facilities or municipalities?

2. **Software**
   7. What are the different software that the HMIS uses for data management and analysis?

   8. What kind of training did you receive on TLHMIS (DHIS2)?

   9. What do you do if you need technical support to enter or use DHIS2?
      - Probe: what kind of troubleshooting support do you receive?

   10. What kind of training did you provide to municipalities and CHC HMIS officers on TLHIS?
      - Probe: Do you have any training manual or DHIS–2 user manuals?

11. What is the mechanism to provide DHIS2 troubleshooting support to municipalities and CHC HMIS officers (TLHIS users)?
- Probe: Does anyone in your team is trained DHIS 2 Developer for technical troubleshooting

3. Decisions

12. What are the different types of program decisions that are made in your department?
- Probe: For example, there may be decisions related to where to provide services, how to allocate resources or plan for new activities. How are decisions like these made in your organization?
- Probe: Who is involved in the decision-making process?
- Probe: What sources of information do you think they rely on to make decisions?

13. Could you give me some examples of times during your work when you consulted data to inform a decision about a health service or program?

14. What specific targets are you currently tracking for your health programs?
- Probe: How do you know when a program is not meeting these targets?
- Probe: If you are aware that a program is not meeting expectations, what kinds of things can
- you do about it?

15. Could you tell me about any current organizational plans, policies, procedures, or guidelines that relate to the collection, review, or use of data?
- Probe: Does anyone's job description specifically address the review or use of data?
- Probe: What are their job titles?

3. Assessing Data Demand and Use

16. Can you tell me what typically happens in your organization with data collected by your organization?
- Probe: How often do you think decisions in your organization are informed by data?
- Probe: When data is available, who in the organization reviews it?
- Probe: Who among your colleagues discuss new data or reports?

17. Has your organization ever taken steps to improve the use of data?
- Probe: If so, please tell me about those efforts.
- Probe: Did they result in improvements for the organization?
- Probe: What were the obstacles?

18. Does your organization need data that you don't have?
- Probe: How do you identify data that you need?
- Probe: What process do you go through to get it?

19. In your opinion what is the biggest obstacle to data use in your organization?

5. Data Availability and Quality

20. Tell me about the availability of data within your organization. When you need to access it for decision-making, how easy is it to do so?
    - Probe: How easy is it to get the data from each section/unit (such as M&E unit) and from different areas and different data collection points?
    - How easy is it to get COVID data?

21. Tell me about the data quality in terms of accuracy, timeliness, and completeness of the information available to you from both routine and non-routine sources.
    - Probe: Who is responsible for managing data and assuring data quality within the organization?
    - Probe: Are there written guidelines for data quality or how data quality reviews should be conducted?
    - Probe: In your opinion, what are the primary causes of data quality issues?
    - Probe: How often do you perform data quality checks?
    - Probe: When supportive supervision visits are conducted for M&E and data quality do the supervisors spend time on facilitating the use of the data?

6. Capacity in Data Use
22. What do you think about the technical capacity within your organization to collect, analyze, review, and use data?
    - Probe: What kinds of technical assistance in M&E or data review have you received in the past six months?
    - Probe: Who provided the technical assistance?

7. **Communicating Data – Social and Behavior Change and Civil Engagement**
23. Does your organization have a protocol, policy, or written guidance for sharing or communicating data internally or externally? Please describe them.
    - Probe: Does sharing data include both directions, that is, does the data go from communities up to headquarters and does the feedback go from headquarters down to service providers?

24. When information or data is shared, do you segment communication about data to different audiences?
    - Probe: Who are your audiences for data generated by your programs?
    - Probe: How do you communicate data to your different audiences?
    - Probe: What types of information products are available to you?
    - Probe: What kinds of performance feedback does your team receive?
    - Probe: How frequently do you receive feedback?

25. Has your organization ever documented success stories that involved the use of data?
    - Probe: If yes, how were these stories identified and disseminated?
    - Probe: Have they resulted in additional funding for programs, more data use activities, or M&E system improvements?

8. COVID
26. What are the main challenges the MoH faces for the collection of COVID data?

27. What are the main challenges the MoH faces for improving the analysis of COVID data?

28. Is there a national HMIS person in charge of COVID related data collection? Is the same person responsible for COVID data analysis?
    - Probe: what are their responsibilities

29. Are there written guidelines or a manual on how to collect and analyze COVID-19 data?

30. What are the top three or five areas that you think should be prioritized to improve or strengthen COVID-19 data collection and analysis?

9. HRIS

31. Do you have a need in your work for HR software or tools? What tasks do you need to accomplish?

32. Is HR information available to you? Why or why not?

33. How easy is it to access HR information (e.g., information concerning the number of staff, positions, locations, rate of attrition or other critical personnel information)?

34. To what extent do you believe HR data are accurate and up-to-date? Why?

35. To what extent do you believe HR data are used in human resources planning?

36. What stakeholders do you think exist who have a stake in HR information?

37. Who is responsible for the collection of human resources for health (HRH) information?

38. What specific information is collected on health workers? Provide examples of forms used, if possible.

39. How often is health worker information collected or updated?

40. What systems or processes are used to capture and track information on health workers? Consider databases, spreadsheets and paper forms as well as software.

41. Are your needs met by the system(s) you are currently using? If not, what are your three biggest needs?

42. How are health providers paid? Are they paid centrally or locally by facilities?

43. What pre-service training do health providers receive?

44. Do you have an in-service training program? How do you track who has received which information?

45. Do you know if there are plans to start a Continuous Medical Education program?

46. How many positions of District Public Health Officer –HMIS and CHC HMIS officers are sanctioned?

47. How many positions of District Public Health Officer –HMIS and CHC HMIS officers are vacant?

48. How do you ensure that District Public Health Officer –HMIS and CHC HMIS officers have access to working computer/laptop and internet?

Annex C: List of Key Program Indicators shared by Departments on a Quarterly Basis

| 1. **MCH**	a. Antenatal care (ANC) 1 b. Antenatal care (ANC) 4 c. Postnatal care (PNC)1 d. Postnatal care (PNC) 2 e. Live birth
2. **Nutrition**	a. Nutrition status b. Vitamin A c. Albendazole
3. **Family planning**	a. Contraceptive prevalence rate
4. **Immunization**	a. Bacillus Calmette-Guerin (BCG) b. Measles Rubella (MR) 1 c. Measles Rubella (MR) 2 d. Complete immunization <1 e. Hepatitis B
5. **Outpatient department**	a. Bed occupancy rate b. Length of Stay c. Gross death date d. Turnover internal e. Net death rate
6. **Malaria**	a. Confirmed malaria case incidence b. Malaria case distribution c. Confirmed malaria case distribution
7. **TB**	a. TB case notification b. Success TB treatment c. TB case detection and treatment
8. **Leprosy (lepra)**	a. Leprosy detection rate b. Successful leprosy treatment c. Leprosy case notification
9. **HIV/AIDS**	a. Cumulative number of HIV cases b. Cumulative death cases
10. **Surveillance**	a. Top 10 diseases

Annex D: Additional Pictures from DACA Assessment

Photos 1: The DACA Validation Workshop with the MoH and external stakeholders included presentations and small-group discussions about the findings and to refine recommendations.

Photos 2, 3, and 4: Small groups were assigned a set of findings and recommendations, discussed and validated them, and shared ideas on how to strengthen them.
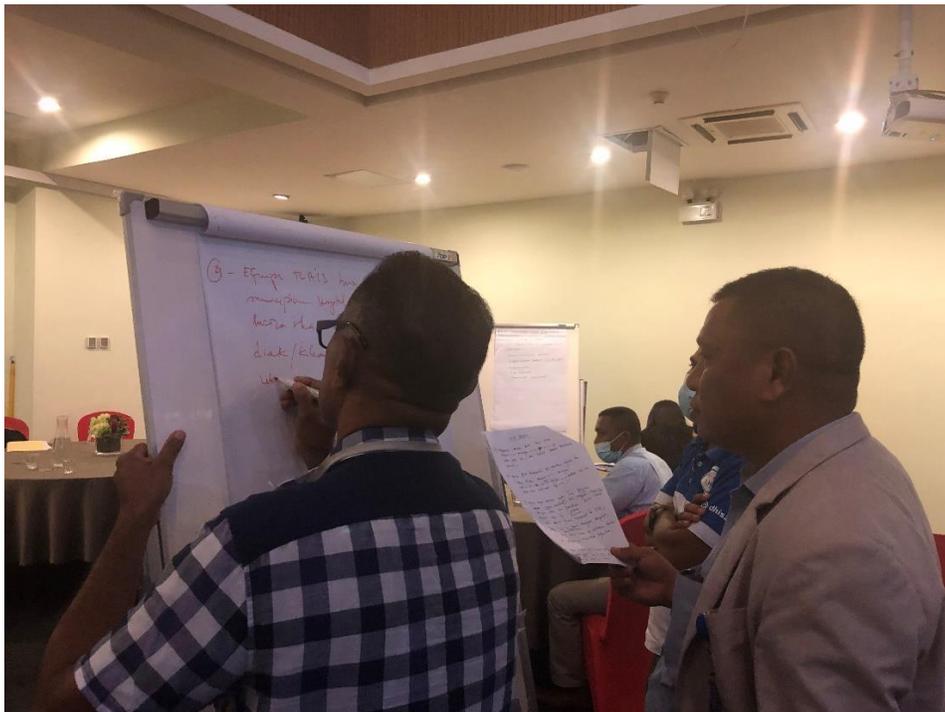
Photo 5: DACA Interview with the HMIS Department and M&E Department.

Photo 6: DACA Interview with TIC, HMIS head of department , and the USAID Health Systems Sustainability Activity