ETHIOPIA DUP | DATA USE PARTNERSHIP

YEAR IV

ANNUAL REPORT

ETHIOPIA DATA USE PARTNERSHIP (DUP)

This report is intended to give an overview of activities supported by DUP at national level and in all regions of Ethiopia from July-2020 to June 2021.

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ACRONYMS

ARM	Annual Review Meeting
AWS	Amazon Web Service
BMGF	Bill & Melinda Gates Foundation
CBMP	Community-Based Mentorship Program
COVID-19	Corona Virus Disease
CSA	Central Statistics Agency
CSTS	COVID-19 Surveillance Tracking System
DDCF	Doris Duke Charitable Foundation
DHA	Digital Health Activity
DHBp	Digital Health Blueprint
DHIS	District Health Information System
eCHIS	Electronic Community Health Information System
EFY	Ethiopian Fiscal Year
EOC	Emergency Operation Center
EPHI	Ethiopian Public Health Institute
HBIC	Home-Based Isolation and Care
HC	Health Centers
HEP	Health Extension Program
HEW	Health Extension Worker
HF	Health Facility
HIS	Health Information System
HIT	Health Information Technology
HITD	Health Information Technology Directorate
HMIS	Health Management Information System
HP	Health Post
HSTP	Health Sector Transformation Plan
IIfPHC-E	International Institute for Primary Health Care-Ethiopia
IR	Information Revolution
KM	Knowledge Management
LQAS	Lot Quality Assurance Sampling
MCH	Maternal and Child Health
MoH	Ministry of Health
M&E	Monitoring and Evaluation
MRU	Medical Record Unit
NCoD	National Classification of Disease
NHDD	National Health Data Dictionary
PHCU	Primary Health Care Unit
PMT	Performance Monitoring Team
PPMED	Policy Planning, Monitoring and Evaluation Directorate
RDQA	Routine Data Quality Assessment
RHB	Regional Health Bureau
SNNP	Southern Nations, Nationalities and People's (Region)
ToR	Terms of Reference
ToT	Training of Trainers
TWG	Technical Working Group
WoHO	*Woreda* Health Office
ZHD	Zonal Health Department
USAID	United States Agency for International Development

CONTENTS

Project title	Ethiopia Data Use Partnership (DUP)
Implementer(s)	JSI Research & Training Institute, Inc. (JSI), Ministry of Health (MoH) and local universities
Reporting period	July, 2020 - June, 2021
Donor	Bill & Melinda Gates Foundation (BMGF) and Doris Duke Charitable Foundation (DDCF)
Goal	The creation of better quality, efficiency, and availability of primary health and nutrition services at all levels of the health system.
Objective	Support the Ministry of Health's (MoH) Information Revolution (IR) agenda that aims to improve collection and use of high-quality routine information in Ethiopia's health sector.

EXECUTIVE SUMMARY

In its fourth year, DUP intensified and consolidated implementation activities in line with the MoH's IR plan to transform *woreda*s into model *woredas* in health management information systems (HMIS). In addition to providing broader support to the MoH and regional health bureaus (RHBs) on IR efforts, DUP continued working with selected learning *woreda*s and hospitals to implement a package of health information system (HIS) interventions, document lessons, transform facilities into IR models, and scale-up successful interventions beyond the learning sites. Moreover, DUP prioritized the documentation of lessons and synthesis and dissemination of evidence, based on HIS, service delivery, and secondary-source data gathered over the life of the project.

During this reporting period, as we sought to mitigate the effects of the COVID-19 pandemic, DUP operated with limited capacity and access to the health system, particularly the learning *woreda* and hospital intervention sites. While we focused on feasible activities that did not compromise the safety of staff or stakeholders, the majority of DUP regional staff maintained relatively good access to the lower levels of the health system and were able to perform critical activities.

Most of the activities included in this report were implemented in partnership with other stakeholders under the leadership of MoH and RHBs, including JSI's Digital Health Activity (DHA) funded by the United States Agency for International Development (USAID). Thus, DUP would like to acknowledge their contributions in the respective areas.

Among the areas DUP provided substantial support to the MoH during this reporting period were:

- Production of routine data analytics as one of the areas where substantial support provided;
- Coordinated, provided integrated training on data quality-data use and DHIS-2 training for health workers at all levels of the health sector;
- Development and dissemination of regular data analytic documents for enhance decision making;
- Conducted rapid data quality assurance (RDQA) and regular monitoring of data quality including reporting status;
- Supported the assessment of the national classification of disease (NCoD) and identified potential areas for revision;
- Production of technical documents and lessons for the 22nd Health Sector Annual Review Meeting (ARM);
- Finalization of the Health Sector Transformation Plan (HSTP) II;
- Development of national digital health strategy;
- Operationalization of the digital health project inventory system; and
- Revision of HMIS indicators, data recording, and reporting tools.

Additional project accomplishments were:

- Virtual presentations on system interoperability at the Global Digital Health Forum;
- The transition of the information technology (IT) Internship Program to DHA to be established as a small business;
- Conduct HIS effectiveness study; and
- Dissemination of case studies and learnings.

Data use baseline vs current

% of facilities that use analyzed data to inform decisions: from

68% -74%

% of woredas and facilities that have functional PMTs:

88% (no baseline data)

DQA baseline vs current

Service reporting completeness: from

72% - 89%

Disease reporting completeness: from

72% - 82%

Service reporting timeliness:

70%

Disease reporting timeliness:

69%

Digitization

DHIS2, online: from **0%** for both to **71%** and offline:

100% access

eCHIS status: from

0 to 4,456

HPs newly started implementing and **3050** HPs have trained HEWs

Connected woreda IR status

National Data use status

73%

National Data quality status

86%

National HIS structure and resources status **79%**

At national level:

196 (15%) of sites are Model

543 (41%) are Candidate

596 (45%) are Emerging

MERL

12 HIS implementation researches in progress

24 published manuscripts uploaded in the publication depository of DUP

57 Masters and

8 PhD students research works supported.

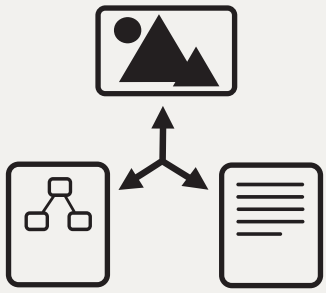
Governance

Revised National HIS Governance Framework along with the revised national HIS governance structures endorsed

8 regions formed HIS governance structures, 6 of them have conducted HIS governance structure meeting

SECTION I

TRANSFORMATION OF HEALTH DATA USE CULTURE



PROGRESS AND ACHIEVEMENTS

SECTION I: TRANSFORMATION OF HEALTH DATA USE CULTURE

Bringing cultural transformation in information use in the Ethiopian health system is one of the pillars in the IR sectoral agenda. The MoH has been implementing the IR agenda in a number of *woredas* in collaboration with RHBs and implementing partners. Under this endeavor, over the past four years DUP has significantly contributed to developing strategic interventions and implementing them to the lower levels with its staff embedded in MoH and RHBs. Additionally, the regional teams focused its efforts on closely working with eight selected *woredas* and five selected hospitals to make them into special learning centers. The details of Year IV activities is summarized and described below by thematic area.

Highlights

1. *Supported the 22nd Health Sector ARM*
2. *The IR Model Woreda Assessment Tool for WoHO and HFs is revised*
3. *At national level, 196 (15%) of sites are Model, 543 (41%) are Candidate, and 596 (45%) are Emerging*
4. *After six months of tailored HIS intervention in 8 WoHO, more than half of the 48 sites, Emerging at baseline, became Candidates.*
5. *70,000 data use and quality posters printed and distributed*

1.1. Support national and regional level initiatives to strengthen Ethiopia's HIS and overall IR Model *Woreda* creation

1.1.1. Centrally and regionally support the IR partners' coordination forum

HIS Review Meeting of the Health Sector

In February 2021, DUP supported MoH's PPMED and HIT directorates to co-host the national-level HIS review meeting where 59 experts from MoH, RHBs, partners, and universities participated to share a six-month update on HIS performance, identify major challenges, and propose solutions. In addition to fully funding the event, DUP's staff assisted in drafting the agenda, preparing PowerPoint slide decks, facilitating presentations, leading group work, and recording minutes. During the workshop, DUP's efforts were reflected and acknowledged by different entities. The Sidama and Harari regions voiced that DUP's support was exemplary in overall HIS support. The Sidama region boldly expressed that having an embedded staff, hired by DUP, was a significant contribution, especially considering that they are a newly formed region.

"The integrated data quality, data use and DHIS2 training which was conducted with support of DUP, was so helpful that now program experts are accessing their data from DHIS2 by themselves. They have also started providing data quality feedback to their subordinates and are using the data for decision at department-level"

Ato Abdulsemed Ali, Director, Plan and Monitoring and Evaluation Unit, Harari Region.

Unlike the previous HIS review meetings that mainly concentrated on presentations and discussions, DUP assisted the MoH to make this session more productive by including a group discussion. Major action items from the meeting are included below:

Plan (WBAHSP & HSTP)

- **Timing:** Shorten the process and communicate early for earlier planning preparation
- **Tools:** Develop and use dedicated software for planning and link it to DHIS2
- Improve engagement of partners in the planning process
- Resolve population estimation issue either by allowing the regions to estimate on its own or consult with Central Statistics Agency (CSA) for other options

Digitalization System (e-CHIS, DHIS2, MFR deployment and Connected Woreda initiative)

e-CHIS

- **Material:** Provide adequate number of tablets (one per HP) and power banks with replacement, tablet maintenance system, and solve the problem on the server
- Strengthen collaboration and coordination with MoH, partners, and downwards
- Establish Help Desk at national level
- Revise the eCHIS implementation manual/guide

Data quality gaps, shortage of infrastructure, and related problems in using DHIS2

- Define the time period or time frame for report completeness and timeliness
- Provide DHIS2 users privilege to RHBs for creating and managing user accounts
- Develop data quality apps (date issues must be resolved)

MFR

- PPMED and Regulatory to provide monthly performance-based feedback to RHBs
- HITD to resolve issues related to software optimization, such as password, testing functionality, analytics, in three months
- All regions notified to complete signature domain within three months and service domain within six months IR (CWS, CBMP & PMT)
- Design real-time monitoring dashboard

CONNECTED WOREDA INITIATIVE

- Re-brand the Connected Woreda strategy to IR model site creation strategy and communicate to stakeholders
- Investigate behavioral factors and design tailored plan or solutions
- Disseminate the lessons and best practices to stakeholders, using different platforms

After the review meeting some of the action items were put in to action and some are still pending for the next fiscal year.

Moreover, during the current year, DUP helped PPMED to conduct to review meetings in which the annual HIS and planning related perfromances were reviewd and decions made.

IMPROVED PARTNERSHIP AND TA POOLING

During the fiscal year, DUP supported MoH to organize six data Use Technical Working Group (TWG) meeting. In these meetings, major HIS related issues were discussed and decisions were made. To mention, MOH's annual work plan, MFR, eCHIS, indicator and NCoD revision, data analytic products and HIS performance were among the major areas. In addition, multiple task forces which operates under the TWG were formed by pooling technical experts from implementing partners and the Ministry itself.

1.1.2. Support monitoring of partner IR *woreda* implementation

Creating and maintaining IR model woredas across the country is one of the strategic intervention areas of the IR. As a result, the MoH identified 36 woredas for the Community-Based Mentorship Program (CBMP) intervention and additional woredas across the country, totaling 1,503 health institutions, to receive support as IR learning sites from partners like DHA, Transform- Primary Health Care Unit (PHCU), Transform-Health in Developing Regions (HDR), six CBMP universities (Addis Ababa, Gondar, Haromaya, Hawassa, Jimma, and Mekele), RHBs, and others. DUP also supports eight *woredas* and five hospitals among these sites; the detailed IR status of these facilities is discussed in sections 1.3 and 1.4.

We institutionalized and scaled-up the practice of assessing the status of HIS structure and resources, data quality, and data use domains using the IR model *woreda* measurement tool. In 2018, only 255 sites (38 *woreda* health offices [WoHOs]), 181 health centers [HCs], and 36 hospitals) that were supported by the six universities began implementing the IR model woreda creation strategy. In 2021, the number has scaled up to 1,503 sites (208 WoHOs, 862 HCs, 88 hospitals, and 345 health posts [HPs]).

In Year IV, the assessment was conducted twice, in January and June 2021. DUP supported PPMED in collecting and analyzing the IR status of sites and subsequently updating the IR dashboard that was created for this purpose. Findings of the assessment conducted in January are described below and those from the June assessment will be analyzed and presented in the next quarterly report.

Data was not collected for 168 sites out of 1,503 mainly due to security issues. Out of the total 596 emerging sites, the vast majority (505/85%) are sites recently recruited to receive support from partners and have generally low performance, which affects the overall HIS performance. Figure 1 depicts the number and percent of model, candidate, and emerging sites by assessment period and shows with and without the newly enrolled sites.

Box 2: Levels of Health Facilities and *Woredas* based on the IR Implementation Criteria

Emerging Facility: A facility that, at the minimum, started setting-up a monitoring and evaluation (M&E) infrastructure and working to improve its M&E practices.

Candidate Facility: A facility with an appropriate M&E infrastructure in place, and, although not fully and satisfactorily, has started using the infrastructure.

Model Facility: A facility with improved quality health data collection, consumption, and communication. At the very least, this facility communicates data offline using the HMIS.

Connected Facility: A facility that accesses and digitally shares data online. At the facility level, this is the ultimate goal of the program.

Model *Woreda*: A *woreda* where all facilities are model and send and access data offline

Connected Woreda: A woreda where all HFs are connected and send and access data online

Finding

196 sites **(15%)** are Model

543 sites **(41%)** are Candidate

596 sites **(45%)** are Emerging

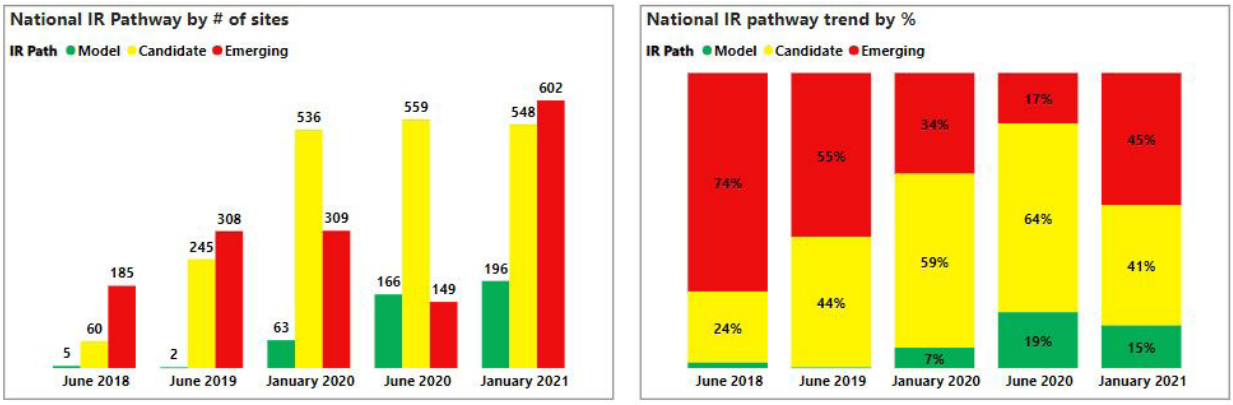


Figure 1: IR assessment status, by period of assessment, January 2021* *Including newly enrolled sites

Data sources is the IR model woreda progress assessment from 1503 sites nationally (Woreda HOs: 208, Hospital: 88, Health Center: 862 and Health Posts: 345).

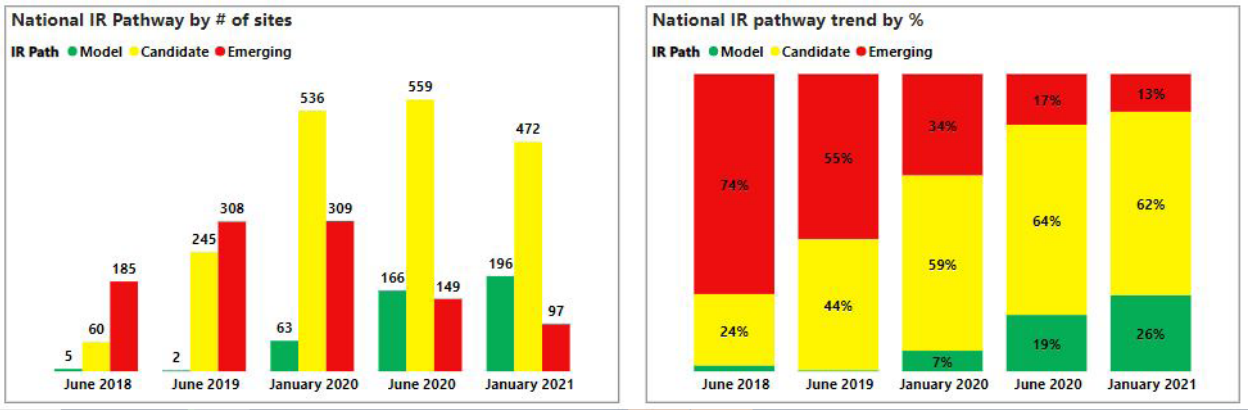


Figure 2: IR assessment status of 830 sites, by period of assessment, January 2021* *Excluding newly enrolled sites

Figure 2 shows that the average HIS structure and resources score, measured out of 30, increased from 15.4 in 2018 to 23.7, recording about an eight-point change. Similarly, the average scores for data quality (out of 30) and information use (out of 40) also increased from 14.4 and 18.5 in 2018 to 25.8 and 29.0 in 2021, respectively. In both cases, the average change is greater than ten points. In general, the overall IR score (out of 100), increased from 48.3 in 2018 to 78.4 in 2021. The changes in all three domains have shown an increasing pattern over time. However, when analyzed further, the IR scores showed big reductions around June 2020, right after the enrollment of the new sites (Figures 3-6).

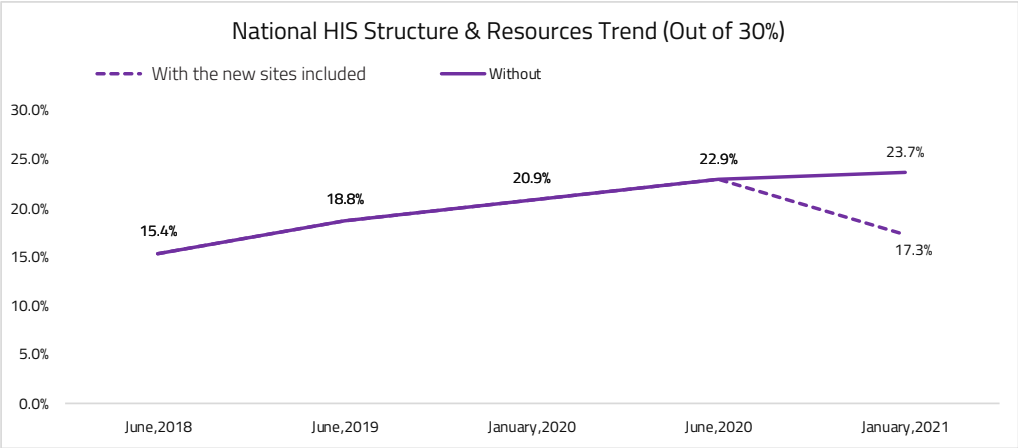


Figure 3: Trend in IR average score for HIS structure and resource and average score of existing and newly added sites

Based on the assessment results (Figures 3 and 4), the HIS structure and resources, as well as the data quality measurement score, in IR sites showed a steady increase in the beginning of 2021 compared to 2018 and 2019.

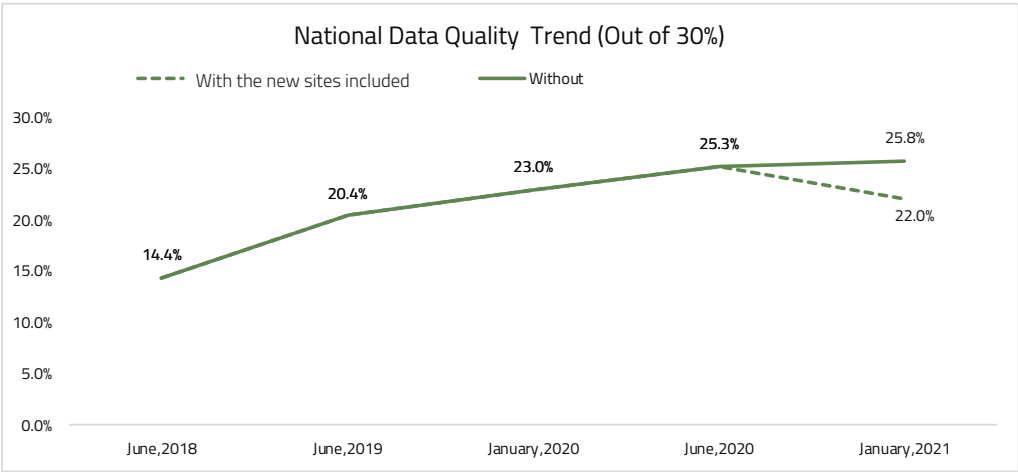


Figure 4: Trend in IR average score for data quality and average score of existing and newly added sites

In a similar fashion, the data use measurement score improved towards the beginning of this year (Figure 5). The observed improvement in both data quality and information use may be associated with the provision of integrated data quality and use training across the country. And also the additional tailored plan implementation support such as training, mentorship, experience sharing that these sites received.

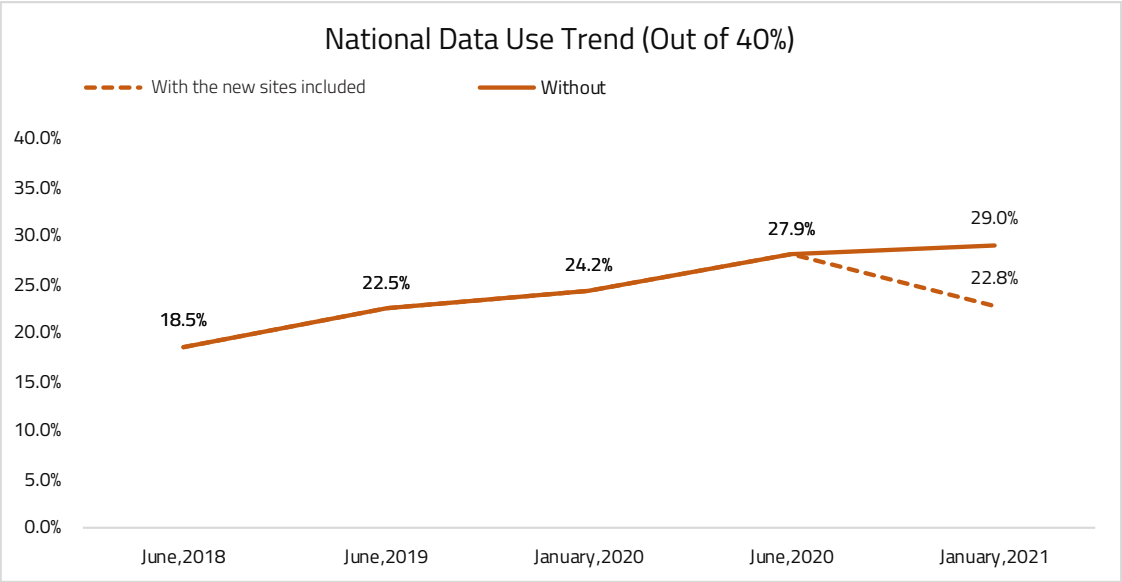


Figure 5: Trend in IR average score for data use and average score of existing and newly added sites

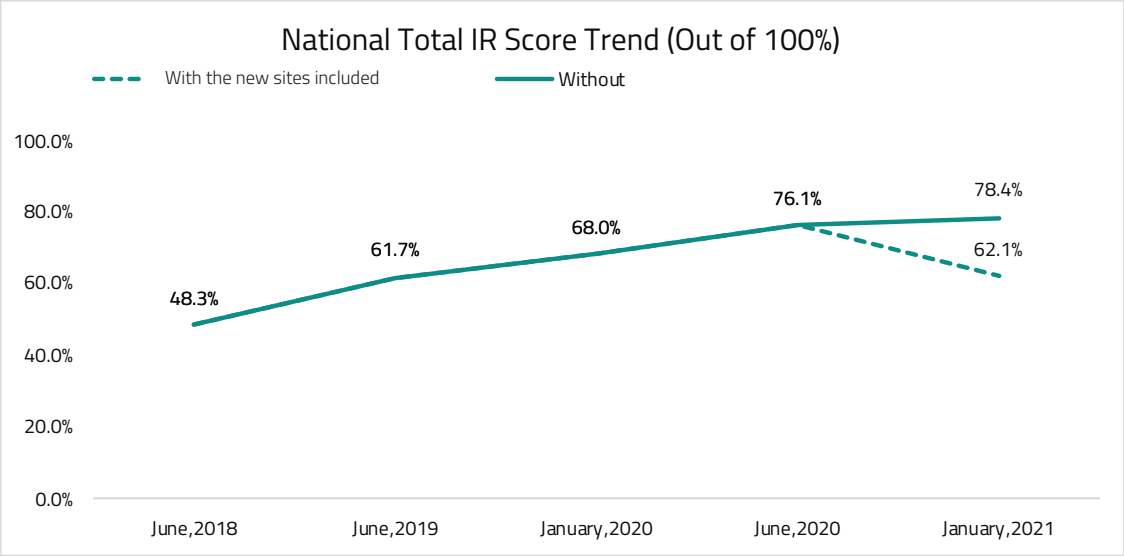


Figure 6: Trend in total IR average score for the three thematic areas and total average score of existing and newly added sites

Moving forward, scaling the implementation of the IR model woreda creation strategy to more sites and augmenting implementation of high impact HIS interventions to improve HIS structure, data quality, and data use is expected to result in meaningful change at scale. Furthermore, different digital tools need to be tested at verified IR model *woredas* before their scale-up.

ADDITIONAL ACCOMPLISHMENTS:

The MoH has now more than two years of ground-level experience using the IR assessment tool to measure and monitor the IR status through the IR model woreda creation strategy. The tool was developed at an early stage of the initiative and it was considered important to revise it based upon the lessons from the two-year period. Following consecutive consultative workshops conducted this year with MoH, RHBs, partner organizations, and universities, the assessment parameters were revised based upon their measurability, applicability, feasibility, universality, and relevance. The weights allocated for each domain (structure, data quality, and data use) were also revised. The assessment tools are now finalized, an instruction guide is prepared for each and ready for use.

1.1.3. Support verification of IR model *woredas*

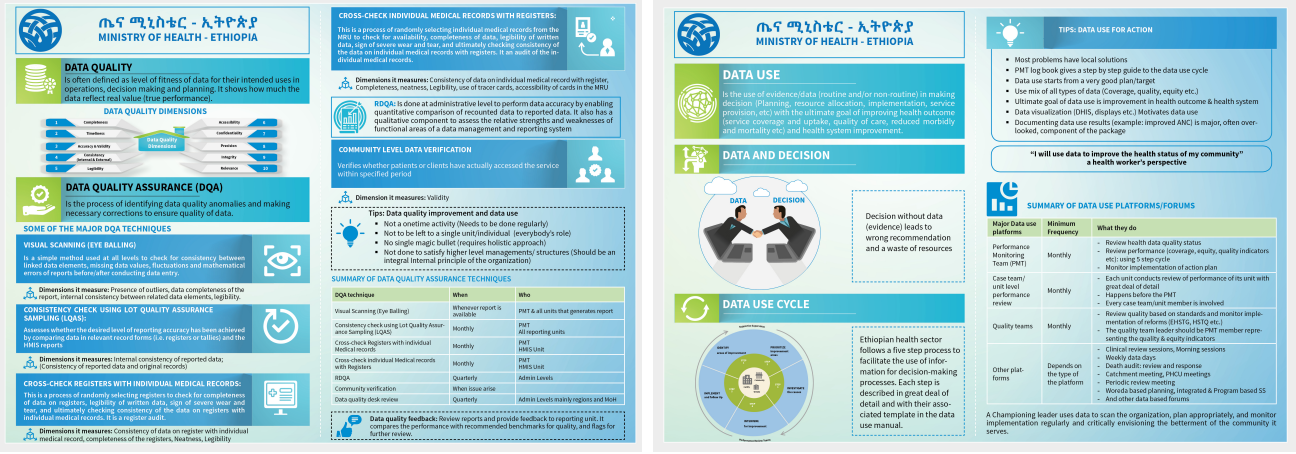
Centrally, DUP staff participated in the verification of IR model *woredas* reported by Hawassa, Gondar, and Jimma universities. Based on preliminary findings, there were IR model *woredas* identified. The final report of this verification will be attached when it is ready.

1.1.4. Support HIS supportive supervision

DUP supported IR Model *Woreda* assessment tool revision and implementation. DUP's **SNNP** team coordinated and engaged in supportive supervision at Wolita, Gedeo, and Amaro special *woredas*. All other regions did similar supportive supervision.

1.1.5. Support development and printing of data quality and data use scope of practice (SOP)

To increase the demand for and use of data at a national scale, DUP supported the production of data quality and data use promotional materials (posters). The data quality poster features data quality dimensions and assurance techniques with frequency and level of implementation. Likewise, the data use poster presents the five steps in the data use cycle, data use platforms/forums, and major activities. **Seventy-thousand** posters are printed and distributed to all HCs and hospitals, WoHOs, and RHBs. In addition, a data quality assurance standard operating procedure manual for the health facility (HF) level was developed and is ready for dispatch.



Data quality and data use posters

1.2 Support creation of an IR Model *Woreda* in eight *woredas* for learning and demonstration purposes

With the aim of creating HIS learning and demonstration sites, DUP, through its regional teams, provided intensive support to eight *woredas* in Year IV. Regional DUP teams have been supporting a total of 51 sites (eight WoHOs and 43 HCs) in Afar, Amhara, Oromia, SNNP, and Tigray regions in developing site-specific, six-month work plans and providing small grants to support the implementation of plans in two *woredas* in Oromia. Moreover, onsite capacity-building trainings, mentorship visits, and experience-sharing and learning forums were organized for these HF and WoHO sites.

Table 1 : List and number of DUP Learning *woredas*

S.N.	Region	Learning *woredas*	Number of HC	Number of HP	Total
1	Afar	Amibara	5	20	26
2	Amhara	Legambo	9	37	47
		Shebel Berenta	6	20	27
3	Oromia	Aleltu	4	20	25
		Tiyo	4	18	23
4	SNNP	Damot Woide	4	24	29
		Mirab Azernet	4	17	22
5	Tigray	Ahferom	7	23	31
Total		**8**	**43**	**179**	**230**

The MoH's IR model woreda creation strategy recommends conducting an IR self-assessment every six months. Thus, in the first half of the year, the **regional DUP team** provided technical and financial support to *woredas* to enable them to conduct these assessments twice, in the second and third quarters of Year IV. Out of 51 sites, 38 have conducted a second assessment following the interventions (Figure7). Due to security concerns, the assessment results could not be obtained from eight sites in Ahferom Woreda Tigray and five sites in Amibara Woreda Afar.

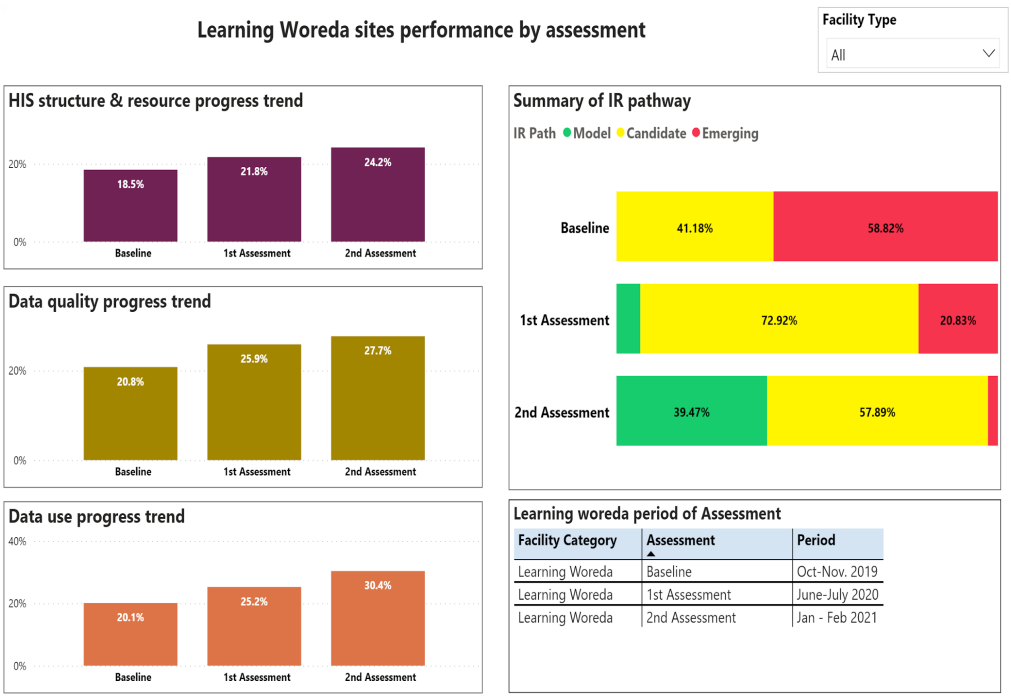


Figure 7: Result of Learning *Woredas* by assessment, February 2021

Significant improvement was recorded in HIS infrastructure, data quality, and data use in sites where leaders were committed to implementing the jointly planned, tailored interventions that included strengthening coordination and boosting morale among staff. The major and common challenges identified in the field assessment were turnover of WoHO and HC leadership and program staff's limited access to DHIS2 due to poor infrastructure (poor connectivity and absence of electric power).These challenges have negatively affected data use at the department level in some *woredas.*

DUP's regional teams have closely monitored the implementation of the tailored intervention plans through remote and onsite **supportive supervision** of learning *woredas* in the respective regions. Details of these conducted activities follow.

1.2.1. Support *woredas* on the implementation of tailored intervention plans

Amhara	- 83 medical record unit (MRU) clerks trained on electronic medical record (EMR) - HMIS mentorship training to 53 individuals from Legambo Woreda, Akesta, and Woldia hospitals, South Wello ZHD, Shebele Woreda, Shebel, Finoteselam, and Felegehiwot hospitals, and East Gojam ZHD - Provided 11 computers and installed local area network (LAN) in 13 HCs in Legambo Woreda to connect 15 service units at each HC
Oromia	- Granted Aleltu and Tiyo woredas budget for HF mentorship, RDQAs, and woreda-level HIS review meetings and both WoHOs and facilities under them now: a. Have PMTs and started monitoring performance using key performance indicators b. Are aware of the information use cycle and indicators' definition and calculation c. Are close to 100% on data quality measurement standards, service and disease reporting timeliness and completeness - Provided a need based MRU management trained for 31 MRU and HIT staff
SNNP	- A total of 62 health workers, PHCU heads, and program experts received a refresher and a basic training on data quality, data use, and DHIS2. Participants developed plans to improve HIS in their facilities.
Tigray	- Mentorship provided to seven HCs, one PH, one GH and four WoHOs - Developed and disseminated tailored action plans for all four IR Woredas - Facilitation and vehicle support for the Woreda level - Mentorship for Ahferom - Follow-up and support given through phone calls - Provided support to the team deployed (sponsored by DUP) in the Tigray region for emergency
Afar	- Conducted two rounds of assessment on IR woreda and facilities

1.2.2. Support *woreda*-level IR experience sharing forum

At national-level: Arranging a national-level experience sharing forum among the learning sites was one of the priority activities this year. A two-day experience sharing workshop was organized in February 2021 for six *woredas*: Legambo and Shebel Brenta from Amhara, Tiyo and Aleltu from Oromia, Mirab Azernet and Damot Woyde from SNNP. A total of 60 participants that included staff from RHB, and ZHD, WoHO heads, *woreda* HMIS focal persons, and heads of the HCs attended the meeting. *Woredas* in Afar and Tigray did not participate due to security reasons. The six represented *woredas* presented on their performance since the start of implementation in October 2019 and developed a detailed performance improvement plan for the following period of March-June 2021.

Major accomplishments:

- *Conducting the IR self-assessment has become a norm;*
- *IR Model sites are increasing;*
- *HCs started conducting LQAS for the disease report by preparing a facility specific disease list.*

Some of the challenges:

- *Non-functional HealthNet*
- *High turnover of HIT staff due to dissatisfaction with a low compensation mechanism associated with a low Job Evaluation and Grading (JEG);*
- *Substandard MRU room size;*
- *Absence of power banks for eCHIS; and*
- *Shortage of shelves and tickler files in HPs*

Woredas also shared their best experiences in improving data quality and data use practices (Box 1).

Box 1: Best Experience Shared by Learning *Woredas*

In **Oromia**, conducting quarterly data verification and desk reviews and providing regular feedback, using a channel on the Telegram app, resulted in improving data quality (report completeness, timeliness, data accuracy, data consistency). Furthermore, mentoring also improved facility utilization of DHIS2 for data analysis and visualization through the creation of a dashboard.

In **Amhara**, improved NCoD implementation resulted from onsite training, auditing the medical folder every two weeks, and mobilizing resources from the community to renovate MRU and make standardized shelves available.

In **SNNP**, an accountability mechanism was created on data quality through signing a MoU between the HC head and case team leaders. The *woreda* also reviewed the quality of data by the case team before sending on to the PMT, and HCs allocated a budget to HIS from internal revenue and renovated the card room.

At regional-level: In Amhara and Oromia regions, the RHBs conducted two separate review and experience sharing meetings to discuss progress of HIS implementation in EFY 2012 and foster learning among facilities. In both meetings, participants discussed hurdles in the creation of model HFs and all learning institutions developed tailored action plans to overcome challenges in the next performance period. In Amhara, two learning *woredas* and two learning hospitals shared their results and in Oromia, two *woredas* (Aleltu and Digaluna Tijo*)* shared their results to health care providers, PHCU heads, WoHOs, zonal and regional health program managers.

At *woreda*-level: A two-day *woreda*-level experience sharing and review meeting was organized for the Aleltu *woreda* for a total of 69 participants that included PMT teams from WoHOs, PHCU directors, HITs, MCH focal persons and deputy directors, and HEWs. Similarly, Legambo and Shebelberenta *woredas* also organized HIS review meetings.

Participants at all learning *woredas* and hospitals prepared tailored action plans to overcome current challenges and in Oromia, some action plans were shared with respective ZHDs. (See subsequent improvement in section 1.2.3)

Success factors for Aleltu and Digaluna Tijo *woredas*

- *A need-based prioritization and planning approach,*
- *PMT's consistent use of the information use cycle,*
- *Consistent application of data quality assurance mechanisms,*
- *Periodic IR status assessment, and*
- *Improved documentation practices*

Challenges in Amhara

- *Inadequate documentation,*
- *Irregular RDQA practices,*
- *Non-existence of case-team level PMT,*
- *Knowledge gaps among PMT members on data use,*
- *Inadequate data visibility,*
- *Lack of woreda and facility-level HIS mentors,*
- *Backlog data at MRU, and*
- *Lack of internet connectivity*

In August 2020, H.E. Dr. Dereje Duguma, the State Minister of Health Programs at the MOH and representatives from RHB, ZHD, WoHOs, and partners visited Tiyo *woreda* to view its exemplary implementation of the *Woreda* Strategy.

H.E. Dr. Dereje Duguma visiting one of the HCs in Tiyo *woreda,* Oromia region

1.2.3. Support regular mentorship to eight learning *woredas*

Amhara: Regional DUP staff and government trained mentors provided four rounds of **mentoring** for 15 HCs to ensure sustainability of the initiatives.

BEFORE the mentorship, HCs were inconsistent in documenting minutes mainly because they were not using the standardized PMT logbook. **AFTER** the mentorship, HCs' understanding and utilization of the PMT logbook improved. HCs also began performing performance analysis, displaying wall charts, and conducting root cause analysis on identified problems, and basing disease recording on the national classification of disease (NCoD) guidelines. Proper use of HMIS registers in pharmacy, laboratory, and program documentation started happening. In addition, historical eHMIS data from 2007 to 2010 EFY (2014/15-2017/18) were migrated to the DHIS2 database to enhance local access and use of data for comparisons and trend analysis.

Oromia: Aleltu and **Tiyo WoHOs** and four of their HCs received supportive supervision to strengthen PMT functionality. Findings from all the sites included:

- All have data quality reference manuals;
- The PMTs monitor key performance indicators (KPI) against the plan and identify low performance;
- All use the PMT data quality logbook to record the timeliness, completeness, and LQAS results of monthly reports;
- At WoHOs, some quality and equity indicators are included in the KPI analysis, such as OPD per capita by sex, sexually transmitted infections (STI) by sex, and total OPD attendants by community-based health insurance (CBHI) membership;
- WoHO conducts a RDQA that is documented accordingly;
- Action plans; however, are not regularly prepared based on the data quality assessment findings; and
- Program team staff, including non-HIT PMT members, have limited access to DHIS2 (except at Aleltu WoHO).

SNNP: Regional DUP and ZHD staff mentored and supervised eight PHCUs in the two learning *woredas* of Damot Woyde and Mirab Azernet. The team reviewed data quality and data use practices at outpatient; maternal, newborn, and child health (MNCH); and tuberculosis (TB)/leprosy/HIV units using standard checklist. Onsite, the team provided support to fill major gaps identified during the visit, which included:

- Defining some of the data elements;
- Transitioning from use of offline to online DHIS2;
- Monitoring quality of reports submitted from lower levels;
- Routine reviewing of clinical records;
- Organizing case team-level performance reviews;
- Displaying performance data in easily understandable ways.

Tigray: In the first half of the year, DUP and government staff conducted **supportive supervision** at four *woredas*. With the support and follow-up, the *woredas* in turn conducted supportive supervision to facilities in their catchment, most of which are conducting regular PMT meetings. Regular feedback was provided to each of the learning sites based upon the quality of its data reported to the RHB.

1.2.4. Support eight learning *woredas* to conduct quarterly RDQAs

In **SNNP**, DUP regional staff supported the Mirab Azernet WoHO to conduct RDQA for the four HCs in the *woreda* and 12 HPs, selected at random. The major gaps identified through the RDQA were shortage of HMIS and revised CHIS tools, non-functional MRU computers, lack of HC technical support on CHIS to HPs, limited practice of data analysis and visualization, and incomplete HMIS registers. There was also a mismatch of recount and reported figures at the HPs. DUP staff performed maintenance on four MRU computers, gave staff an orientation, and helped them prepare site specific improvement action plans for all identified gaps.

In **Oromia**, DUP supported the Tiyo and Aleltu learning *woredas* to conduct four quarterly RDQAs for their HFs. Ten indicators were selected for verification of reported data to recounted. Accordingly, the data verification factor which was within acceptable range for 50% and 70% of the indicators in Tiyo and Aleltu *woredas* respectively in 2012 has increased to 90% of the indicators in both *woredas* in 2013.

In **Amhara**, both learning *woredas* independently conducted RDQAs with DUP technically supporting the data analysis and interpretation of the findings.

1.3. Facilitate provision of comprehensive support to 28 learning hospitals in order to make them model in IR

1.3.1. Provide supportive supervision in order to improve quality and use of data in hospitals

DUP supported the preparation of tailored action plans for 28 learning hospitals in all the regions. Moreover, regional DUP, RHB, and ZHD staff monitored the implementation status of action plans in each hospital.

As part of the national level **integrated data quality, data use, and DHIS2 training,** most of the 28 learning hospitals received training in Quarters 2 and 3. DUP staff supported post-training follow-up in three hospitals: Dire Dawa, Dilchora Hospital, Harar Jugal Hospital, and Hiwot Fana Specialized Hospital. The two hospitals in Harar have shown improvement in their data quality and data use practices. Both hospitals have conducted LQAS and reviewed their performance on key program indicators and data quality within the established PMTs. Jugal Hospital has started practicing department-level data reviews before sharing the results at the PMT meetings. Jugal Hospital's services and disease report LQAS score was 95% around the third quarter. At Dilchora Hospital, there is still a gap in data quality practices, observed in incomplete medical records, incorrect use of NCoD, and data inconsistency. Onsite mentoring was provided for these gaps.

Hawassa Referral Hospital received four joint supportive supervision visits from RHB and DUP regional staff. Both data quality and use practices were observed in MCH, emergency, dental clinic, antiretroviral, voluntary counseling and testing, and medical and surgical outpatient departments. In particular, there were encouraging data use practices in the MCH unit, where staff conducted regular performance monitoring and updated their data visualizer. Yet there was also limited understanding on some data elements in service registers, data quality assurance methods, and data use at the case-team level, on which the visiting team provided technical support.

II DDCF demonstration *woredas* for design and implement tailored intervention in collaboration with local universities, regions, MOH

DUP's regional staff regularly mentored sites supported by the Doris Duke Charitable Foundation (DDCF) together with MOH/RHBs and CBMP universities.

In Addis Ababa, Amhara, Gambella, Harari, Somali, and Tigray, DUP regional staff conducted **mentorship** and supportive supervision visits jointly with CBMP staff to monitor implementation of the tailored action plan.

In Addis Ababa, Amhara, and SNNP, need-based **trainings** on data quality and information use, eCHIS, and HIS leadership and governance trainings were provided to *woredas* and sub-cities.

In Addis Ababa and Oromia, DUP regional staff increased participation and visibility of CBMP universities in **regional HIS forums**, such as HIS TWG meetings, HIS review meetings, M&E strategic plan development meetings, and monthly HIS meetings that enabled universities to share their experience and align their plan with their RHB.

In Harari and SNNP, DUP's regional team technically assisted CBMP universities in **implementation research** activities namely; in the proposal development, development of data collection tool, data collection, data analysis, as well as report write-up.

In Addis Ababa, DUP facilitated an **experience-sharing** opportunity for three low performing HCs and Menelek Hospital to learn from the exemplary performance of Yekorya Zemachoch Hospital.

DUP supported the MoH in reviewing the six-month performance of the six CBMP universities. DUP staff also followed-up with each university and collected the third IR assessment results from 198 sites out of a total 255. The assessment was not conducted in 57 sites of Tigray, Afar, and Benshangul Gumuz regions because of the current security issues in the areas. According to the assessment findings in the CBMP sites (Figure 8) the average IR score per site is 84% (HIS structure 24.8%, data quality 27.9%, and data use 31.1%). Moreover, 50.5% of the sites recorded Model status, 44.9% were Candidates, and the remaining sites were Emerging.

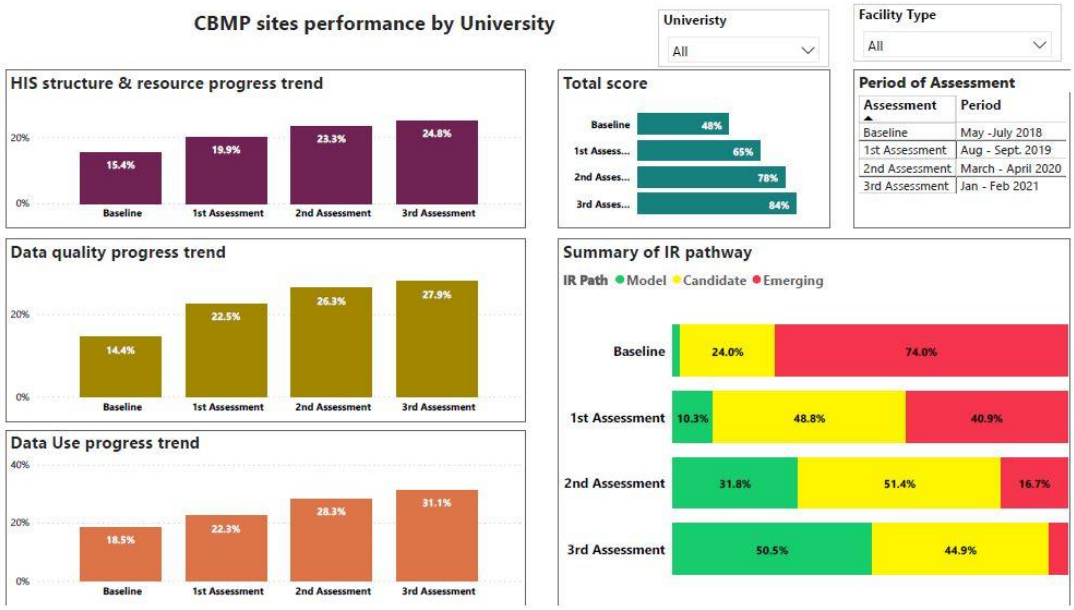


Figure 8: CBMP sites performance, February 2021

1.3.2. Support IR model facility assessment for learning hospitals

With continued support from DUP, 23 out of the 28 hospitals have conducted second assessments after the interventions. Three of hospitals in Tigray did not complete the assessment due to existing security concerns, and two hospitals, one in Oromia and one in the Somali region, also did not complete an assessment as they transitioned into COVID-19 treatment centers. The assessment results show that the overall IR performance score improved by 11% from baseline and three hospitals, Zewditu Memorial Hospital, Yekatit 12 Medical College Hospital, and St. Peter's Hospital, reached IR Model status. The remaining 21 hospitals are at Candidate status, and no hospital scored at the emerging level (Figure 9).

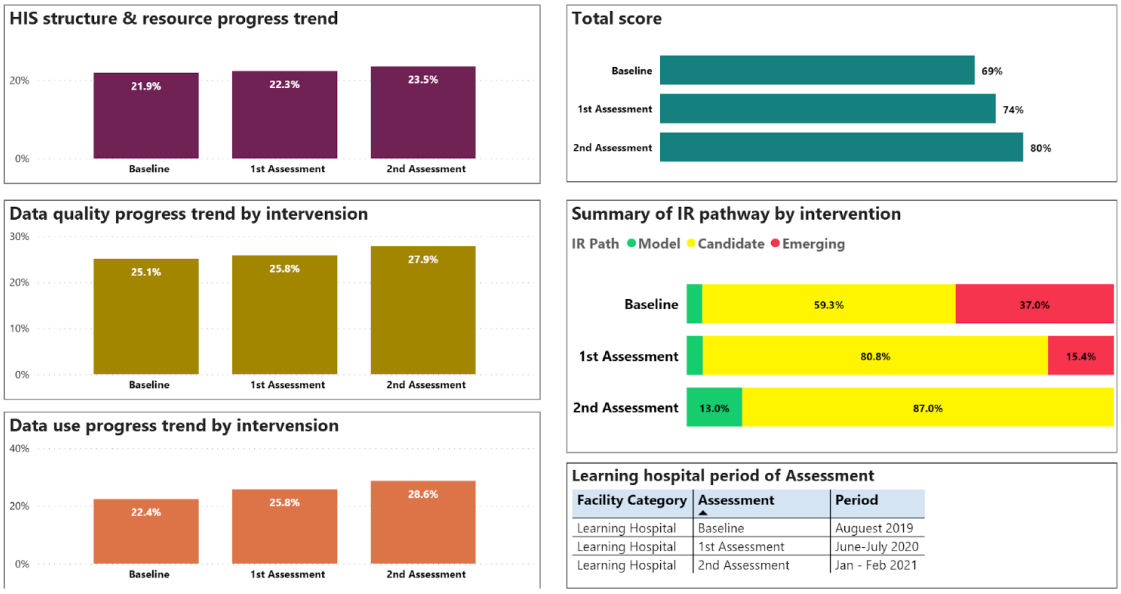


Figure 9: Result of Learning Hospitals by assessment, February 2021

1.3.3. Support bi-annual IR model hospital implementation learning and experience sharing forum

Nationally, DUP organized and supported, both technically and financially, a two-day **experience sharing** workshop in February 2021 in which a total of 74 participants from **24 learning hospitals** attended. Of the 28 learning hospitals, three hospitals from Tigray and the Karamara Hospital from the Somali region did not attend the workshop. All attendees, except for the Dubti Hospital from the Afar Region, presented on their progress since the start of implementation of the initiative in August 2019. The major progress reported included:

Major accomplishments:

- *Three hospitals from Addis Ababa reached IR model status;*
- *Tikur Anbesa Specialized Hospital (TASH) and Yekatit 12 Hospital from Addis Ababa and Adare Hospital from Sidama have started implementation of EMR with their budgets;*
- *TASH started mapping NCoD with DHIS2;*
- *Some hospitals started case team-level data and performance review;*
- *Information is displayed and communicated to stakeholders through different media, such as Smart TV, social media, brochures, leaflets, etc.;*
- *Collaboration between the hospital PMT and the hospital Quality Team is promising;*
- *Zewditu Memorial Hospital, Adare, and Jigjiga referral hospitals developed quality improvement projects on improving data quality;*
- *Some hospitals have started considering data quality and data use as a major criteria for selection and recognition of best performing teams;*
- *Hospitals are giving attention to MRU through renovation, folder management, and training of MRU staff.*

Some of the challenges:

- *Lack of an approved EMR national standard;*
- *Absence of clear guidance on the interface of the hospital PMT and quality teams; and*
- *Limited DHIS2 access privileges.*

To facilitate cross-learning among hospitals, different best experiences were shared (see Box 2).

Box 2: Best Experiences Shared by Learning Hospitals

Tool development: Adare Hospital developed an Excel-based data quality and data use audit tool. The tool has three excel sheets: data entry sheet, summary sheet, and action plan sheet. The tool helped the hospital to monitor department-level data quality and data use components. This tool was also used to incentivize the best performing department in improving data quality.

Linking data quality to quality improvement: Zewditu Memorial Hospital and Jigjiga Referral Hospital reported using another quality improvement project to improve the data quality. Zewditu Memorial Hospital improved its data quality measurement score from 41% to 91% by using USAID's data quality assessment checklist. According to the hospital team, the senior management team and clinicians developed a feeling of ownership of the data, and data quality is a criteria to reward and recognize staff. Likewise, the Jigjiga Referral Hospital Team also reported improving medical record completeness from 52% to 80% and decreasing hospital medical folder loss from 35% to 5% after implementing change ideas.

Using smart TV to display information: Gondar University Hospital reported directly connecting smart TV with the DHIS2 server computer to regularly display the dashboard on selected key indicators in the hospital. The team reported this practice has supported them in bringing accountability to the forefront.

CBHI database use: Bonga Hospital identified low revenue collection as a performance gap during a PMT meeting. Upon conducting a root cause analysis, the hospital PMT found problems in the fee waiver reimbursement. As a solution, they customized the CBHI database which helped the hospital to reduce the error that happened during manual registration and enabled them to filter data in detail by *woreda*, *kebele*, sex, and date of facility visit. After implementing this change idea, their fee waiver reimbursement collection has improved.

An action plan was developed at the MoH level to address these challenges. Furthermore, at the end of the workshop all 24 hospitals developed improvement action plans for March–June 2021.

At regional level, one experience sharing workshop was organized in Addis Ababa for the eight hospitals which was attended by 33 participants for 2 days. During this workshop, the IR implementation status of the hospitals was evaluated, cross learning among the hospitals was facilitated and a special session on NCoD implementation was conducted.

1.4. Targeted support to five learning hospitals to make them into learning centers

1.4.1. Support the five hospitals to develop and implement tailored action plans, based on needs assessment

During the first half of the year, DUP provided intensive support to the five learning hospitals of the 28 high caseload hospitals namely; Nekemte Specialized Hospital, Zewditu Memorial Hospital, Finoteselam, Adare, and Adigrat hospitals. As a result, all the learning hospitals have showed consistency in their data quality assurance and data use practices. All learning hospitals, except for Adigrat Hospital which was not functional because of security problems in the region, have conducted monthly LQAS and scored higher than 90%. Service reporting completeness of all the hospitals stayed at 100 % for the six-month period. Disease reporting quality on both measurement parameters was higher than 90 % for the last two months of the reporting period.

Generally, disease-reporting timeliness was noticeably high compared to service reporting (Figure 10). In addition, all four hospitals conducted monthly PMT meetings and two Adare and Zewditu Memorial hospitals conducted a case-team level performance review. Accordingly, performance improvement action plans were designed and implemented. In Adare, six case team-level performance and one hospital-wide improvement projects were designed and are being implemented.

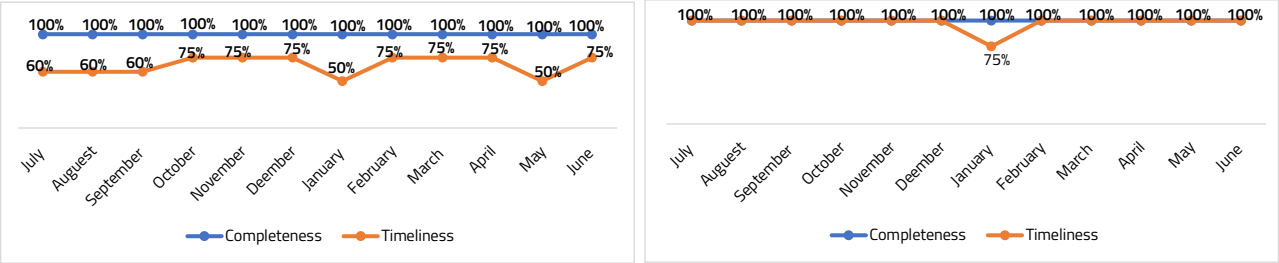
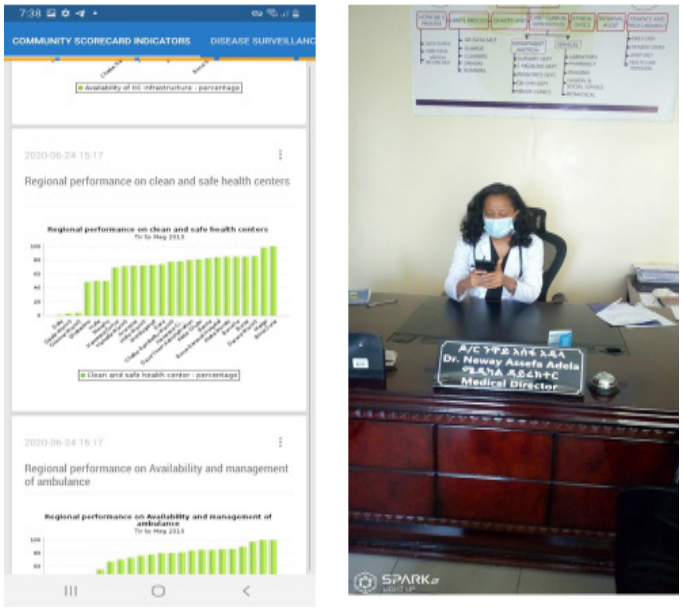


Figure 10. Service (left) and disease reporting quality at the five learning hospitals, July2020 –June 2021 (Source: DHIS2 as of July 21/2021)

Achievements at the individual learning hospitals are described as follows.



Dr. Neway Assefa, Medical Director of Adare General Hospital, using the DHIS2 dashboard mobile application for performance review.

Nekemte Specialized Hospital (Oromia)

- *The hospital's IT professionals conducted a LAN requirement specification (developed a site plan, identified a data center, and prepared a list of materials and bid documents) to increase accessibility and use of DHIS2 in each department.*
- *DUP covered the procurement of a few materials and the Oromia RHB allocated a budget for procurement of a server and related IT materials*
- *DUP trained 52 MRU staff on MRU management and 74 staff on integrated data quality, data use, DHIS2, and NCoD.*

Zewditu Memorial Hospital (Addis Ababa)

- *Conducted a baseline assessment*
- *Received a needs-based DHIS2, data quality, and information use training for its 47 staff.*
- *Preparing to test non-monetary incentives to improve data quality and use.*
- *Received a smart TV from DUP for dissemination of performance information with staff and the public.*
- *Claimed IR Model status by its own assessment*
- *Shared its experience with other hospitals at the experience-sharing workshop organized by DUP.*
- *Its recipe for success: strong leadership commitment!*

Adare Hospital (SNNPR)

- *33 staff from the hospital and Hawassa City Administration Health Department trained on integrated data quality, data use, and DHIS2.*
- *At the training, participants developed data quality and use improvement plans, based upon the identified gaps in their respective areas.*
- *Agreed to test non-monetary incentive mechanism to improve data quality and use.*
- *DUP's supportive supervision and mentoring found that:*

  » LQAS are regularly conducted at the department level;

  » Registers are reviewed on a monthly basis;

  » All deaths were audited;

  » Performance review meetings were established at the case team or service delivery unit level.

  » Every service delivery unit has a program performance monitoring chart;

  » Written feedback is given regularly to service delivery units on the routine HMIS reports received;

  » Action plans and quality improvement projects were prepared for identified priority problems;

  » Information from selected indicators is visualized and publicly displayed;

  » The hospital brochure and leaflet are used to disseminate information on its performance;

  » Leadership started using the DHIS2 dashboard as a performance monitoring tool.

Adigrat Hospital (Tigray)

- *A planned follow-up visit was canceled due to current security reasons.*

Finote Selam Hospital (Amhara)

- *Customized tools introduced by Zewditu Memorial Hospital to test the effect of a non-financial incentive package on data quality and data use practices.*

1.5. Support data quality, data use, and data analytics practices at national and regional levels

1.5.1. Provision of HIS training

DUP planned to provide IR-related training for 20,000 professionals in the project lifetime. Thus far, 13,877 professionals have been trained. Of which, 5,263 individuals were trained during this reporting year on different topics. DUP provided technical support to 46% of the trainings, financial support for 7% of them, and both technical and financial support to 47% of these trainings. Three percent of trainees are from the Ministry and other federal agencies and the majority of trainees, 97%, are from the regions (Figure 11).

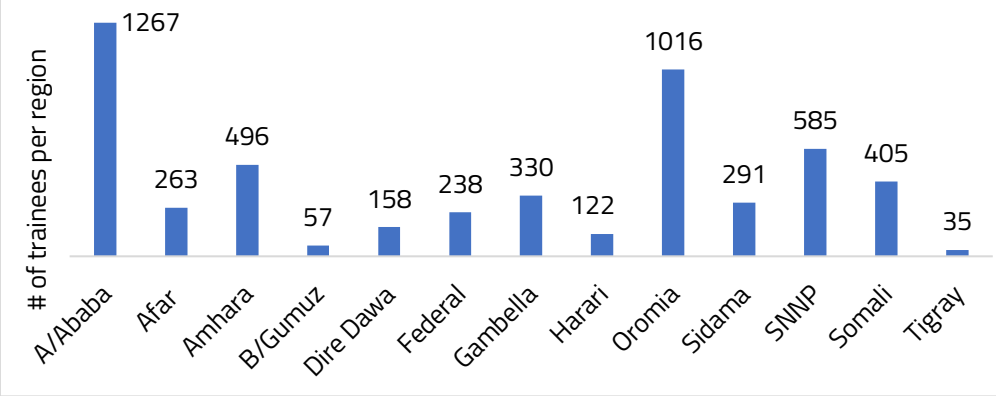


Figure 11 : DUP supported trainings from July 2020–June 2021 by region

The major training provided is the integrated data quality, data use, and DHIS2/ data quality and data use training, which consisted of 40% of the trainees. Other trainings include DHIS2-COVID-19 tracking and eCHIS training, data management, EMR, recording and reporting procedures, and leadership.

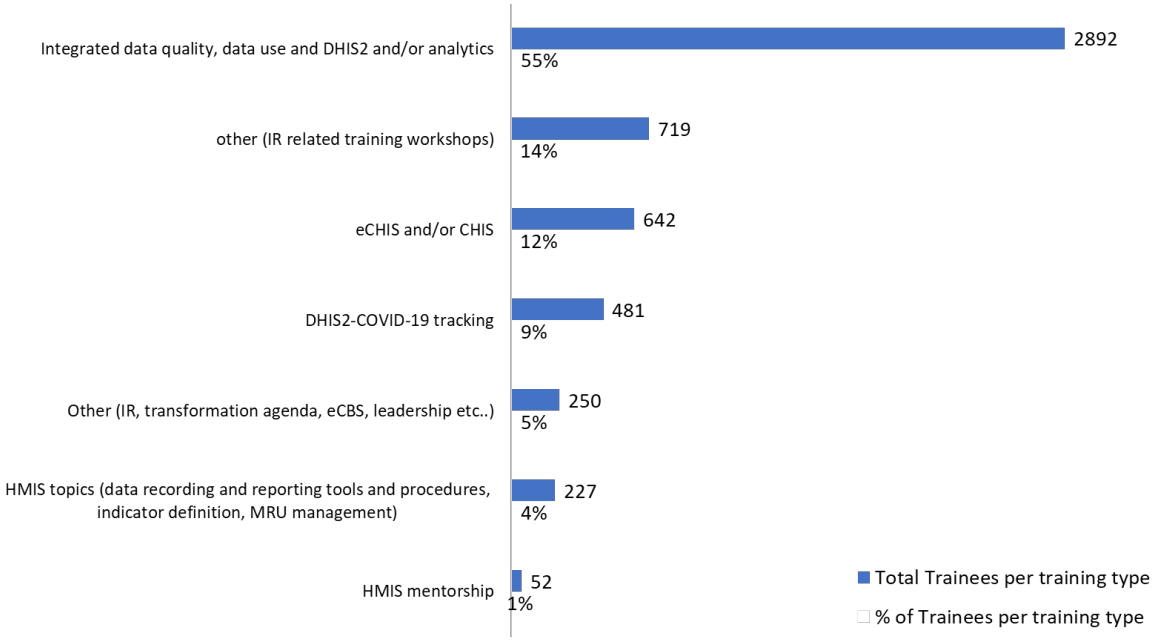


Figure 12: DUP supported trainings from July 2020-June 2021 by number and type

The trainings were provided based on lessons from learning *woredas* and gaps and challenges that regions, *woredas,* and HFs encountered while implementing DHIS2 and ensuring data quality and optimum data use practices. All the training sessions were followed by planning exercises where participants identified courses of action to transform the data use culture in their respective work environments. Although we have yet to evaluate the impact of the training, we have started observing an increase in health worker commitment, interest, and capacity to use their data.

1.5.2. Support use of evidence during annual woreda based planning, policy analysis, program review meetings, and policy making process by making synthesized reports available

Coordination of and support to the 22nd Health Sector Annual Review Meeting: One of the major platforms for MoH evidence-based discussions and decisions is the Annual Review Meeting (ARM). The 22nd health sector ARM was organized in Addis Ababa from November 4–5, 2020. DUP supported and led the development of technical documents such as the annual performance report, special bulletin, and health and health-related indicators report. In preparing the annual performance report, DUP was engaged in running data analytics and writing the following sections, including maternal health, non-communicable diseases, pharmaceutical supply, transformation agenda, and others. Lessons from sites that are intensively supported by DUP to generate learning were included in the special bulletin. Likewise, a document that compiled IR success stories and another that presented the implementation status of IR initiatives were prepared. DUP further supported the Ministry by printing documents that were distributed during the ARM, including 250 copies of the ARM executive summary report.

The 22nd Health Sector ARM with the Minister and State Ministers of health in the front row, November 4 - 5, 2020, Addis Ababa

Documentation of Ethiopia's experience in the Information Revolution: With the aim of sharing Ethiopia's experience on measuring data use, DUP in partnership with MoH has prepared a document that describes the concept of data use, Ethiopia's IR agenda, and the IR model woreda creation strategy, including its measurement approaches and tools (the document is shared with this report). Additionally, DUP supported the development of a detailed IR progress report for interventions under the IR strategy's two pillars, data use and digitization, and its foundation, governance.

Support in the finalization of the HSTP II: DUP technically and financially supported the MoH to finalize the document by organizing a series of consultative workshops in this reporting year. Additionally, DUP supported the development of a separate HSTP monitoring and evaluation (M&E) plan. DUP also supported the translation of the draft HSTP II and the HSTP II Advocacy Plan into Amharic. The final draft was endorsed and in May 2021, PPMED conducted a virtual advocacy workshop on the plan to 120 people from the public. DUP played a critical facilitation role through the preparation of the agenda and PowerPoint presentation slides.

Support in the development of sub-strategic plans: In line with the HSTP II, different directorates and agencies are developing sub-strategies. DUP actively supported the Health Professional's Accreditation and Licensing Directorate; Geffersa Rehabilitation Center; and the Women, Children, and Youth Directorate in strategic plan development. The support mainly included guidance on the planning framework, target setting, and cost estimation. Moreover, DUP supported the MoH's MCH Directorate in its endeavor to develop a nutrition strategic plan by providing baseline data, refining targets and activities, and supporting development of the costing of the plan. DUP also supported the MoH's Pharmaceutical Medical Equipment Directorate in the development of medical device management strategy.

Finalization of the new health policy: DUP supported the MoH to organize different workshops for further consultation and finalization of the MoH's draft national Health Policy. Consultations were done face-to-face, virtually, and through social media with professional associations, the private and public sectors, and the general public (House of People's representative and line ministries) to gather valuable comments. Feedback from the stakeholders was incorporated, and the policy was sent to the Attorney General (AG) for comments in the fourth quarter. The first round of comments from the AG were incorporated and the document was sent back to the AG for final approval.

Alignment with the Planning and Development Commission: DUP supported aligning MoH's five- and ten-year plans with other social and economy sectors' plans during different forums prepared by the Ethiopia Planning and Development Commission.

Preparation of ToR for the assessment of the health sector planning process: DUP supported the MoH in developing a ToR and plan of action to assess the health sector's planning process. The purpose of the assessment was to identify the strengths and challenges of the planning process and its implementation status to improve the plan's quality and use. While the assessment was not conducted because of other competing priorities, DUP actively engaged in the development of the proposal, questionnaire, and consultative forums for the proposed assessment.

Concept note development: The Ministry directorates submitted 51 project concept notes to the Government's Planning and Development Commission for funding. However, according to the commission's feedback, these projects required further evaluation and prioritization to reduce their number to a more manageable size. DUP actively engaged in screening the projects by developing selection criteria that objectively measured the outputs, deliverables, outcomes, cost, and beneficiaries of the projects. Based on these criteria, 31 projects were prioritized and endorsed by the MoH management as final and submitted to the Planning and Development Commission for funding.

Assessing the inclusion of health in all policies: The MoH conducted a desk review of other sector policy documents to understand if and how health is addressed in their policy. In February 2021, DUP organized a workshop for MoH and DUP experts to gain common understanding on public policy formulation, translation, health in all policy, prioritization, and policy negotiation. In this workshop, DUP and PPMED staff ranked ministries from other sectors, based on their influence, interest, and stake on the health sector. Out of the 21 line ministries that were initially selected for review, only 12 had a policy or strategic document. DUP technically supported reviewing the sectors' policies and strategies. Accordingly, most of the sectors have incorporated health and health-related issues in their strategic document on some level. In the future, to fully realize the inclusion of health in all policy strategies, MoH will focus on providing orientation to other sectors about health-related issues pertinent to their sector, involving these sectors during the health sector plan development process, and engaging and ensuring inclusion of health during the sector's plan development.

Annual program-based budgeting (PBB) of MoH: As one of the budgetary public entities governed by the Ministry of Finance and Economic Development (MoFED), the MoH is required to submit an annual program budget request. In Quarter 3, DUP heavily engaged in revising the MoH's PBB template for the fiscal year 2014 E.C. and providing orientation for directorates, hospitals, and Armauer Hansen Research Institute (AHRI) on the templates and the program budget structure. This effort was followed by a strong follow-up, providing support to the directorates, hospitals, and AHRI in preparing their budget requests. With the assistance of DUP, the budget was drafted and submitted to MoFED along with a budget summary and a line item justification. The budget was adjusted, based on suggestions from MoFED and re-submitted in the last quarter.

Development of planning guidelines: DUP supported the PPMED to develop a guide to be used as a reference to direct the processes of plan development in the health sector. A one-week workshop was organized in December, at which 20 experts from PPMED and agencies participated. The developed planning guidelines was used to train RHB staff and for the annual plan development process.

Annual *woreda*-based health sector plan: DUP supported the preparatory phase of the *woreda*-based planning process, which included finalization of planning templates, development of an indicative plan and budget proposals, and preparation of training materials. In Quarter 4, planning tools, guidelines, and formats were revised at the national level. The guidelines were revised to accommodate both the Balanced Score Card and the Strategic Planning Management planning approaches. In April 2021, DUP technically and financially supported a national-level orientation workshop for 70 participants from all regions and MoH and agency program experts, to provide guidance and templates for the *woreda*-based planning. Respective program and agency experts presented on MoH's indicative plan.

DUP's regional staff technically supported the regional-level orientation and plan development process for Amhara, Addis Ababa, Dire Dawa, Somali, and Tigray regions by assisting in target setting, costing, resource mapping, and the plan aggregation workshop. After regions sent their final plans to the MoH, DUP provided technical support during the national-level aggregation and reconciliation workshop.

EFY 2014 MoH Comprehensive Plan: In Quarter 4, DUP supported the revision of comprehensive planning formats, forms 2 and 4 in particular, and orientation of MoH and its agencies on the planning guide and formats. DUP staff were well represented in the taskforce and technical support group that coordinated the planning process.

1.5.3. Support provision of periodic feedback on data quality, performance, completeness and timeliness of report etc. based on monthly review of HMIS data

At the **national-level**, as a result of concerted efforts over the past three years at all levels of the health system, the flow and availability of routine health data has improved. For example, service data reporting increased from 72% in 2017 to 89% in 2021 (although service reporting completeness showed a slight decline over the last three quarters as a result of the political unrest that impended health service delivery in the northern part of the country). Similarly, disease reporting completeness was lower than the 90% target for the past three quarters with a similar reason. Likewise, timeliness of service and disease reporting were substantially below the 90% target (figure 13).

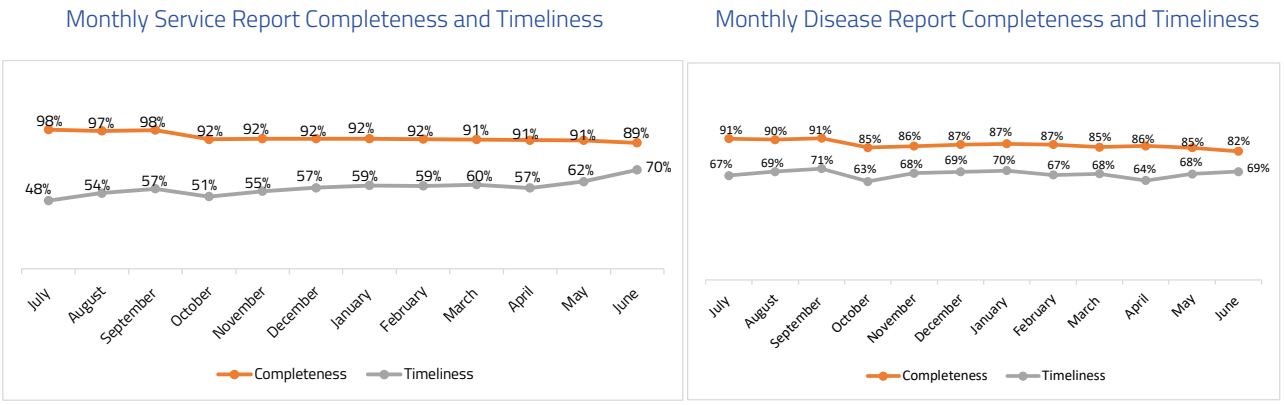


Figure 13. Service (left) and disease reporting completeness and timeliness at national level, July 2020 – June 2021 (Source: DHIS-2 as of July 21-21)

In the reporting year, the MoH's PPMED provided three rounds of feedback to the RHBs on the quality of routine data. DUP assisted in identifying data quality issues, conducting analysis, completing a write up, and providing feedback to Addis Ababa, SNNP, and Oromia RHBs. These reports primarily focus on selecting outliers, addressing inconsistencies between related indicators, and reporting rate status as measured by completeness and timeliness.

At **regional-level**, DUP regional offices conducted robust reviews of monthly program performance and monthly disease and service reports submitted by sub-cities, facilities, and hospitals. The results of the reviews were shared and feedback was provided to the respective institution's PMT, program directorates, ZHDs, RHB, and WoHOs.

*Group channels on Telegram was used as feedback communication platform by **Addis Ababa, SNNP, Sidama**, **Gambella**, and **Harari** teams.*

*Although the **Tigray** DUP team was not active for several months due to security reasons, the team attempted to review consistency of the report from DHIS2 and to monitor report completeness and timeliness of respective woredas and hospitals. As a result, the team reported backlog data of some facilities, collected weekly PHEM and emergency essential service indicator and onsite HIS technical support provided.*

*In **Amhara, Oromia,** and **SNNP** regions LAN installation and different electronic materials supported to improve functionality of ICT.*

In **Amhara**, in six months' time, the target for service report and disease report completeness was reached and maintained at **98% and 95%,** respectively. Likewise, practicing LQAS improved from 84% to 98% in hospitals (Figure).

In **Dire Dawa** regional report completeness and timeliness (n=51) reached **100**% as well as **100**% and **99**%, respectively, for monthly and quarterly service and disease reports.

In **Oromia**, report completeness and timeliness for all types of reports significantly improved in all supported facilities, and trends of the LQAS scores also showed greater than or equal to **90**% for all types of reports.

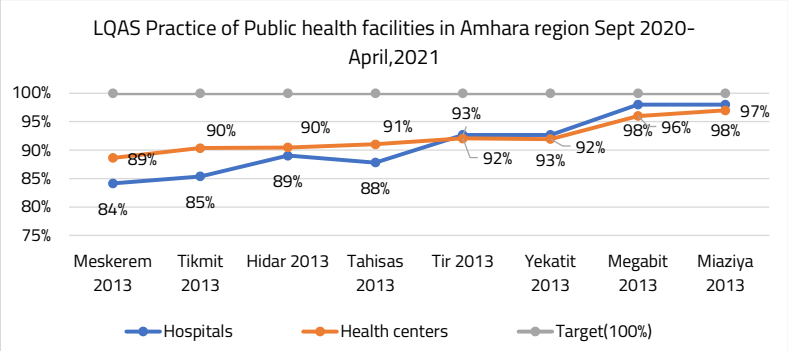
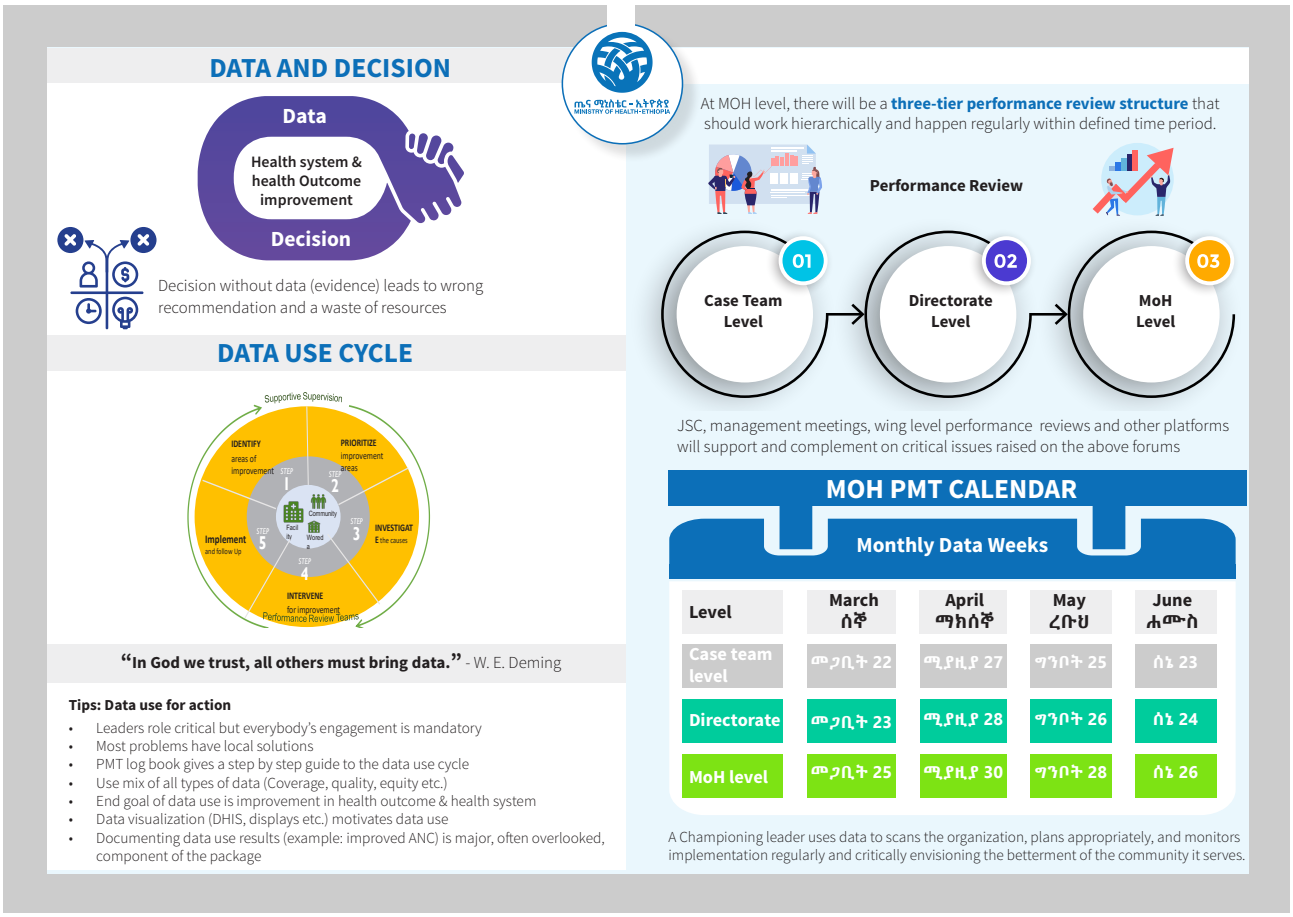


Figure 14: LQAS practice of public HFs in Amhara Region September, 2020 - April, 2021

Data sources: 952 public HFs (82 hospitals and 870 HCs) reviewed.

1.5.4. Follow-up and strengthen regularity and functionality of PMT meetings at all levels

The PMT meeting is the foremost platform for using data for action at all levels of the health system. In these forums, the PMTs analyze performance data, detect gaps, identify root causes for observed gaps, and develop actions to remedy them. The absence of a standard PMT meeting at the Ministry-level has been a repeatedly mentioned limitation for promoting data use practices within the MoH itself. Therefore, DUP, together with PPMED, supported the finalization and endorsement of the PMT TOR and developed a poster for the national-level PMT, which featured data use concepts and a meeting calendar. At the inaugural MoH PMT meeting, DUP developed data-driven presentations and compiled meeting minutes. The PMT meeting was led by the State Minister - for Programs, and directors of the major directorates of the Ministry participated in the meeting. Two major action items were identified during the meeting: strengthening efforts to improve private HF reporting, and sustaining the initiated PMT meetings at the MoH and directorate/case team levels. The plan is to hold the MoH level PMT meeting every month as soon as the monthly report is collected and compiled through DHIS2, the national routine data collection and analysis digital platform. However, due to multiple competing priorities, the monthly PMT meeting could not be maintained at the Ministry level.



A PMT poster prepared by MoH with the support of DUP to promote data use practices

Similarly, DUP's regional teams helped coordinate the RHB PMT meetings where participants discussed results from the monthly or quarterly data quality and performance analytics, designed improvement plans, and provided feedback to the lower administrative levels and HFs. PMTs in some regions took new courses of action to boost program performance, data quality, and data use practices at all levels of the health system. For instance, Addis Ababa, Harari, Amhara, and Diredawa RHBs introduced case team and directorate-level PMTs, and involved them in identifying root causes of performance gaps and developing action plans accordingly. In Harari region, high performing PHCUs were recognized at the PMT meetings as a way to promote data use practices in the health system. In Sidama (a newly formed region), DUP supported the customization of a draft ToR to establish institutional, departmental, and case team level PMTs at the RHB.

Abiyot Asrat, a nurse at Jelobelina Health Center, in Dire Dewa City Administration, shows PMT meeting Minute file

The PMT in Tsid Mariam health center, Awabel woreda noticed a sharp decline in skilled birth attendance, from 25 to less than 10 deliveries per month since March, 2020. The head of the HC explained the situation as follows: "During the root cause analysis using fishbone method, fear of COVID-19 was identified as main cause. However, we didn't stop there; with the board memebers, community meetings were called to discuss why and several issues were raised. A substantial number of people mentioned fear of COVID-19 as a reason not to visit the facility. This confirmed our earlier analysis, and we promised to expand maternity room space. We also asked health extension workers (HEWs) to explain COVID-19 prevention methods and that the health center is safe to give birth. Since then the number of births attended has increased, as can be seen on the chart."

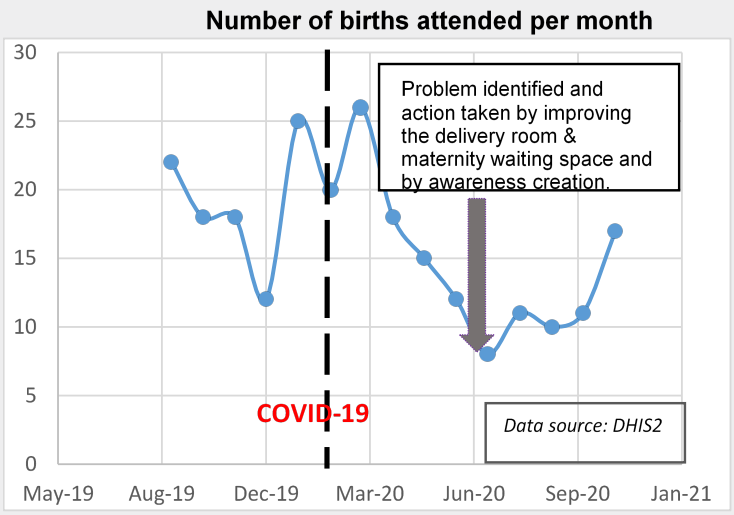


Figure 15: Data use at service delivery level: The case of Tsid Mariam HC, Amhara Region

1.5.5. Support data visualization and data analytics

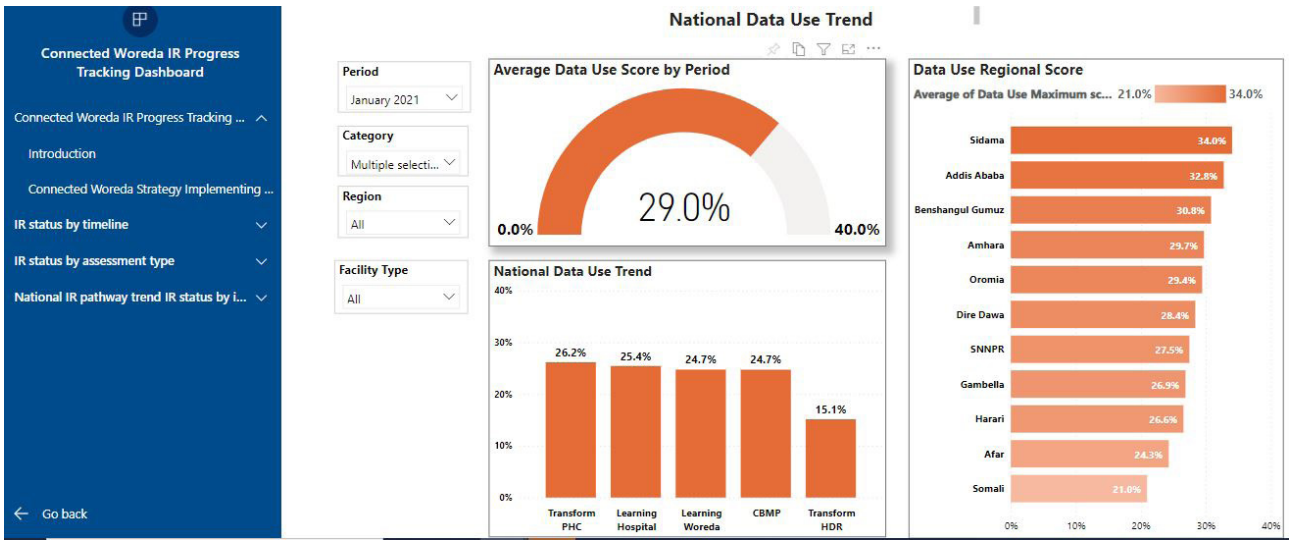
In Year IV, in an effort to increase health managers and policy makers' demand and use of DHIS2 data, DUP produced and regularly shared analytical reports with MoH senior management and all regions.

At **national-level**, DUP has participated in the preparation of quarterly and monthly analytical reports that show progress and gaps on KPIs related to maternal health, malaria, and non-communicable diseases disaggregated by region. These reports include:

- The First Quarter Data Analytic Report; (Hamle to Meskerem 2013)
- The Six-Month Data Analytic Report; (Hamle 2012-Tahisas 2013)
- The Nine-Month Data Analytic Report and (Hamle 2012-Megabit 2013)
- Five monthly analytic reports for the months of Tikimt/October, *Tir*/January, *Yekatit*/ February, *Miazia*/April and *Ginbot*/May.

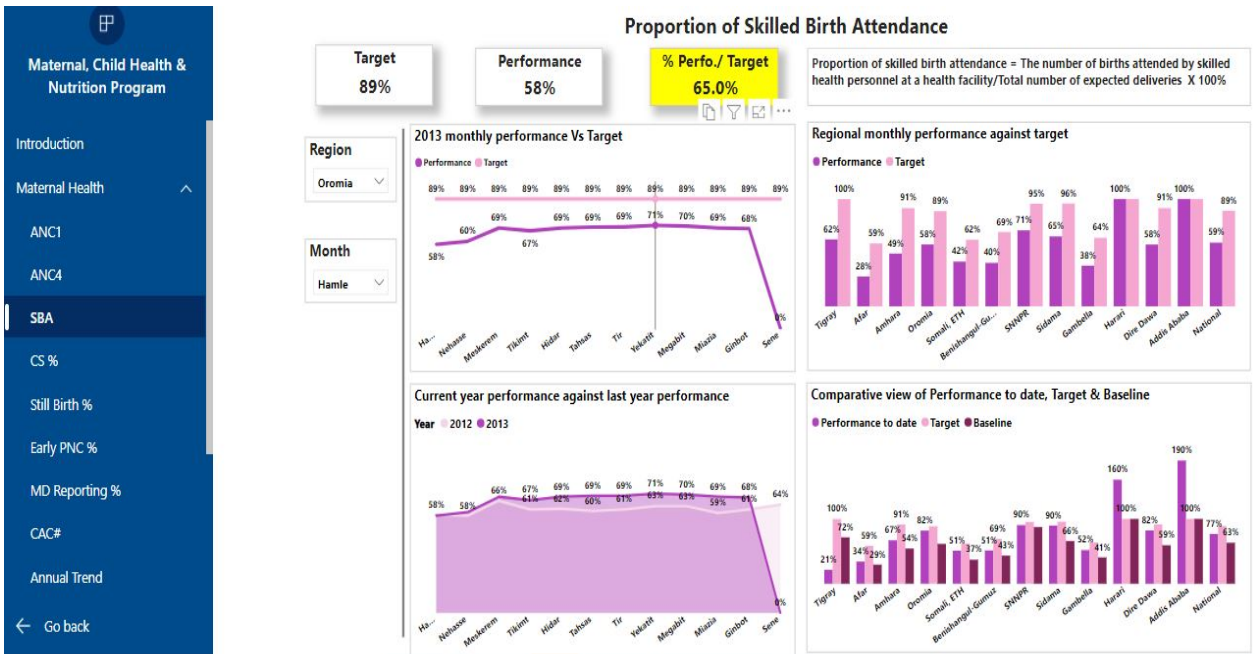
During this process, DUP actively engaged in pre-analysis data quality checks, analysis, interpretation, presentation, and report write-up of the maternal health and disease prevention sections. In addition, DUP supported, both technically and financially, the graphic design, printing, and dissemination of all the analytics products to a wide group of stakeholders, including MoH directorates, RHBs, and partners.

Creating and maintaining connected *woredas* across the country is one of the strategic intervention areas of IR. With MoH, DUP has been supporting the implementation and monitoring of connected *woreda* IR status for several months. In Year IV, DUP supported MoH in the design and development of a dashboard to track and monitor IR implementation status of connected *woredas* across regions in respect to HIS structure and resource, data quality, information use indicators, and facilities' IR pathway (categorizing facilities as Model, Candidate, and Emerging based on the three indicators).



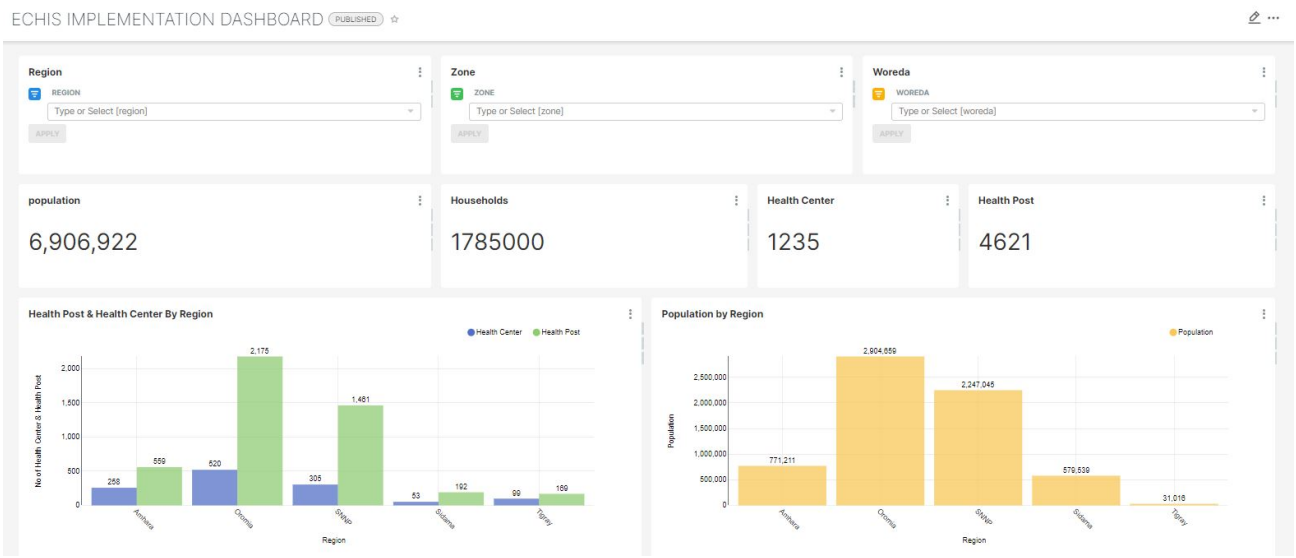
MoH's Connected *Woreda* IR Progress Tracking Dashboard housed in DUP, April 2021

Furthermore, DUP developed a prototype dashboard for the Maternal Child Health and Nutrition (MCHN) program, monitoring for key indicators to address the needs of the MCHN Directorate. A series of meetings were held with the directorate's staff, including the director, to understand their data needs and a PowerBI dashboard was prepared based on the data generated from DHIS2. The dashboard is now finalized based on feedback from the directorate. It includes different charts and graphs for more than 35 indicators under five thematic areas (maternal health, family planning, EPI, child health, PMTCT, and nutrition). The directorate's staff now have access to key program indicators in near real-time with drill down capabilities in geographic area and other dimensions. This dashboard also enables the directorate to track the performance of programs and compare against targets and prior period performance.



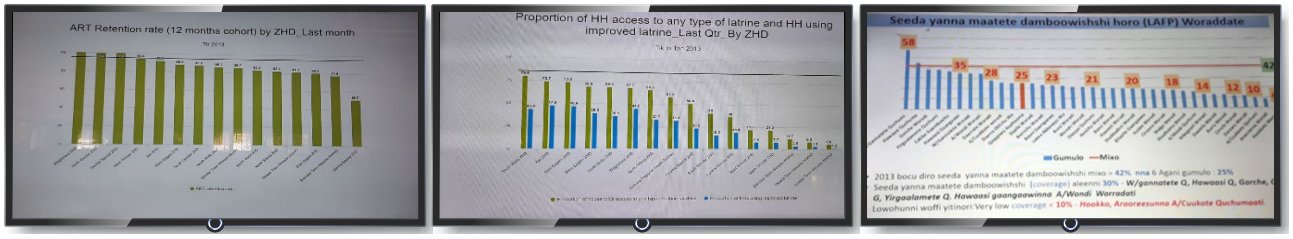
MoH's MCH Program Monitoring Prototype Dashboard, April 2021

The lack of an eCHIS implementation tracking and monitoring tool was one of the challenges to monitor and control the system's implementation status and take corrective measures in a timely manner. This gap, along with other factors, limited efforts to measure and understand the extent of the data quality, analysis, and program owners and health extension workers' (HEWs) information use of eCHIS. MoH planned to integrate an eCHIS implementation tracking and monitoring tool in this fiscal year. In this regard, DUP supported the Ministry in tool selection, requirement elicitation, as well as dashboard design for certain eCHIS implementation KPIs. The tool not only helps to track locations where eCHIS is implemented by region, zone, and *woreda*, but also provides details such as total population, number of households, and number of HCs and HPs in a selected area (see below). This will allow for better visualization of community data and supports data-driven decision-making in the program area at all levels.



MoH's eCHIS implementation site dashboard, April, 2021

At **regional-level**, DUP's regional teams have closely supported their RHBs on analysis and interpretation of KPIs of essential health service and data quality (completeness, consistency, and timeliness) on a monthly basis. In **Gambella,** DUP staff also prepared a five-year performance indicator analysis for the region. This work resulted in improved DHIS2 data visibility by creating a dashboard of key indicators displayed on TV screens at RHBs and some directorate offices particularly in Amhara, Oromia, Sidama, and SNNP regions.



Smart TV used for data visualization in Amhara (left) and Sidama RHBs (right)

Regional DUP teams supported the preparation of the first regional bulletin of the first semi-annual performance period in **Somali** and a regional annual performance report bulletin in **Oromia**. In **Amhara Dire Dawa, Gambella,** and **Oromia**, the DUP regional team was able to install the DHIS2 mobile app on the local server and made the dashboard accessible by authorizing RHB staff access through their smartphones. The team also provided an orientation on app management.

Moreover, in **Addis Ababa, Gambella, Harari,** and **Oromia,** DUP regional teams supported the preparation of weekly COVID-19 epidemiological updates, shared them with their respective RHBs, and supported their presentation at the EOC meeting.

1.5.6. Support MoH and RHBs to conduct Routine Data Quality Assessments (RDQA)

Routine data auditing and assessment of the underlying data management and reporting system is among the HIS interventions aimed at improving the quality of data generated and shared at different levels of the health system.

At **national**-**level**, PPMED postponed RDQA to the next fiscal year because the senior management at MoH prioritized integrated supportive supervision (ISS) instead. However, important parameters of data quality and data use, including indicators for verification, were included in the HIS section of the ISS checklist. DUP supported the development of the checklist and participated in the ISS. In addition, DUP technically and financially supported an ISS report write-up workshop and assisted the Ministry in editing and designing the report.

The ISS covered all regions except Tigray, 11 zones, 27 woredas, 15 hospitals, 57 health centers, 96 health post, and 125 households. According to the findings, most of the data use and data quality parameters showed improvement. To mention some, 61% of the sites use an updated DHIS2 dashboard, 85% of WoHOs have functioning PMTs, and 89% of the HFs conduct reporting consistency checks using LQAS. Regarding the verification factor of recounted to reported values for skilled birth attendant indicator (N=73), Penta 3 (N=169) and TB detection (N=73) indicators, 92%, 78%, and 85% of the facilities, respectively, have a verification factor between 0.9 to 1.1. The average (national level) verification factor for the three indicators were 1, 0.96, and 0.97 respectively which indicates that verification factors for those indicators fall within the acceptable range.

At **regional level**, the **Addis Ababa** DUP team supported the RHB to conduct RDQA at 24 health institutions. The team also facilitated a two- day RDQA finding dissemination workshop with 50 participants where participants discussed identified gaps in detail and developed an improvement action plan.

In **Harari,** DUP in collaboration with regional PMED staff conducted RDQA in eight HCs, two hospitals, and nine HPs visited during the supportive supervision.

In **Oromia**, RDQA was conducted at 31HFs (hospitals, HCs, and HPs). Overall, data accuracy on the assessed indicators was lower than the expected range; data transfer errors, arithmetic errors, and missing source documents were identified as possible causes. In addition, a shortage of standard registers, parallel registration and reporting, skill gaps, non-functional PMT, and lack of information use practices were observed. To mitigate these and other system component issues, the team proposed mitigation actions that include training on data quality and how to use the HMIS tools, distribution of HMIS and eCHIS tools, regular supportive supervision, and close follow-up on the functionality of PMT. In Quarter 3, DUP's regional team used supportive supervision as an opportunity to conduct the verification part of RDQA in 21 HCs, seven hospitals, and 21 HPs. Based on the findings of each facility, the team provided onsite feedback and discussed the way forward.

In **Somali** region, using the established regional HIS governance framework as an opportunity to engage implementing partners, both USAID's Transform-HDR Project and DUP mobilized resources to support the RDQA in four zones. The assessment covered 32 HCs and HPs in 12 *woredas*. The findings indicated that all assessed data quality parameters—reporting timeliness, source document completeness, report completeness, and data accuracy—require due attention. Data accuracy on all the assessed indicators was critically low. Lack of data collection forms, malfunctioning of electronic devices, high turnover of trained staff, and poor performance monitoring and data use practices were identified as potential contributors to the data quality problems. An action plan with clear roles and responsibilities was prepared to close the gaps. Moreover, to bridge the knowledge and skill gaps, DUP and UNICEF supported data use and quality training to HF and WoHO staff in eight *woredas*. As a result, at the lower level, data seeking behavior and knowledge of report checking is gradually being established, using a constructive feedback mechanism

is becoming a norm, and facilities have initiated PMT and are maintaining its functionality. Follow-up supportive supervision was conducted at 12 *woreda*, 12 HCs, and three hospitals in Quarter 4 and significant improvement was observed (Table below).

Table 2: Findings from RDQA and supportive supervision in Quarter 1 and 4 in Somali region

#	Indicators	Finding of RDQA Quarter 1	Finding of SS Quarter 4
1	Proportion of facilities that have clear instruction on how to complete report	5%	90%
2	Documentation of report submitted	50%	100%
3	Facility staff trained on data collection and compilation	50%	80%
4	Report completeness	45%	100%
5	PMT functionality	14%	50%
6	Proportion of facilities that conduct LQAS	15%	85%
7	Proportion of facilities whose verification factors within acceptable range for: • Skilled Birth Attendance • Penta3 vaccination	 35%	 93% 95%

1.5.7. Support national HMIS indicator revision workshops at national and regional levels

Support to the national HMIS indicator revision

Since the Ethiopian HMIS was redesigned in 2007/2008 under overarching principles of standardization, simplification, and integration, it went through two revisions in 2014 and 2017. The revision process is generally expected to happen every three to five years to align with major programmatic developments, new strategic plans, and initiatives. Therefore, in Quarter 3, the sector started revising its HMIS indicators to address the shifts in the HSTP II and monitoring challenges of programs. From previous experience, the revision process can take an extended period of time and it is usually complicated as the different departments have ambitious data demands which are unrealistic to accommodate within the limited number of national indicators.

DUP staff played an important role in supporting MoH to effectively lead the overall process, which starts from the development of a ToR. Following the ToR, a core technical team (CTT) was formed in which DUP is well represented. DUP staff actively supported four of the five thematic categories operationally developed for this task, namely health system strengthening, disease prevention and control, medical services, and hygiene and sanitation. DUP supported each directorate and agency in the aforementioned categories to draft and review their proposed list of indicators, collectively and in one-on-one discussions with the respective directorates.

The indicators were fine-tuned in series of workshops; to develop a first draft of the revised HMIS indicators list (with definition, formula, interpretation, data source, frequency of reporting, and level of disaggregation for each indicator) then to refine them before approval.

1.5.8. Support revision of the National Classification of Disease (NCoD)

Improving the quality of disease data as cause of morbidity and mortality is critical to measure the burden of diseases and effectiveness of health intervention programs. Along with revision of the national health indicators, MoH has established the national task force for NCoD revision at the end of the second quarter and accomplished several activities in the third quarter. As the continuation of the effort, DUP supported MoH both technically and financially to conduct the NCoD gap assessment from March to April 2021 on 51 HFs and two directorates in seven selected regions and two city administrations. In addition, DUP sponsored the NCoD gap assessment report writing workshop where DUP designed the Google form for data collection and finalized the report. The major findings of the rapid assessment were:

- Nearly 40% of service units of a HF do not use NCoD to prepare the monthly disease report
- The processes of disease data recording and reporting with assigned roles and responsibilities to healthcare workers in most of the visited health facilities were similar
- Availability of existing NCoD resources such as OPD/IPD registers, tally sheets, NCoD booklets, and access to National Health Data Dictionary (NHDD) pocket mobile application was inadequate in the visited health facilities
- Inadequate training and regular mentorship given to healthcare workers, contributing to the observed knowledge and practice gaps
- The confidence level of facility heads on the morbidity and mortality data was low
- Missing diagnosis, erroneous use of parenthesis such as *Kaposi sarcoma* (Malignant neoplasm of breast) and *Malignant neoplasm: Female genital organ*, unspecified (Malignant neoplasm of prostate), redundant list of diagnoses, inconsistent NCoD ID/code (a disease may have three different IDs for extended, compact, and mini-editions of NCoD

DUP presented these findings to the national data use TWG, and identified key action items (NCoD content, tools, and job aid revision, training, report generation) with a tentative timeline after conducting additional virtual meetings. Since most of the NCoD content and implementation gaps were related to ill-defined principles and concepts, the national task force identified 14 key issues that needed managerial level decisions prior to the execution of the action items. Therefore, DUP provided further technical support to MoH providing additional evidence to facilitate the officials' decisions.

1.6. Cross-cutting

1.6.1. Data use regional and national level cross-cutting activities

HMIS recovery effort in Tigray

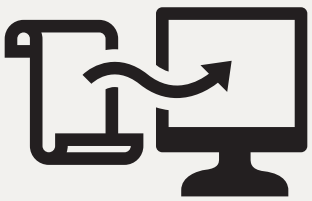
In the third quarter, DUP's Tigray regional team travelled to Addis Ababa and held consultative meetings with MoH and the DUP management and technical team. Subsequently, the team developed its six-month plan to support the HMIS recovery effort in the region. Based on this, the team has coordinated the establishment of a partners forum, developed an emergency HIS recovery plan, and assigned the responsibilities to support the recovery plan to different partners. DUP technically and financially supported the HIS refresher training to RHB and Mekelle University CBMP staff. Airtime was provided to regional HMIS officers to support weekly data reporting to monitor the status of essential services. Additionally, DUP has logistically and technically supported the collection of weekly and monthly service data from facilities in Mekelle Zone. The team developed data management ToR under emergency situations and formed a data management team, which included DUP staff as focal persons. In Quarter 4, the Regional DUP Team supported a two-day workshop for 12 MoH, EPHI, and RHB experts to develop a joint health system recovery and response plan for the region. The plan was prepared at the end of this workshop and was presented to the MoH task force and the RHB management.

Consultation workshop and training on DHIS2 with Ministry of Defense

In April, DUP supported a consultative workshop to initiate the deployment of DHIS2 at the Ministry of Defense. The meeting served to orient the Ministry of Defense on the MoH's HIS reporting processes and tools, DHIS2 in particular. A total of 23 participants from PPMED, Ministry of Defense Health Department (17), and from the HISP project attended the workshop. During this meeting, a list of reporting hierarchy was drafted and the Defense Ministry was assigned to enrich it further and send it to MoH. Participants agreed for the Ministry of Defense to use existing recording tools endorsed by MoH. The preparation of a draft data set is in progress and an agreement was reached on the need of a data sharing guide and on its development after the data set was prepared. A DHIS2 deployment plan was prepared for the Ministry of Defense.

SECTION II

DIGITIZATION OF PRIORITY HIS



SECTION II: DIGITIZATION OF PRIORITY HIS

Over the past few years, several digitization efforts and digital health interventions are underway, guided by the IR agenda, that enable the MoH to catch up with the booming digital era. The recently developed national digital health ecosystem blueprint (DHBp) also has provided an advanced and fresh outlook of the digital health efforts in the Ethiopian health sector. DUP is a key partner of MoH in digitalization of key HIS and supporting the penetration of the digital health concepts in the sector. The following section zooms in to major digitization supports DUP provided to MoH and regions in EFY13 (July 2020 - June 2021).

Highlights

1. *Developed a national digital health ecosystem blueprint (DHBp)*
2. *Conducted the health sector's HIS maturity assessment*
3. *Developed the national Digital Health Strategy (2021–2025)*
4. *Executed two DHIS2 academies*
5. *Produced the NHDD governance protocol (with mobile app)*
6. *Conducted an apps inventory that was published in the Digital Health Atlas*
7. *4,456 HPs have implemented eCHIS. 3,050 of them implemented this year.*

2.1. Prepare National DHBp

DUP significantly engaged in and supported the preparation of the DHBp, an initiative triggered and guided by the Office of the State Minister, Operations. The DHBp was prepared with the intention of creating an ecosystem and clear governance mechanism for the execution and sustainability of digital health strategies, policies, procedures, and projects of MOH and its stakeholders. In addition, the blueprint is meant to help the harmonization and packaging of the many fragmented digital health initiatives. The blueprint has four main pillars: Solutions and Services, Access and Delivery, Data Hubs, and Infrastructure and the technical details have been included for each. The blueprint also identified ten overarching digital health initiatives to guide digital health in the coming decade.

The blueprint is not meant to replace existing digital health strategic documents; rather, it is expected to enhance visibility, coordination, and integration of the different digital health and information system strategies and roadmaps. DUP provided a wide range of technical assistance and logistics support in the revision of the DHBp and facilitated the participation of multiple stakeholders, namely MoH (Minister's Office, State Minister's Office, HITD, and PPMED), agencies (EPHI, AHRI, EFDA, and EPSA), partners (DHA and ICAP), and academia (Mekelle University). The DHBp was reviewed by the National HIS Advisory Group (NAG) and by the MoH's senior management, and is now finalized and endorsed. DUP is currently supporting the copy editing, graphic design, and publishing of the blueprint. Socialization and implementation tasks will follow in the months to come, and DUP will continue supporting these efforts.

DHBp Stakeholders meeting in MoH, H.E. Minister's meeting hall

2.2. Develop the National Digital Health Strategy (2021–2025)

DUP supported the MoH's HITD and the Office of the State Minister in developing a comprehensive and long-term National Digital Health Strategy for 2020–2025. This strategy is expected to guide stakeholders in the health sector—service providers, health program managers, policy analysts, decision makers, strategic partners, and funders—to refocus their digital health investments accordingly. It will guide the establishment of digital health frameworks and infrastructural components to facilitate data-sharing across geographic and health sector boundaries. It will also encourage national alignment and connectivity while giving regions, zones, *woredas*, HFs, health care providers, and care-providing organizations the ability to solve their specific digital health challenges.

The digital health strategy was developed in light of the DHBp that was prepared to guide all digital health investments in the coming ten years (2021–2030). The strategy was also crafted in harmony with the existing documents of the health sector, such as HSTP-II, IR roadmap, HIS strategy, the draft health information technology policy, and other strategic documents. Experiences of global digital health strategies, which includes the experiences of the World Health Organization and European Union, have also been incorporated. MoH management and staff, agencies, regions, implementing partners, and other stakeholders were consulted in the course of its development. The strategic document covered the present status of digital health, digital health vision, mission and objectives, implementation strategies, strategic directions/pillars, core initiatives, detailed implementation plan, costing and budget, and M&E plan. DUP facilitated the development of the strategy and covered the travel and logistic expenses in the entire process that included rigorous development, refinement, and alignment workshops. The strategy is expected to be finalized and endorsed by the MoH-IR steering committee and Office of the State Minister before it is officially implemented in the upcoming Ethiopian fiscal year.

2.3 DHIS2 Implementation Support

2.3.1. DHIS2 Academies

DHIS2 is a global public good transforming health information management around the world. It is an open source, web-based platform most commonly used as a HMIS globally. Currently DHIS2 is a standard HMIS tool across all health administration levels and health facilities in the Ethiopian Health sector. DHIS2 has also been extended to other domains including disease tracking and analysis, public health emergency management (PHEM) and COVID-19, KPI tracking, multisector-based nutrition performance management,

and other related initiatives. There have been several capacity building activities performed at national, regional, and HF levels to enable data capturing, reporting, and analysis using DHIS2. In light of this, DUP collaborated with MoH and the International Institute for Primary Health Care to conduct two successful DHIS2 academies locally.

2.3.1.1. DHIS2 Analytics Academy

Data analytics academy-level training was also provided to selected health professionals so as to promote a comfortable use of the DHIS2 system for evidence-based decision-making and planning, particularly at the points of service (facilities). As there has been a tremendous turnover of the trained staff at *woreda* and facility levels, there is a need for a pool of DHIS2 data use certified trainers in the sector. Therefore, the overarching goal of this academy was to create a national pool of DHIS2 data analytics trainers and to promote the MoH's Digital Health Innovation and Learning Center (DHILC), located in St. Peter's Hospital, as a hub and incubation for digital health, with the DHIS2 Data Use Training as the first use case. It also aims at getting the first high-profile academy experience under the MoH umbrella and paving the way for subsequent international academies in the DHILC and beyond. With primary guidance from DUP, MoH (HITD and PPMED) and the International Institute for Primary Health Care in Ethiopia (IIfPHC-E) were engaged in the process. We used IIfPHC-E's well-established Moodle-based training platform. H.E. W/ro Alemtsehay, State Minister of Health, officially opened the training. The HITD Director, IIfPHC-E representatives, and DUP representatives gave opening and closing remarks each day of the training. The training quality was maintained by following globally accepted DHIS2 academy standards that includes the use of certified trainers, employment of strict assessment mechanisms, and logistic arrangements. The training was held from May 4-9, 2021, and the trainees were certified and awarded based on their performance scores.

DHIS2 Analytics Academy, May 4-9, 2021, National DHILC, Addis Ababa

2.3.1.2. DHIS2 Design and Customization Academy

DHIS2 Design and Customization Academy, June 7-12, 2021, Adama

A six-day long DHIS2 academy level training was organized by DUP with the aim of familiarizing participants on the knowledge and skills to design and customize DHIS2 metadata. While DHIS2 has become an integral part of the Ethiopian health system, there was a huge gap in terms of the number of experts who are able to design and customize DHIS2 for various purposes. This training was designed to have a trained pool of experts who have the necessary skills and expertise to carry out the needed customization and related tasks in the years to come.

The academy was organized with the necessary training facilities. The trainees were carefully selected from regional and national levels, and those with prior experience in DHIS2 and who were certified in the DHIS2 Fundamentals course were eligible for the academy. Accordingly, 12 experts from MoH, two from DHA, two from Addis Ababa RHB, and 11 from the remaining RHBs were trained and certified. MoH's training server and the IIfPHC-E's Moodle-based learning site were used to manage the training. Ten individual-based and group-based assessments, including the comprehensive assignment and final exam, were administered to ensure the required level of competency. Four course facilitators, two from DUP and two from HISP-Ethiopia, delivered the training, evaluated the assessments, and coordinated the overall training. Other DUP and MoH staff were involved in administrative-related tasks.

2.3.2. Routine DHIS2 Implementation Supports

DHIS2 is the most stable and used digital health system in the MoH structure. Unlike the early implementation periods in which the majority of the HFs and health administration units used the offline versions, the number of online users has surpassed offline users. This shift is attributed to the various interventions that MoH, DUP, and other partners implemented, which include increasing the HealthNet/VPN coverage, distributing the 3G Dongles, providing technical assistance, and promoting use of the online version of DHIS2. At the end of May 2021, nearly 78% of public health institutions had active HealthNet connectivity, and 3,605 public institutions (69%) of the expected 5,224 had online access to the national DHIS2 server, making the number of offline only public users as low as 1,619. Further efforts are underway to significantly

reduce offline data capturing and reporting, and maintain online users. The data reporting completeness and timeliness also marginally increased in the year because of the implementation of online reporting monitoring tools and continuous follow-up with sites.

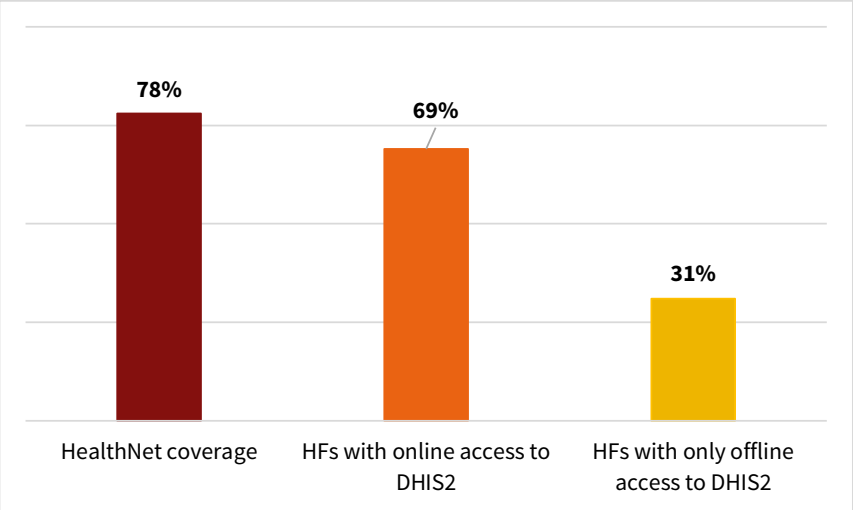


Figure 16. HealthNet Coverage and Online Access to DHIS2 Server among Public Health Institutions, December 2

DUP's routine and need-based technical support also continued at MoH, MoH agencies, and in all regions in the year. This support included, but was not limited to, user management, facility creation and reorganization, facility upgrades, connectivity (HealthNet) monitoring, troubleshooting of failed computers, recovering the failed DHIS2 offline instances, and the like. In addition to the HIS and HIT staff, the number of program staff using the system continued to increase (e.g., MNCH, emergency management, disease prevention and control, quality assurance, special supports, etc.)— and the number of requests for related support also increased accordingly. DUP supported regional and federal users on issues they encountered while using the system. The team also supported the installation of DHIS2 and import of legacy data for the Oromia RHB, and in Amhara, we updated denominator data to enable DHIS2 visualization for EFY 2013, and migrated 2007–2010 EFY eHMIS data to DHIS2. The DHIS2 TWG was revitalized and started reviewing issues that occur at all levels, identifying and prioritizing new requirements, keeping track of data quality issues, and other DHIS2/ HMIS-related tasks. DUP helped the University of Oslo create and mediate a strong partnership/engagement platform with MoH and enhance the visualization and use of DHIS2 integration with third-party tools.

DUP's IT Specialist providing onsite support, Sheikh Hassan Yabare Hospital, February 2021, Somali Region

2.3.3. MoH and University of Oslo (UiO) collaboration on DHIS2 implementation

With DUP's support and facilitation, a successful bilateral agreement was signed between the MoH and UiO in the third quarter of the year. The agreement was made to jointly work on advanced tasks of DHIS2, including research and development, demand-driven app development and customization, and to facilitate the establishment and support of domestic academy-level engagements (like DHIS2 Customization, Apps Development, and Data Use Academies). Joint planning between the two parties has already been initiated to act on the upcoming priority tasks of DHIS2. DUP initiated and facilitated the platform for the agreement made between MoH and UiO as well as provided technical guidance and prepared the agreement document for the two parties. Currently DUP is facilitating the prioritization of the DHIS2 tasks in light of the current MoH's HMIS indicator revision, other customization priorities, and the envisaged version upgrade of DHIS2 (from the current v2.30 to v2.36, the most stable recent version).

2.3.4. Provision of DHIS2 metadata management training to DUP's IT experts

Advanced training on DHIS2 metadata management was provided to 11 DUP regional IT and HIT specialists. The purpose of the training was to help regions to respond to continuous metadata management requests. Metadata related requests were beyond the scope of the regional team and they used to be deferred to the DUP Central Team. The DUP Central Team spent considerable time on the support but once the regional experts received the training, they immediately started supporting the metadata management in their respective regions. The relevant metadata management tasks would progressively be transferred to the regions in the year to come and only sensitive matters that require high-profile expertise will be fixed centrally. IT Specialists of Somali and Oromia regions made exemplary efforts in putting the training to practice.

2.3.5. DHIS2 Replica Server configuration at MoH

A read-only DHIS2 local instance, which is the replica of the online version, was configured at the MoH data center to serve as a backup instance and to facilitate data analysis for MoH staff by improving system

performance. This has a dual importance, as it serves as a backup server as well as it minimizes the load on the Amazon Web Services (AWS) during analysis - through which it can cut analysis costs. The MoH Team can now do the analysis of DHIS2 data from the local server, as they do from the AWS. The impact of this configuration will be evaluated and expanded to regions too. Currently DUP is testing an automatic redirecting of data entry to AWS and data analysis to the local server (whenever the local server is up and running).

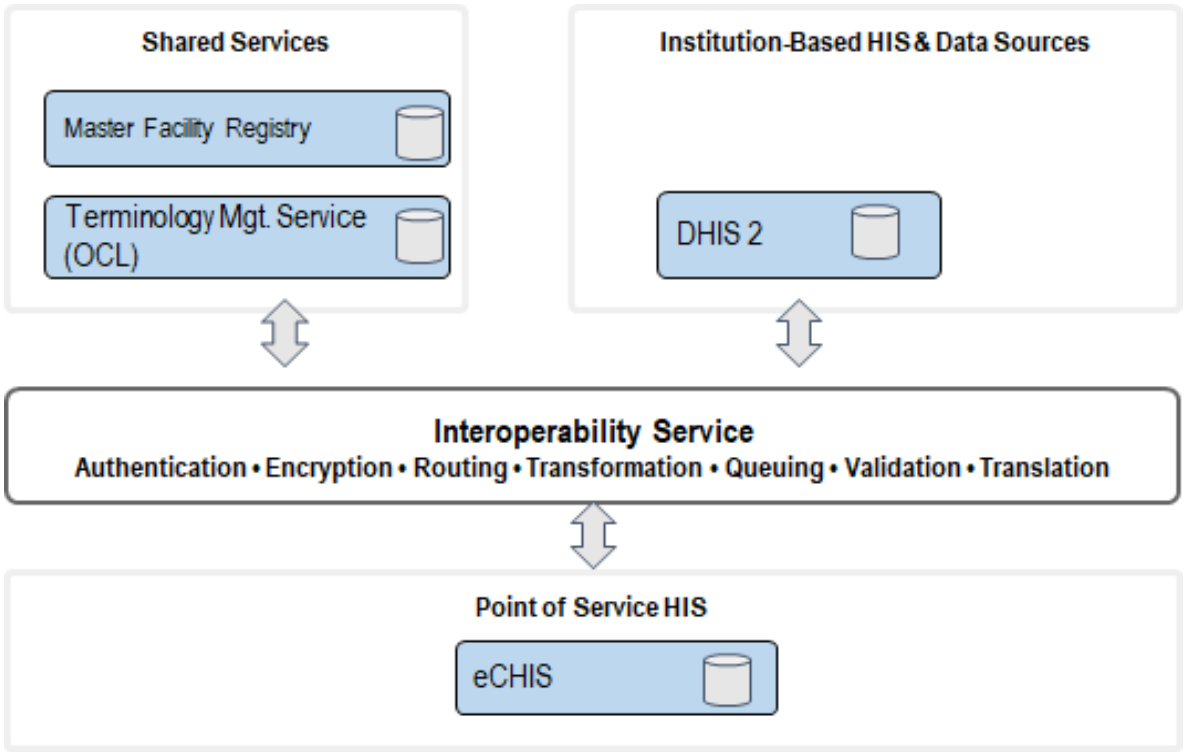
2.4. eHealth Architecture, Interoperability, and Standards

2.4.1. eCHIS/DHIS2 data exchange pilot testing

The Ethiopian eHealth Architecture (eHA) provides an architectural solution to enable interoperability and data exchange between point of service applications (e.g. eCHIS) and HMIS (e.g. DHIS2) through an interoperability layer which is based on OpenHIM. DHIS2, a widely utilized HMIS, has been in service for more than four years and the main source for aggregated health data in various dimensions at a national level. On the other hand, eCHIS is a mobile-based point-of-service data collection platform and job-aid, and widely used by HEWs.

This activity helps to automate the process of data exchange between the two systems and make the work of HEWs to be directly and automatically synced to DHIS2. This capability is expected to enhance the process of data collection and improve accuracy and timeliness of HP data.

To enable data exchange between these systems, DUP supported the development of a mediator service as a component of the eHA interoperability layer that utilized capabilities of eHA shared services (i.e. terminology management service [TMS] and Master Facility Registry [FR]). The mediator used eCHIS's MNCH module data elements for the data exchange, as the other modules are not fully matured.



eHA components participating in the eCHIS/DHIS2 data exchange

Having achieved a promising eCHIS/DHIS2 data exchange in the testing environment, DUP facilitated the selection of piloting sites with actual data from HFs. Accordingly, two *woredas* (Alelitu and Walmera) from Oromia region and one *woreda* (Dangla Zuria) from Amhara region were selected for this purpose. Currently the MoH and DUP team are working with the *woredas* and respective facilities and started the piloting phase. In this process, the HEWs and supervising HCs in the *woredas* are closely monitored for their consistent use of the eCHIS tool for the available modules, and the MoH/DUP team follow-up for an automatic data exchange between eCHIS and DHIS2 systems. The full-fledged eCHIS/DHIS2 data exchange will be implemented in the production environment based on the lessons and areas of improvements identified from the pilot test.

2.4.2. HIS Maturity Assessment

Driven by the IR Agenda of the HSTP, the MoH is committed to install a strong digital health system at national and sub-national levels. This effort is a work-in-progress that has been done incrementally and measured meticulously for its appropriateness. While a lot has happened over the last few years regarding the implementation of different initiatives to strengthen HIS in the health system, the level of maturity of those systems has yet to be measured from different information systems perspectives. This leaves MoH and its partners with very little or no evidence in terms of where the country's HIS is and what needs to be done to attain the required level of maturity. Therefore, in the last year, DUP supported MoH in conducting a national HIS Maturity Assessment to bridge the information gap, measuring the overarching HIS maturity level based on the major domains and subdomains of the system.

HIS Maturity assessment group work, Adama January 30, 2021

This assessment was conducted with strong engagement of relevant MoH directorates (HITD, PPMED, HR Administration), selected RHBs (Addis Ababa RHB, Oromia RHB, and Afar RHB), MoH agencies (Ethiopian Public Health Institute - EPHI, Armauer Hansen Research Institute - AHRI, Ethiopian Food and Drug Administration - EFDA, Ethiopian Pharmaceuticals Supply Agency - EFDA), the CBMP universities (Addis Ababa University, Hawassa University, Jimma University, Gonder University, and Mekelle University), and strategic digital health partners (DUP, DHA, Transform PHC, Italian Cooperation, CHAI, ICAP, and AMREF). The maturity assessment was conducted in two phases. First, a current status assessment and goal setting meeting was conducted from January 30–February 2, 2021. Second, the write-up of the future state and improvement roadmap setting workshop was conducted from March 4–6, 2021. The current 2021 overarching HIS maturity level was measured based on five major domains, 13 components, and 39 sub-components and through an evaluation out of five points based on the HIS Stages of Continuous Improvement (SOCI). The goals and the roadmap for high-impact interventions were set for each subcomponent up to 2024, or by the end of HSTP-II. The following graphs show the current state (”As Is”) and the future state for targets set by the main domains and subdomains.

In general, the workforce and data quality and use domains scored higher than the other domains and seem to be on the right track. However, the leadership and governance, ICT infrastructure, and standards and interoperability scored the lowest, between 2.29 – 2.47, and were identified as areas that need more concerted investment moving forward.

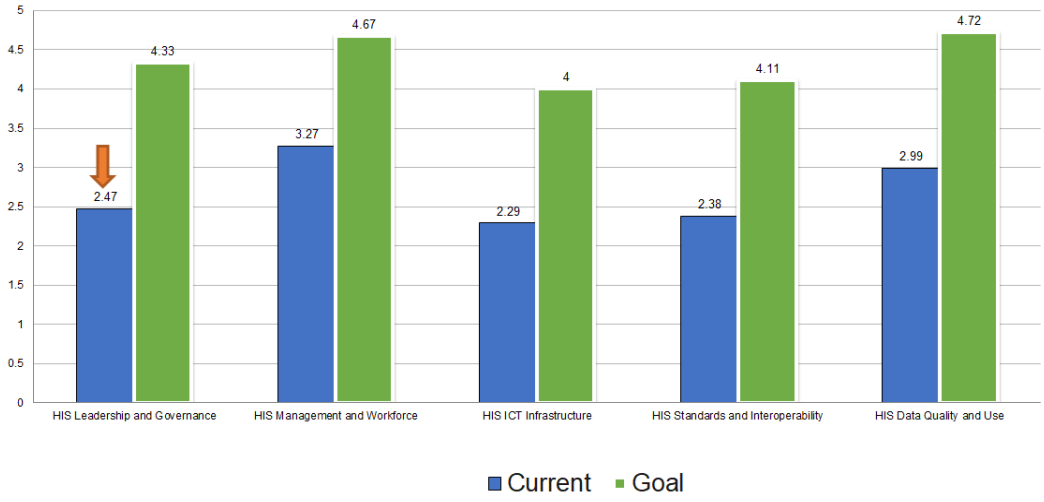


Figure 17: SOCI ‘As Is’ (End of 2020) and Future State (End of 2024) by the Five Domains

A detailed look at the sub-components shows that the leadership and governance, ICT infrastructure, and standards and interoperability domains scored low particularly due to gaps in enforcement and compliance to policies and legislation, and issues with the connectivity infrastructure and data exchange respectively. Moreover, while the HIS strategy, financial management, and data quality assurance scored the highest among subcomponents, policy, legal and regulatory, and interoperability scored the lowest (Figure 18).

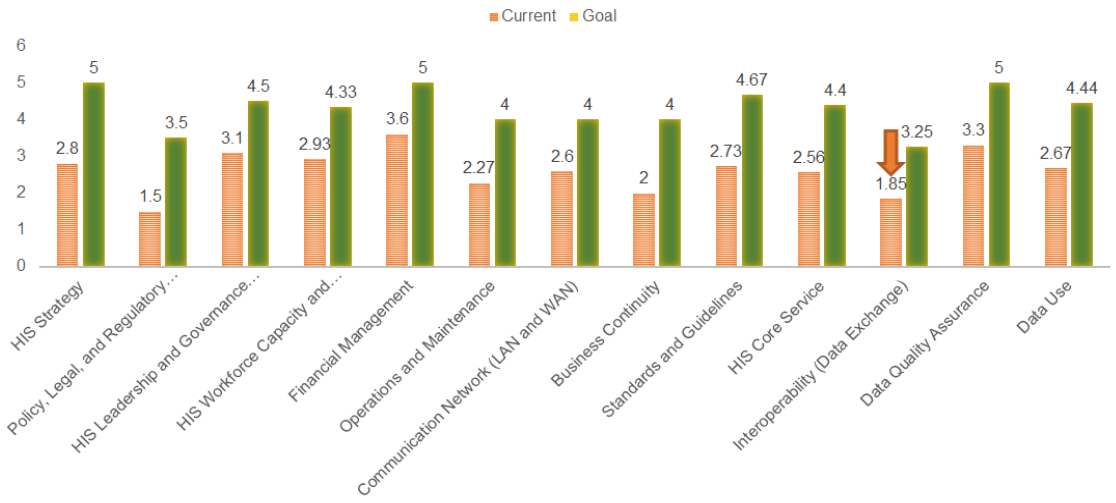


Figure 18: Current (SOCI 'As Is' End of 2020) and GOAL (Future State End of 2024) by the 13 Components

The table below summarizes the current state of maturity, the envisaged maturity levels for the end of 2024, and key areas that need attention (referred to as "pain points") in the assessment.

Table 3: The current and future HIS maturity levels and areas that need attention

Domain Name	Current Cumulative Score (End of 2020) (out of 5)	Future Status (HSTP-II 2024) (out of 5)	Pain Points
Leadership and Governance	2.47	4.33	▪ Endorsement and enforcement of policies and legislations; ▪ Structures, processes, and specific mechanisms for enforcement of policies and legislations; ▪ Inclusive coordination mechanisms.
Management and Workforce	3.37	4.67	▪ Mainstreaming the Informatics concept; ▪ Clear HIT structure and incentive mechanisms; ▪ Tailored competency enhancement training and development programs; ▪ Assessing and deploying the digital health workforce to meet the growing demands.
ICT Infrastructure	2.29	4	▪ Business continuity plan – particularly sustainable power sources and connectivity infrastructure; ▪ Speeding up the pace of the HealthNet/VPN scale up and maintenance; ▪ Creating a strong collaboration with the service provider; ▪ Addressing the increasing hardware demands.
Standards and Interoperability	2.38	4.11	● Reviewing, endorsing, and implementing the data exchange and messaging standards; ● Defining the minimum national clinical data sets based on international standards; ● Implementing and utilizing core registry services; ● Coordinating and working with agencies on unique person identification system; ● Ensuring security standards for data exchange and enforcement procedures.

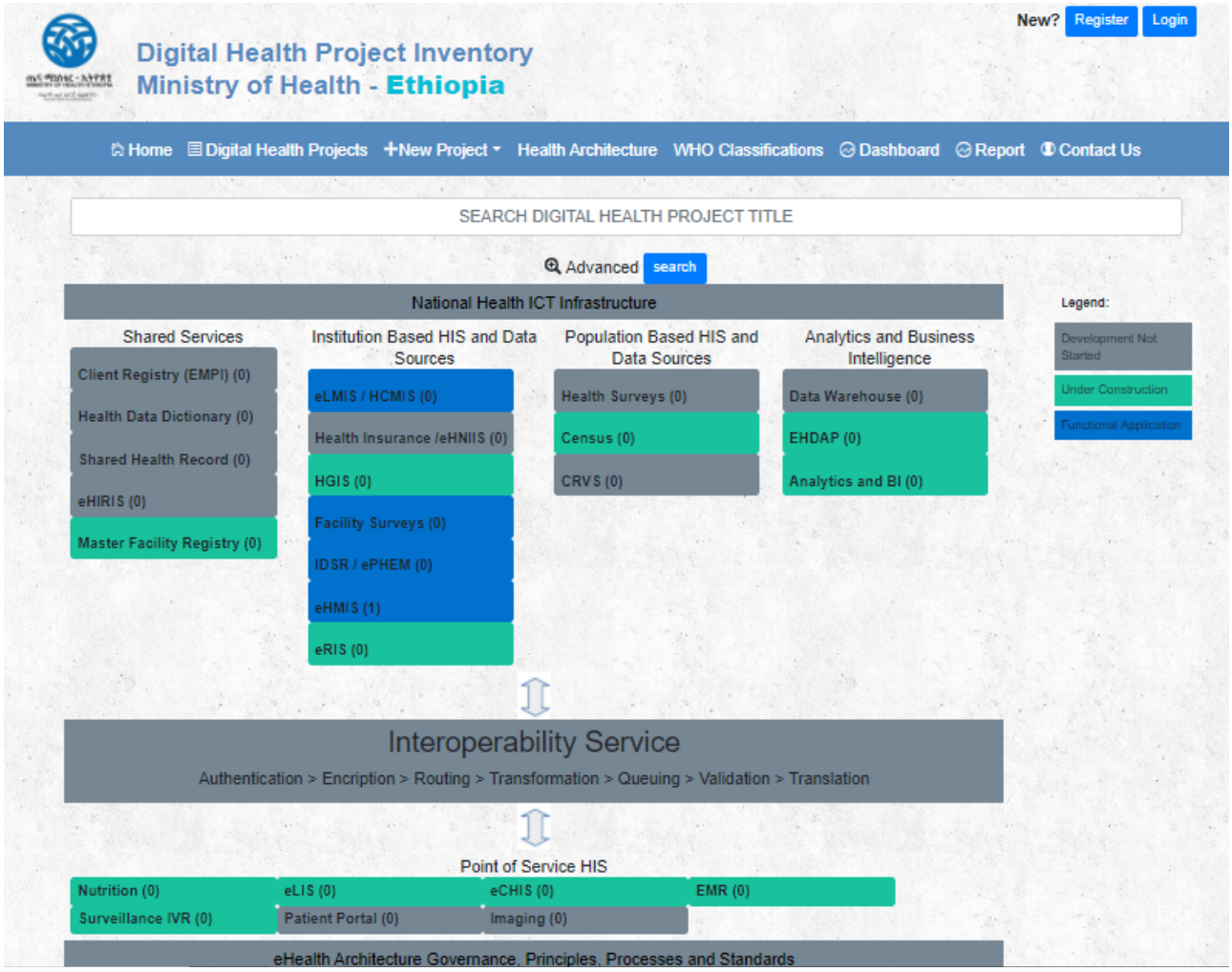
Data quality and use	2.99	4.72	• Regular data reviews and audits - and automating the process; • Dynamic data use strategy to meet the emerging decision support needs at all levels; • Developing and managing data repositories and warehouse; • Data use competency mechanisms; • Standardizing the design, use and dissemination of information products; • Developing and using guidelines on data use impact.

As a way forward, two comprehensive reports on this assessment are close to finalization: (1) HIS Maturity Assessment Process Documentation and, (2) Comprehensive HIS Maturity Assessment Results and Roadmap. The findings of the assessment have already been used in the DHBp to monitor and evaluate the pillars of the blueprint. These results will also drive the planning in the coming years of MoH, the DUP project, and other strategic partners. DUP coordinated the entire process, and supported the technical and financial aspects of the assessment.

2.4.3. Ethiopia Digital Health Projects Inventory System

In the reporting period, DUP finalized the development of the Ethiopian Digital Health Projects Inventory System and its governance and operational documents to guide MoH, partners, and agencies on the operationalization of the inventory system. With the HSTP in place, the inventory system serves as an epicenter to conduct current landscape analysis of the health sector and assess what activities have been done thus far. In addition, the inventory can also be used as a clearing house for the standards followed in a certain application and clearly show the technology with which a project is developed, its focus area, and geographic coverage to mention a few.

Stakeholders have started to use the application to register and update their systems. MoH has urged all digital health partners to properly register their systems and get them approved by MoH before they are implemented at a wider scale. The registration and approval criteria are also documented and communicated to all relevant stakeholders. By doing so, advancing the goals and objectives of the digital health projects inventory is possible, and the current moves of MoH are commendable. Training manuals and end-user guides have been prepared and submitted to MoH, and DUP is working with MoH to get the documents officially endorsed before they are widely shared.



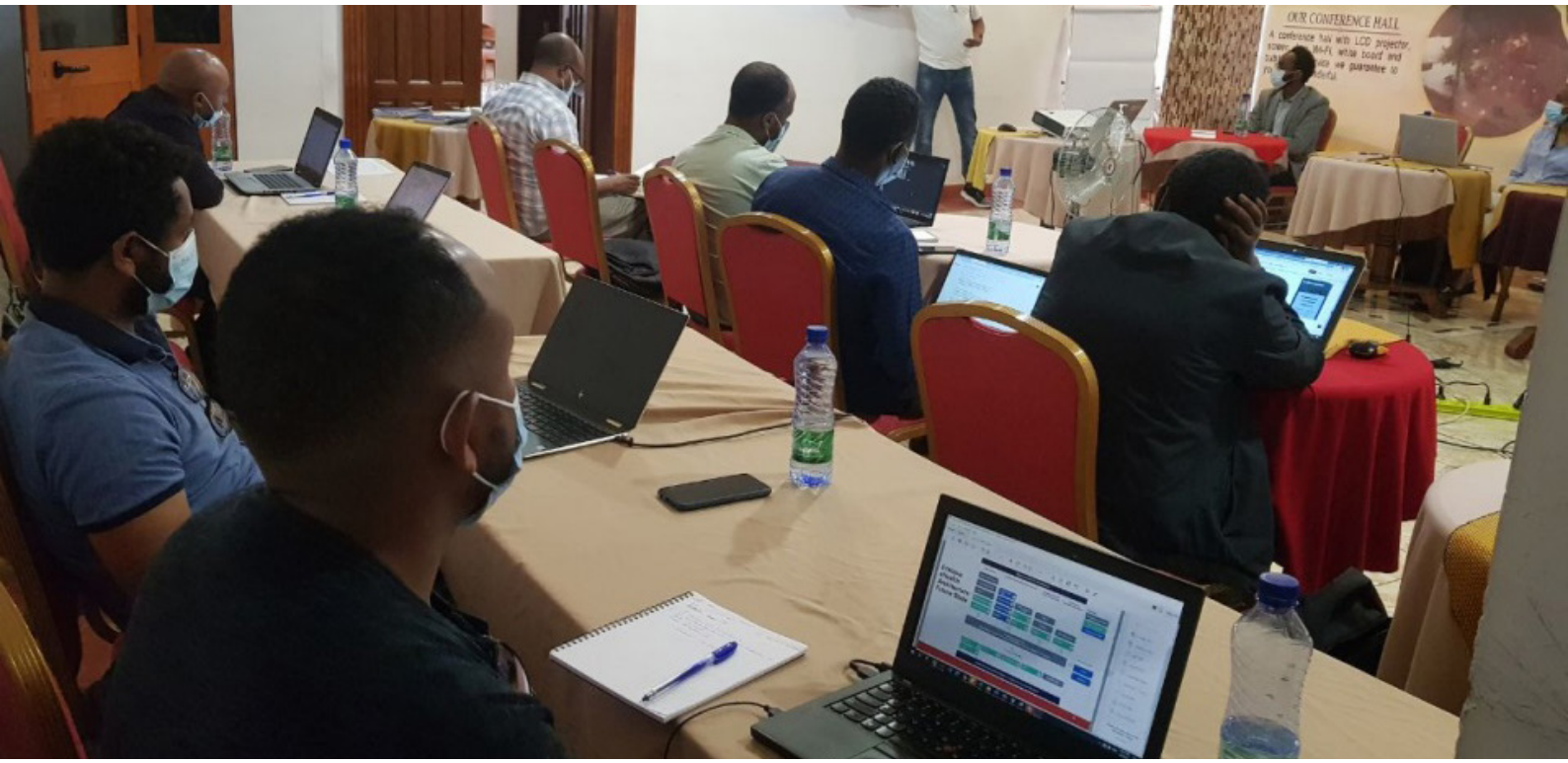
Ethiopia Digital Health Projects Inventory System

2.4.4. Documentation of interoperability and messaging standards

The Ethiopian eHA envisions a holistic and harmonized exchange of data between and among the participating components and HIS. To realize this envisioned feature with interoperable systems in between, standards for terminology, syntax, security, and privacy are needed.

DUP drafted the Interoperability and Messaging Standard document in order to stipulate, compare, and adopt the globally known interoperability and messaging standards to the Ethiopian eHealth context. The process starts by identifying a comparison matrix and guiding principles for adopting candidate standards. After standard comparison by the internationally known approach, this document prepares a number of implementation use cases for all stakeholders that dictates how to follow basic assumptions and procedures to ensure consideration of the adopted standards is present in each milestone of development and implementation.

A three-day workshop that included different stakeholders (MoH, agencies and partners) of the HIS workspace was conducted to assess the existence of the data exchange and interoperability practice in Ethiopia. Necessary messaging and interoperability use cases were identified. A comparison matrix was prepared to compare the use cases with similar global use cases. Participants then identified global IHE and underline standards to support the data exchange and interoperability implementation of the use case.



Data Exchange Standards Workshop, June 2021

When finalized and endorsed by the MoH, this document will give clear direction on how to take the next step towards eliciting interoperability and data exchange use cases within a globally known and nationally endorsed framework and standard. In addition, it supports in realizing the DHBp and achieving the future state in which all different components and applications of the eHA could exchange data seamlessly and securely.

2.4.5. eHA and interoperability documentation and experience sharing

During the reporting period, DUP along with MoH and stakeholders developed different guidelines for producing an eHA roadmap and capability framework for the health sector. DUP supported the development and operationalization of the Ethiopian Digital Health Projects Inventory System and documentation of core terminology and messaging standards. DUP also developed and tested the eCHIS/DHIS2 data exchange. Those experiences were documented and shared in the following two presentations at the 2020 Virtual Global Digital Health Forum, December 7–9, 2020:

1. *Health Information Systems Architecture and Lessons from COVID-19*
2. *Architecture in Practice: Connecting Community Health Systems and Laboratory Information Systems into the Health Information Exchange*

In addition on May 12, 2021, DUP also participated as a panelist in the Country Health Information Systems and Data Use program (CHISU) webinar, "**Standards-based Interoperability of Systems: Country examples of testing and enabling exchange of data for holistic health information management,**" where DUP shared examples of interoperability solutions that have brought about significant effects on health data quality and use.

2.5. Master Facility Registry Support

2.5.1. Improving the MFR

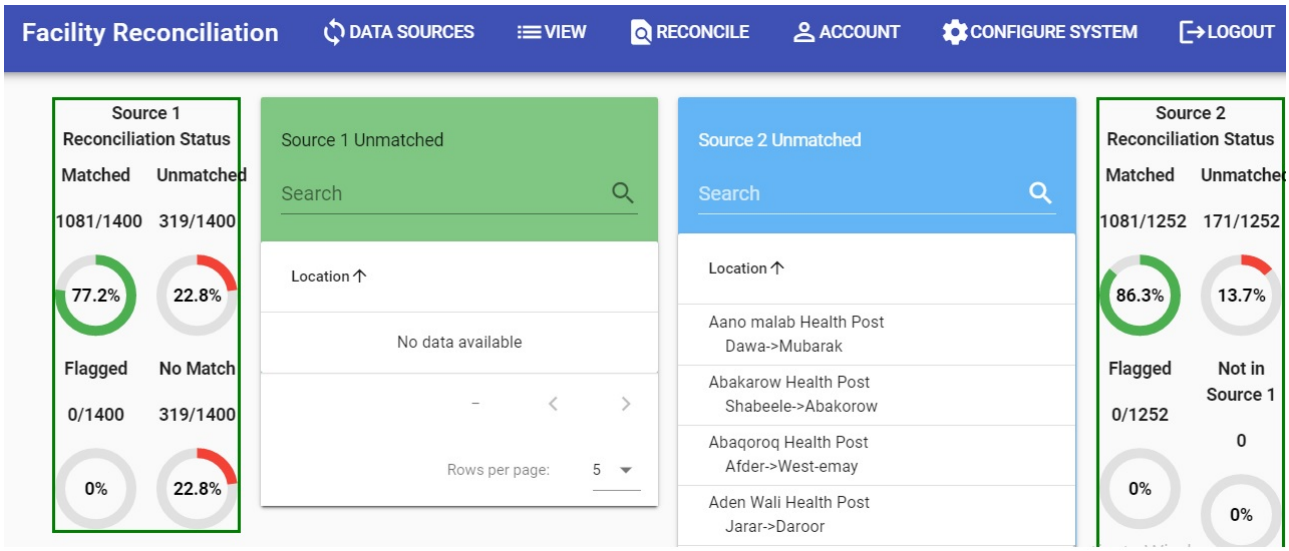
MoH has made significant investments in the national adoption of the MFR which acts as a central authority to collect and distribute up-to-date and standardized health facility data, including geospatial data. DUP worked with the MOH and DHA project on MFR project coordination, implementation, identification of challenges, and documentation and amendment of software requirements (both functional and non-functional). Driven by careful investigation of the existing system (Resource-Map), DUP proposed and supported the improvement of the existing MFR by changing its backend in the bid to enhance data exchange and interoperability with different digital health systems. After successive consultations, the technical team agreed to follow HAPI FHIR-based implementation as a backend standard to represent HFs and services, and IHE-mCSD standards for facility data exchange and interoperability. Accordingly, an improved MFR was developed, and system bugs were fixed. Currently rigorous user acceptance testing is underway to ensure that the improved MFR is interoperable with different HIS.

2.5.2. Revitalizing the MFR TWG

Based on the MFR governance guideline and the State Minister's direction to strengthen the implementation, the MFR TWG was reorganized to incorporate various multidisciplinary working groups from HITD, PPMED, HEP, Regulatory Body, and DUP. DUP continued contributing technically and playing coordination roles to ensure MoH came up with a sustainable single source of truth for facilities. As part of the coordination efforts, DUP organized a half-day workshop with Dr. Lia, Minister of Health; Dr. Abraham, Minister of Science and Innovation; and other high-level officials from CSA and Geospatial Information Agency. Participants ultimately agreed to establish a TWG to review the needs of MoH and dissect and provide the information to improve the MFR system further, including the geospatial data. The TWG organized subsequent forums to see the MFR system functional and serve the intended purpose.

2.5.3. Supporting the MFR geospatial data alignment

Most of the facility lists in the MFR database lack geospatial information, which is a huge gap and limits the analyses that can be done regarding the facilities and therefore limiting the decisions that can be made accordingly. In order to address these challenges, DUP supported the MoH both financially and technically to reconcile facility data from multiple sources and to create a harmonized single list of HFs with geospatial data elements. Considering the large number of HFs in the country, to make the facility matching exercise manageable, public facilities were prioritized in the first phase, followed by private and non-government owned HFs in the second phase. In January 2021, DUP and MoH organized a workshop for other strategic actors, primarily the Ministry of Information Technology, CSA, and the Geospatial Information Institute to build consensus with the MoH on the objectives of sharing data and on the data sharing protocol.



Caption of the Global Facility Reconciliation App

Subsequently, DUP sponsored two rounds of facility validation and reconciliation workshops from March 1–3, 2021 and March 24–27, 2021 to support the matching process. The purpose of these workshops was 1) to align and generate a master list of MoH facilities from three data sources: Health Extension Program (HEP) database, DHIS2, and the existing MFR and 2) to reconcile and harmonize a facility list between the MoH, CSA, and EPHI data sources and to align geospatial data for the matched facilities. In addition to the HEP Directorate, PPMED, HITD, Health and Health Related Regulatory Directorate (HHrRD), and RHBs, the Ethiopia Geospatial Information Institute and JSI's DUP and DHA actively contributed their expertise for the successful completion of the matching process.

In both workshops a web-based automated reconciliation tool, Global Facility Reconciliation App (GoFR), was locally installed and used to assist in mapping facility lists from different data sources. The tool helped to automatically and manually match facilities at a lower-level administrative boundary, and unmatched facilities were re-evaluated by the same tool at a higher-level administrative boundary to get a final list of matched facilities.

During the first round of the facility matching activity, the goal was to align facility name and administration boundary data among MoH data sources from HEP, DHIS2, and MFR. A total of 21,765 public health facilities in all ten regions (including the facilities from the new Sidama region) and two city administrations were identified and 95.5% (20,797) of them were aligned and prepared for the next round of the reconciliation process (Figure 19).

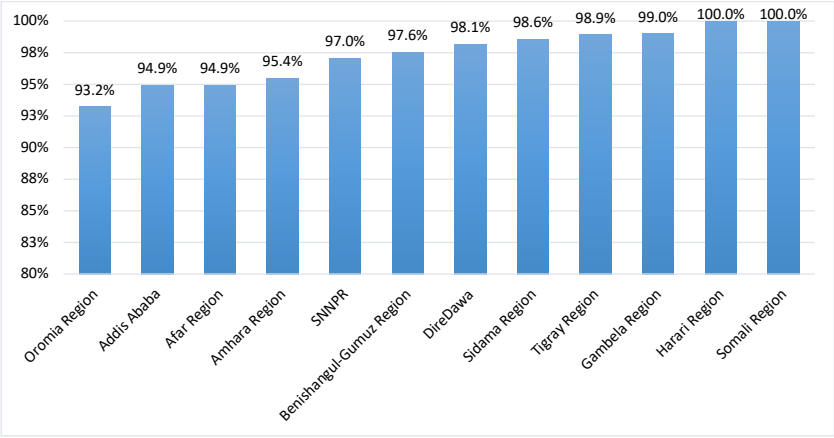


Figure 19: Facilities in the MFR matched by name and region, March 2021

The MoH HF list matched in the first workshop was then used against the data source from CSA, GeoSpatial Institute, and EPHI to gather geo-location data in the second workshop. Figure 20 depicts the number of MoH facilities matched with CSA and EPHI data sources and that have geo-location data.

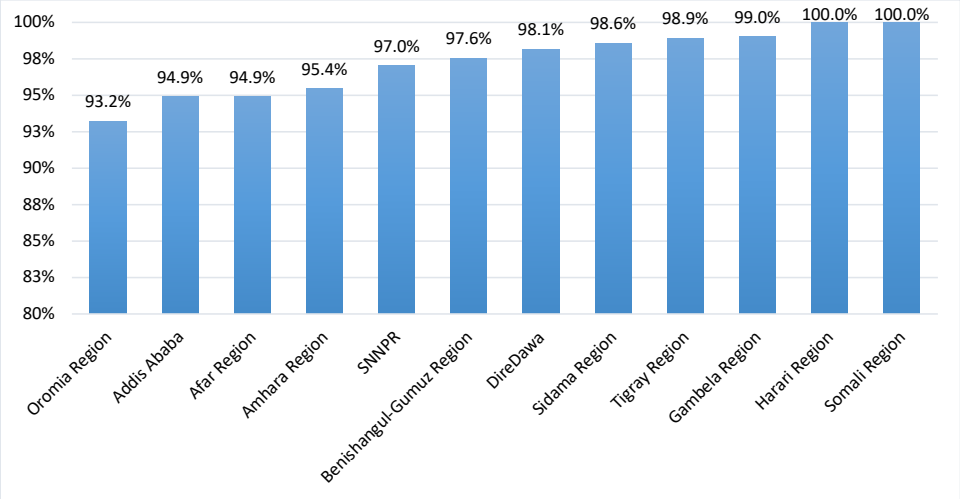


Figure 20: Percentage of facilities matched with geospatial data, March 2021

Encouraging results were achieved in the second workshop while reconciling public health facilities from multiple data sources. Nine regions and two city administrations scored more than 83% matching results, which simplified collecting geospatial data for the remaining facilities. However, the number of matched facilities for the Gambella region was very low. Further intervention is required to improve the data quality and incorporate missed public HFs in the data source.

This exercise proved that the methodology adopted for this matching process is effective and recommended for matching the remaining private and non-government HFs. It also demonstrated that the GoFR is an indispensable tool for matching facility lists from different data sources. As a next step, reconciling the private and non-government health facility list will follow.

2.6. Support eCHIS

2.6.1. eCHIS leadership

DUP coordinated the eCHIS initiative with strategic partners, and supported and monitored its implementation at service delivery sites (HPs and HCs). During the reporting period, DUP helped MoH revise the eCHIS development roadmap, supported eCHIS partners' mapping exercise, and achieved alignment between partners that support different *woredas*. The mapping exercise will help MoH to support *woredas* that are not covered by partner organizations. DUP also helped revive the eCHIS TWG by creating a formal ToR. In this year, the eCHIS TWG meeting was conducted ten times to monitor progress and to design the way forward. DUP also advocated for eCHIS governance that the ministry prioritized, resulting in the creation of a steering committee, as well as outlining the roles and responsibilities of each MoH directorate involved in eCHIS, (HITD, PPMED, HEPD). Regional DUP staff are responsible for eCHIS coordination and thought leadership in their respective regions.

2.6.2. eCHIS development coordination

In addition to strengthening the governance of eCHIS, DUP coordinated the development of the core functionalities of the TB and malaria modules, which involved the integration of more components to the TB module (latent, multidrug resistant, and drug-resistant pulmonary TB, and TB medication), and malaria

module (focal test and treat and foci investigation components). Quality assurance retesting of the TB and malaria modules was completed. In addition, with DUP's support, the scoping of non-communicable diseases (NCDs), neglected tropical diseases (NTDs), and HIV for inclusion into eCHIS is completed and submitted to the development team.

While work is being conducted by developers hired by DHA, DUP's role is to coordinate the electronic system development process for the remaining modules (health interventions) through the eCHIS team leader who was hired and embedded within MoH.

Belaynesh Jemberu- Health Extension Worker at Wegdi Dera Health center in Aleltu woreda Oromia Region

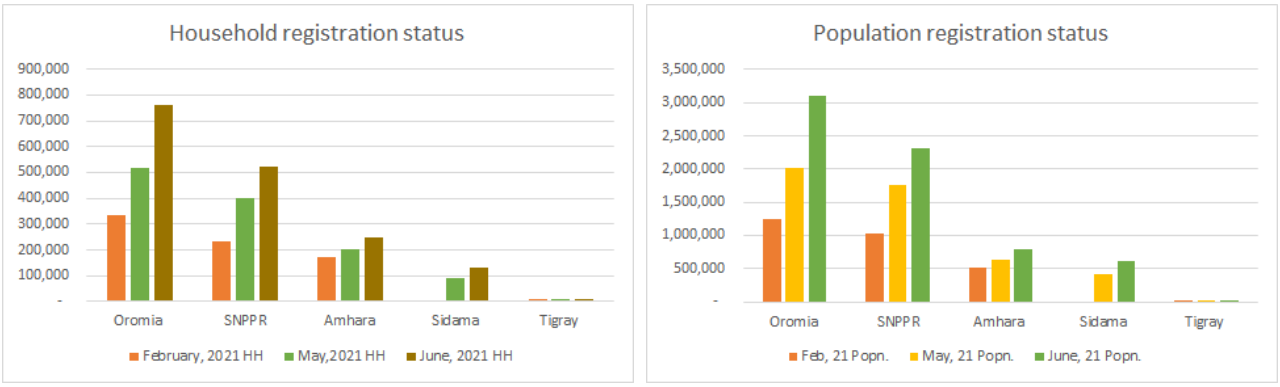
2.6.3. eCHIS implementation coordination

DUP has been coordinating the eCHIS implementation through an embedded implementation coordinator while advising on implementation scale-up planning, implementation strategies, support mechanisms and resource mobilization, and utilization. Regional DUP teams provided technical and troubleshooting support on eCHIS, regularly analyzed system use status, and provided feedback to zones, *woredas*, and kebeles.

Firehiwot, Health Extension worker (HEW) at Eko Efo Health Center in Oromia registering family members in eCHIS app

By the end of 2020, **1,578** HPs in five regions implemented eCHIS and **1,359** HEWs were actively using the system. By June 2021, a total of **4,456** HPs implemented eCHIS across eight regions.

Region	# of HP implemented eCHIS in 2012 EFY	# of HP newly implementing eCHIS in 2013 EFY	# of HP newly trained but not started yet (Expected start till end of July)
Tigray	130	-	-
Oromia	552	1,640	1,790 (Security and sim card issues)
SNNP	390	955	-
Sidama	50	198	-
Amhara	284	257	1,351 (delayed training)
Total	**1,406**	**3,050**	**3,141**



Figur 21. eCHIS implementation and status across regions

2.6.4 Support to learning *woredas*

A. Learning *woreda* support in Oromia

DUP and Oromia RHB provided a refresher training on eCHIS to 115 HEWs, midwives, and HEP focal persons from the learning *woredas* on the implementation of eCHIS through initiation of service registration and referral linkage. To address the device shortage, the Oromia RHB provided 38 tablets to the learning *woredas* and the DUP IT specialist analyzed and resolved technical problems in four eCHIS tablets. Currently, all HEWs, midwives, and HEP focal persons of eight PHCUs in the two learning *woredas* in the Oromia region have eCHIS tablets to record services that they provide. An onsite orientation on the eCHIS dashboard was provided to HMIS/IT focal persons as well.

DUP and Oromia RHB provided a refresher training on eCHIS to

115 HEWs, midwives, and HEP focal persons from the learning *woredas* on the implementation of eCHIS

Alemitu Assefa, HEW in Shebeka Welkity in Diglu and Tijo *Woreda*, Arsi Zone, Oromia Region

B. Learning *woreda* support in SNNP

Between February 8–20, DUP, in collaboration with the RHB and Wolaita ZHD, provided two rounds of eCHIS end-user training to Damot woyde WoHO, PHCU directors, midwives, HEW program focal persons, and HEWs. DUP supported 522,600 ETB for per diem and other training costs. Further, the team followed-up on eCHIS start-up for Damot woyde *woreda* and visited all PHCUs. During the visit, orientation was given to all HEWs at their respective PHCU level and technical support was provided. In SNNPR, eCHIS mentorship was conducted for two learning *woredas*, namely Damot Woyde and Mirab Azernet. During the mentorship, various technical issues related to the eCHIS application were resolved and solar chargers were provided for HPs in both woredas.

During eCHIS mentorship at PHCU level with HEWs, Damot Woyde *Woreda*, Wolayita Zone, SNNPR

2.6.5. Support to COVID-19 community-based surveillance

As part of the MoH's nationwide campaign to assess every household for COVID-19, DUP coordinated the development of community-based surveillance (CBS) with eCHIS family folder profiling in agrarian regions. The family folder was integrated with the COVID-19 CBS application and updated based on input from experts. Subsequently, a virtual master ToT was provided to RHB staff (health information, M&E, HEP, and public health emergency management experts) in six agrarian regions—Tigray, Amhara, Oromia, SNNP, Sidama, and Benishangul Gumuz.

2.6.6. Support on supportive supervisions, pastoral CHIS, ToTs, pilot implementations, and module translation

DUP technically and financially supported the design and customization of pastoral CHIS for use in Afar, Somali, and Gambella. A team of experts from MoH and the respective RHBs reviewed and finalized the pastoralist CHIS user's guide. Training to the lower level of the health system is planned for the next quarter.

DUP participated in the annual supportive supervision on CHIS (agrarian, urban, and eCHIS), covering 25 HPs in 12 *woredas* of SNNP, Amhara, Sidama, and Oromia regions. Key strengths identified included availability of standard tools and knowledge on LQAS from the agrarian CHIS; availability of trained staff at all levels; strong follow-up of household registration; and an almost-complete household registration in the urban CHIS. The supervision also indicated that the priority assigned to the system in the regions and the regular supervision in Oromia supported eCHIS implementation. Nonetheless, poor information use and documentation practices; weak supervision and follow-up; high staff turnover; tool shortages; and inconsistencies in the application of data assurance mechanisms were observed to hinder uniform implementation of both agrarian and urban CHIS. Further hindering implementation were PHCU supervisors' limited knowledge of eCHIS; lack of close follow-up; shortages of tablets and health information professionals; and connectivity problems. DUP developed an action plan with potential solutions to these problems.

During the year, DUP supported a regional-level eCHIS ToT in three regions, namely Harar, Dire Dawa, and Benishangul Gumuz. Accordingly, a total of 45 participants were trained, with 15 from the Harari region, 15 from Dire Dawa, and 15 from Benishangul Gumuz. Participants included governmental staff and partners, including DHA staff. Similarly, DUP supported the ToT in the Amhara region where a total of 141 governmental and DHA staff attended.

With the support of DUP, the pilot implementation of the eCHIS nutrition module began at the Anchar *woreda*, West Hararghe zone, Oromia. The training was provided in two rounds: the first round from February 17–21, 2021 and the second round from February 22–25, 2021 in Chiro town. A total of 38 participants at the first round and 40 participants in the second round were trained on using the new module. A total of 78 participants from MoH, DHA, West Hararghe zone, and HCs and HPs of Anchar *woreda* attended the training.

Conducting Training Health Extension Workers on electronic Community Health Information System in Oromia

The development of the TB and malaria modules of the eCHIS was completed during the quarter. Subsequently, DUP supported organizing a modules translation workshop for 24 participants from Tigray, Amhara, SNNPR, and Oromia regions. Working in groups led by facilitators, participants translated the modules into the four regional languages. The translated materials included training material on TB and malaria for HEWs and for health care workers. The modules' translation will be completed after a minor revision, and the modules will be ready for pilot testing and rollout.

DUP also supported the translation of the Pastoralist CHIS User's Guide into Amhara, Oromia, Somali, and Afar regional working languages and approval of the translations by the respective RHBs is underway.

2.7. The NHDD

2.7.1. NHDD content and mobile App enhancement

The NHDD enhancement efforts continued in the reporting period, with a major focus on revising the NCoD and enhancing the NHDD-Pocket (mobile app) to improve data quality at service delivery sites. A new alphanumeric code was introduced and mapped to correct the variations in disease codes/identification among different versions of NCoD (Mini, Compact, Extended). Likewise, some wrongly associated diseases and conditions were corrected using the newly released International Classification of Disease as reference, and descriptions of over 1,000 NCoD diagnoses from known sources were added to help clinicians understand diseases and conditions. The NCoD Core TWG was also revitalized to prioritize refinement of terminology management services and include more priority-use cases that are core to the enterprise architecture. DUP worked with DHA to update the mobile app to incorporate the revisions. The revised NHDD Pocket has the revised ICD-10 disease lists with improved searchability (both by names and codes), favorites lists, and other features for the consumption of clinicians and HMIS experts.

2.7.2. NCoD Content Improvement

Since February 2021, MoH started working towards reviewing the NCoD content and developing standard operating procedures for recording and reporting data on causes of morbidity and mortality. DUP is a member of the core TWG and the national taskforce that were established by the MoH. Thus far, DUP reviewed the ToR for the working group, and prepared a rapid assessment proposal and field data collection tools for a gap assessment. DUP also planned to continue its support in finalizing the assessment and the remaining activities of the NCoD revision, including updating the content and design of NCoD, developing the scope of practice, providing ToT, and updating the NHDD accordingly.

2.8. EHR Standard Development Support

As one of the key priorities, MoH with other key stakeholders, such as CDC, ICAP, JSI-DHA, Mekelle University, and EMR system implementing hospitals from Addis Ababa, have developed the national Electronic Health Record system (EHR) standard with a series of workshops that took place in Addis Ababa and Adama. In this regard, DUP actively participated in all of the workshops with a lead role for the 'Core functionalities, Modules and Minimum Data set' section of the standard. The national EHR standard document contains six main sections: The first section describes the scope, objectives, and guiding principles of the EHR standard. The second section defines the functionalities (102) that any EMR/EHR shall, should, or may have, including 15 module sub-systems, and the corresponding minimum dataset. The third section is dedicated to specifications and recommendations for data and interoperability standards that an EMR should comply with. The fourth section is about data ownership, access, sharing, privacy, and security, and the last section contains EHR's implementation requirements ranging from readiness assessment and fulfilling computer network infrastructure to maintenance and monitoring system utilization. The EHR standard is endorsed by MoH's senior management, and copyediting and publishing tasks are underway.

2.9. The Digital Health Innovation and Learning Center (DHILC)

2.9.1. Establishment of the DHILC

DUP provided financial and technical support for the establishment of the DHILC at St. Peter's Hospital. H.E. Dr. Lia Tadesse (Minister of Health), H.E. Dr. Abraham Belay (Minister of Innovation and Technology) and Dr. Solomon Zewdu (Deputy Director - Global Development, BGMF) inaugurated the center on August 6, 2020. The DHILC is a platform for major digital health innovations through user-centered design and validation of new requirements and use cases; synthesis and promotion of best-available practices and global goods; validation of new digital tools; and translation of innovations to scale through impact-driven

partnerships. Two DUP full-time staff members manage and execute the daily tasks in the center to ensure its uninterrupted functionality and eventual transition to MoH.

In preparation for the center's transition to MoH, DUP finalized technical documentation; completed call center deployment and activated the license for the call center; and provided detailed DHILC infrastructure management training to eight MoH staff. DUP is also supporting the development of the governance structure, standard operating procedures and security mechanisms, and other DHILC documentation with MoH to fully transition the center. MoH, DUP, and DHA have initiated discussions on cost sharing for consultancy, infrastructure, software packages, and the like.

From left to right: H.E. Dr. Lia Tadesse (Minister of MOH), H.E. Dr. Abraham Belay (former Minister of Innovation and Technology) and Dr. Solomon Zewdu (Deputy Director - Global Development, BMGF) cutting ribbon for the inauguration of DHILC at St. Peter's Hospital on Aug. 6, 2020

2.9.2. Maintenance and Support of the DHILC

DUP successfully supported the functionality of the DHILC, which included the development of eCHIS and HRIS; data exchange Hackathons; the DHIS2 Analytics Academy; as well as the development of the strategic documents carried out in the center. Delegates from the State Minister's Office and HITD visited the DHILC at the end of March and provided encouraging feedback on the overall management of the center, including its infrastructure readiness. Several renovations also happened over the year to make the center more usable by all concerned digital health stakeholders. DHILC is now ready to host high-profile endeavors, including international academies. Consultations are underway with the MoH and DHA to operationalize the call center (the HelpDesk) wing of DHILC and to use the facility for repository purposes.

2.10. Amazon Web Service support

Given the current fragile local infrastructure within the MoH, it was necessary to look for alternative hosting strategies for key HIS in the country. DUP played a vital role in convincing MoH to consider hosting selected digital health solutions in the AWS, in parallel to supporting capacity enhancement efforts for local hosting. MoH accepted the proposed solution and has hosted DHIS2, MFR, and lately the COVID-19 Tracker, among others, for nearly the last two years. In the reporting period, DUP continued AWS technical support including maintaining interconnection between instances; deploying new instances (e.g., for the COVID-19 system); troubleshooting during system failure; and handling any other emerging needs. DUP has also deployed an AWS backup storage system for Armauer Hansen Research Institute and is supporting real-time monitoring of the hosted systems using the Amazon monitoring tool.

Between the routine HMIS systems, MFR and the COVID-19 data, DUP was paying nearly $30k a month for AWS. This was unsustainably costly and needed serious discussion. To maintain the AWS usage and at the same time to reduce operational costs, DUP performed daily follow-ups of event triggers from Cloud Watch (AWS monitoring tool); optimized the AWS instances to save costs of the hosting services; deactivated systems/servers that are not active; supported the renovation of the MoH data center; brought some of the Cloud instances to local servers; and, triggered discussion with MoH on sustainable planning. To optimize running instances, DUP technical experts followed the AWS sizing recommendations of resource usage. Additionally, the expenses of the COVID-19 system have been removed from DUP's billing at the end of April 2021.

2.11. Google Workspace (Collaboration Platform)

DUP has been supporting Google Workspace users, fielding requests such as adding accounts to a directorate group and troubleshooting system setting problems. DUP invited all MoH directorates to an eight-session end-user training to enhance the use of Google Workspace services. Although all directorates had been invited to participate in the user training, 12 out 25 sent their experts, totaling around 180 participants. DUP also prepared a comprehensive training manual on Google Workspace at the request of the State Minister, Operations. At the advice of the MoH, DUP added the Ethiopian Pharmaceuticals Supply Agency (EPSA) to Google Workspace and granted 200 user accounts.

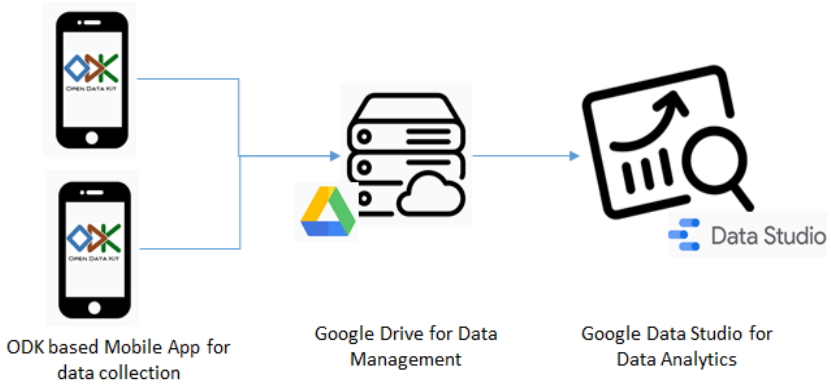
2.12. Other Information, Communication, and Technology Infrastructure Technical Assistance

During the reporting period, DUP's digital health team, at MoH's request, supported:

- Ethiopian Food and Drug Administration to solve connectivity misconfiguration in the *WoredaNet.*
- Emergency Directorate of MoH to establish an emergency call center. Based on the requirements, lists of required devices and software packages were prepared and the LAN designed in consideration of the staff seating arrangement
- MoH to reconstruct the internal LAN.
- The EPHI in Bahir Dar to fix network connectivity.
- Distribution of network equipment for the five learning hospitals on the EMR project.

2.13. Automation of the IR Assessment Tool

Initially, an Excel-based tool was in use to collect and analyze hospital and HC IR assessment data. This tool had limited capabilities and features for managing data collection, maintaining data quality, and sharing reports to multiple stakeholders. In order to address these challenges, DUP developed a mobile app with the capabilities of data collection and management for each HF. The app is integrated with a data aggregation, analysis, and reporting server that enables the IR assessment processes to benefit from the fully automated system. The system was demonstrated to the DUP team and was successfully implemented on a production server.



Architectural representation of IR Assessment Tool

2.14. IT Internship Program

MoH in partnership with DUP launched the IT Internship Program in December 2019, recruiting 178 newly graduated IT professionals from universities across the country. After running it for a year, DUP's engagement in the program ended in December. The program gave recent graduates experience in digital health infrastructure challenges through the provision of computer maintenance, software installation/ updating, networking, troubleshooting, and capacity-building services.

DUP documented the inception, implementation, accomplishments, and transition of the program, and organized an acknowledgement, experience-sharing, and transition conference in December 2020 in Addis Ababa. The State Minister of MoH H.E. Alemtsehay Paulos officially opened the conference that was attended by representatives from the regions and key governmental and nongovernmental partners. At the event, the interns' contribution to the health sector in the last year was highlighted through video documentaries, poster presentations, and panel discussions. (https://www.jsi.com/jsis-ethiopia-data-use-partnership-jointlyhosts-the-first-it-internship-program-appreciation-and-exit-ceremony/)

A panel discussion panelists during the IT Internship Program Exit and Appreciation Ceremony at Skylight Hotel in Addis Ababa

Generally, the IT Internship Program attracted competitive and energetic IT experts and contributed to the nationwide job creation effort. In collaboration with USAID's DHA, the majority of the interns (137) have organized themselves and created 20 small and micro-enterprises to provide IT-related services to the regions and others as private providers. Details of the IT Internship Program, including video, were prepared and disseminated.

2.15. Other Digital Health Support

2.15.1. HITD restructuring and performance review

Following the assignment of a new director, HITD conducted a detailed review of the digital health initiatives in the pipeline that are supported by different partners. DUP had discussions with the new director to help him understand the role of DUP, DUP's priority digital health engagement areas, and DUP's coordination mechanisms, all of which were given due recognition by the director. As an entry point, the director organized the HITD technical staff forum in Adama from April 8–11, 2021 with the participation of 43 MoH staff. The forum aimed to review in detail what had been achieved and what needs further attention; introduce a restructured HITD approach; and enhance team synergy in digital health. DUP supported the director in organizing the meeting agenda and covered the forum's expenses.

2.15.2. Procurement tracking system

A five-day training and workshop was designed to develop the skills of finance and IT personnel who will use the procurement tracking system to manage and track procurement requests. The ToT happened from March 29–April 2, 2021 with participation of six IT experts and four procurement officers from MoH. DUP financed this training workshop to encourage the introduction of digital mechanisms to change the very slow and manual procurement practice of MoH and the regions. The system is now functional, and a cascade plan is underway.

2.15.3. MOH's website enhancement workshop

DUP supported the MoH's website enhancement and requirements specification workshop from March 4–6, 2021. The workshop was held in Adama under the leadership of the Minister's Office and the Public Relations Directorate. The purpose of the meeting was to push the enhancement of the MoH website, driven by the state-of-the-art technologies and with due consideration of the current and the future requirements. In this meeting, participants discussed possible enhanced features, including security, additional required recommended features, and legacy data migration details (from the old website).

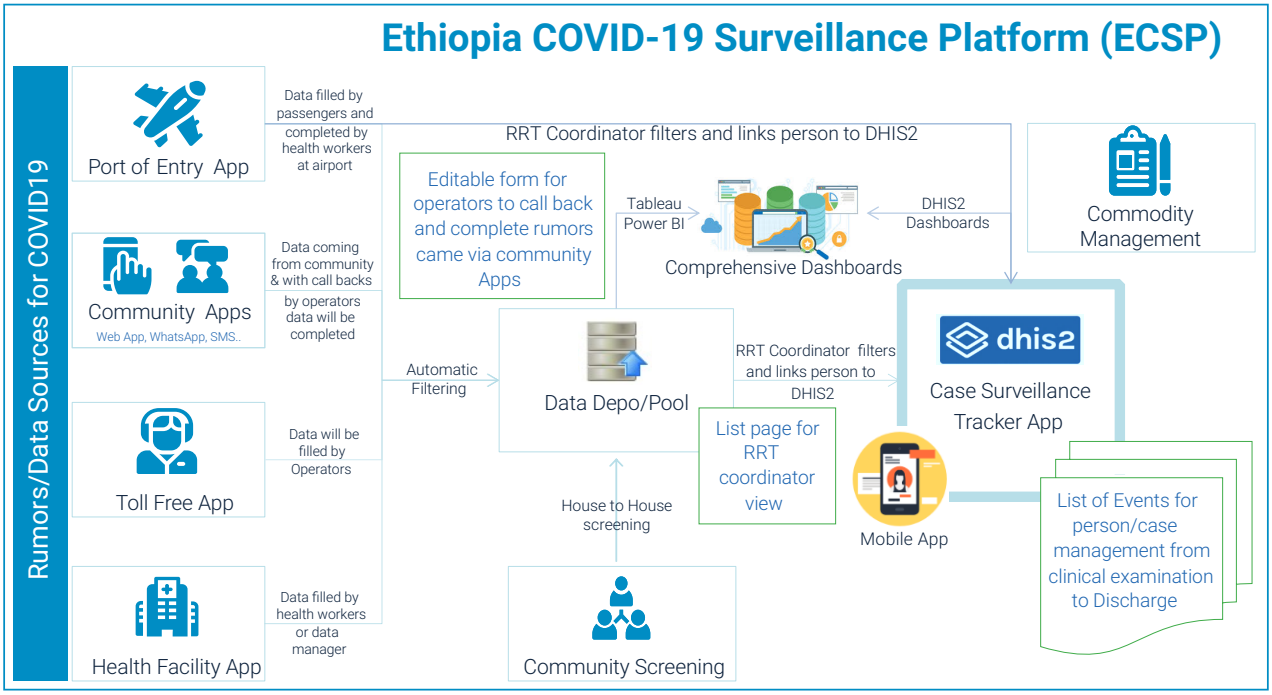
The meeting participants were multi-disciplinary: MoH senior management members, communication and public relations advisors, health policy advisors, and technology experts. It is expected after the workshop that MoH will have an attractive, secure, and content-rich website that contributes to promoting the transformation of the health systems and services.

2.16. National COVID-19 digital response

Since the beginning of COVID-19 pandemic in Ethiopia (March 2020), DUP has engaged in selection, customization, and implementation of different applications to establish the national COVID-19 surveillance and tracking system. DUP's involvement ranges from providing technical assistance to procurement of equipment to provision of training and mentoring end users to hiring consultants for data encoding and management. DUP's major accomplishments are described below.

2.16.1. Designed and established COVID-19 surveillance and tracking system

Early in the COVID-19 outbreak in Ethiopia, there was no well-established digital case-based tracking system. The surveillance team at EPHI was desperately seeking a digital system to support the Emergency Operation Center's (EOC's) pandemic response. DUP, in collaboration with DHA and USAID Ethiopia, approached EPHI and developed a blueprint for a digital platform to meet the workflow and data requirements of the national COVID-19 response team.



Ethiopia COVID-19 Surveillance Platform Workflow – Blueprint

The major challenges during system design and development stages included the lack of a standardized manual system, complex workflow, and frequently fluctuating requirements. DUP developed the DHIS2 tracker (including the laboratory test and result tracker), aggregate daily treatment and isolation center data reporting feature, home-based isolation and care (HBIC) aggregate daily reporting tool, community registration, and the interoperability layer (using OpenHIM) for laboratory information system integration with the DHIS2 tracker. We also developed the toll-free and the port of entry applications in collaboration with DHA. DUP went through several demonstrations and meetings with different stakeholders to get buy-in from health officials at MoH and EPHI and endorsement of the system as the national digital platform, replacing the existing Open Data Kit (ODK) and other fragmented systems.

2.16.2. Customized DHIS2 tracker

DUP fully led and supported the customization of the DHIS2 tracker. To accommodate the changing data requirements and workflows of the various COVID-19 response units (e.g., rapid response team, contact tracing, laboratory sample collectors, surveillance, and case management team), there were several rounds of back-and-forth to release the final working version of the DHIS2 tracker. DUP's technical team adopted OpenHIM as an interoperability layer and Health Level Seven as messaging standards to establish and operationalize the data exchange platform. The customized system evolved to COVID-19 Surveillance Tracking System (CSTS). The CSTS is hosted on the cloud (AWS) to improve server performance and reduce frequent server downtime due to inadequate infrastructure at the MoH data center. DUP is covering the increasing cost of hosting.

2.16.3. Developed COVID-19 data access and sharing protocol

DUP's software development team drafted a data access and sharing protocol to govern application usage and implementation in the case-based and surveillance tracker suite. The document provides direction on user account management and security and server/infrastructure security. It has detailed guidance for implementers on how to provide and accommodate accounts to end users and a data access terms and condition protocol. It also reflects the server/infrastructure aspect of the DHIS2 COVID-19 tracker deployment. Moreover, data storage, backup, and data sharing policies are stated in the document.

2.16.4. Built capacity

As part of the CSTS implementation/rollout process, several virtual and face-to-face hands-on computer/tablet-based trainings were provided to trainers and end users. Six one-day DHIS2 tracker trainings were provided to 165 case managers, interns, focal persons, and HITs from more than 100 quarantine, isolation, and treatment sites in Addis Ababa. During the face-to-face end-user training, DUP strictly applied COVID-19 prevention measures (requiring facemasks, sanitizer, and physical distancing).

2.16.5. CSTS deployment and mentoring

In addition to procuring and distributing tablets and barcode readers, DUP implemented the DHIS2 tracker in more than 68 test laboratories in the country and over 100 quarantine, isolation, and treatment sites in Addis Ababa. Likewise, DUP supported the implementation of daily and weekly aggregate data reporting modules in 35 isolation and treatment sites in Addis Ababa. DUP's IT interns were heavily involved in supporting system deployment and mentorship, and four data encoders were temporarily hired and assigned to EPHI, treatment sites, and regional testing laboratories to support entry of laboratory requests and treatment data. Data analytics is an integral part of the system, as shown in Figure 22. Further analytics from individual-level laboratory test data are displayed in Figure 23.

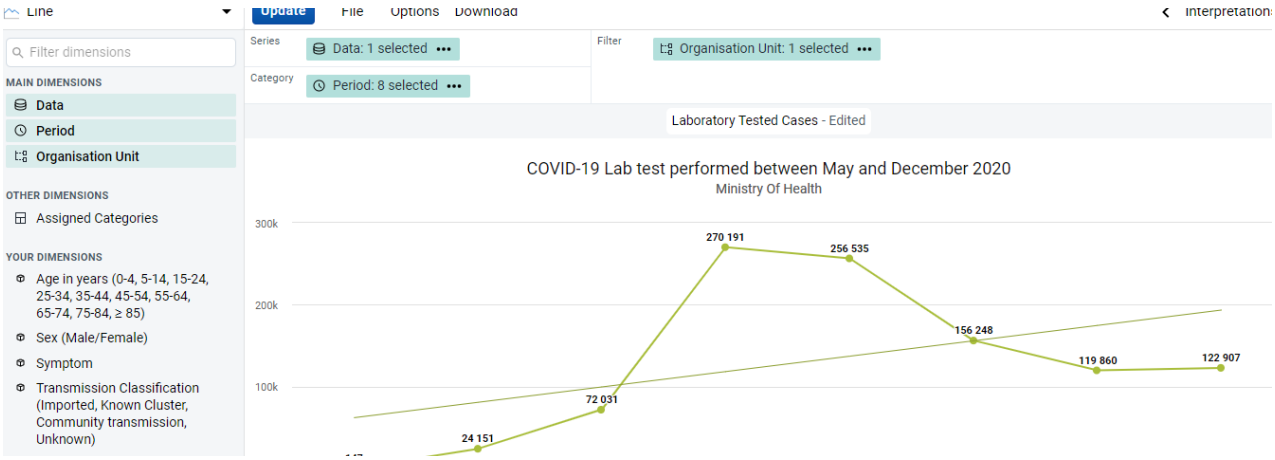


Figure 22. COVID-19 laboratory tests performed between May and December, 2020

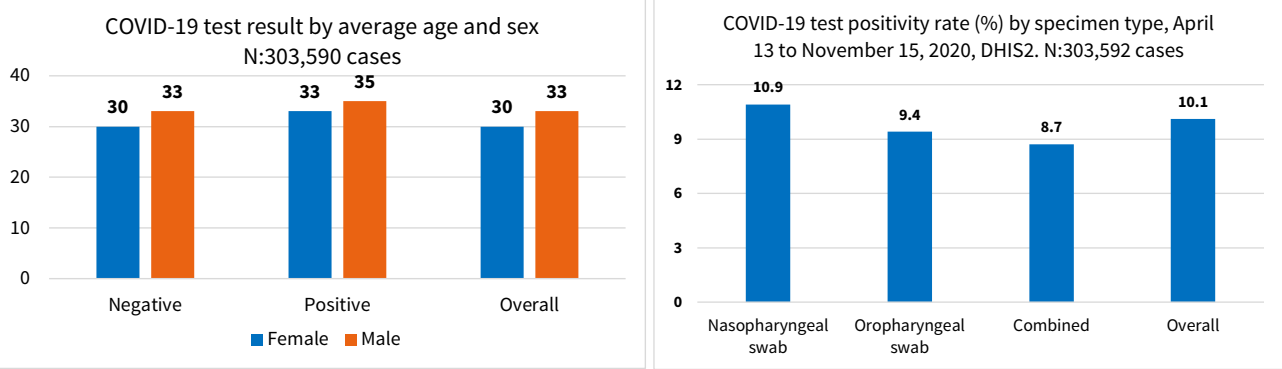


Figure 23. Average age and sex of individuals by COVID-19 test results (left) and test positivity by specimen type

2.16.6. Deployed home-based isolation and care at treatment and isolation centers

In response to the revision in COVID-19 case management protocols, the HBIC application was developed and the HBIC aggregate data entry and reporting tool was integrated to the DHIS2 tracker. DUP supported deployment and mentoring on the upgraded DHIS2 tracker with a daily aggregate data reporting module and a newly developed HBIC module at the isolation and treatment sites and administrative levels, respectively. At the end of August, the rollout coverage in Addis Ababa was about 36%. However, because of connectivity challenges, lack of tablets, and inadequate human resources for electronic data encoding, implementing sites did not reach 100% coverage.

2.16.7. Antigen-Rapid Diagnostic Test System

Related to COVID-19 prevalence, Antigen-Rapid Diagnostic Tests (RDT) are being conducted at various facilities. With the help of DHIS2, a system was designed to keep track of the individuals who are tested, and the subsequent decision-making in this regard. Technical support was provided for users who are using the system for data collection and use. The aggregate data collection on COVID-19 logistics, including number of occupied beds, oxygen concentrators, etc., are being reported by facilities. Extensive support has been given by DUP to the facilities to enable them to carry out reporting (including creation of user accounts, adding more RDT sites, capacity building on data management, etc.), which resulted in helping the MoH meet an average of more than 120 facilities consistently reporting every month in the last year.

2.16.8. Developed and Implemented COVID-19 national case-tracking dashboard

DUP, in consultation with the EPHI EOC and the National Implementation Team, developed dashboards that gave decision makers timely and visual insight to the pandemic situation in the country (Figure 24). The main data sources of the dashboards are MoH COVID-19 daily situation updates; rumor-capture tools; and toll-free, point of entry registration; and community and workplace screening applications developed by DHA. The dashboard is built on Power BI and updated regularly to give users on-time access to information.

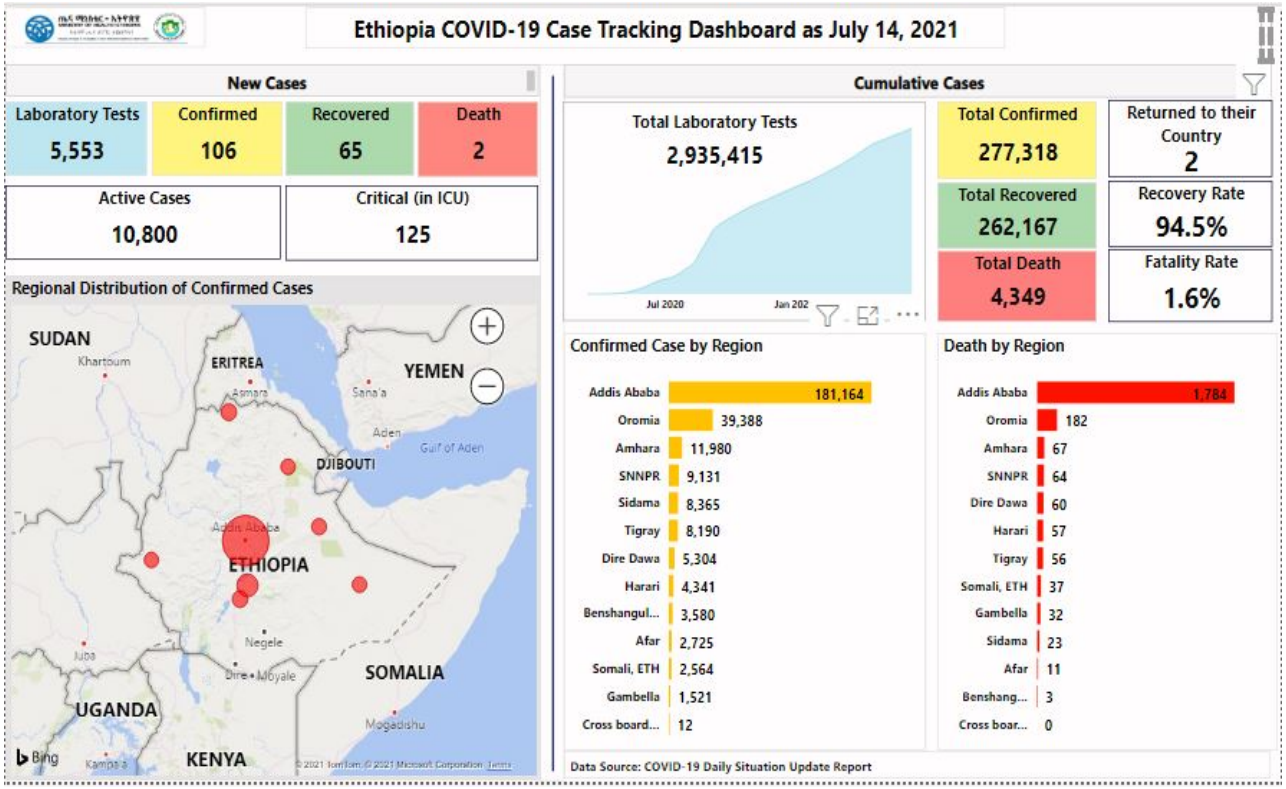
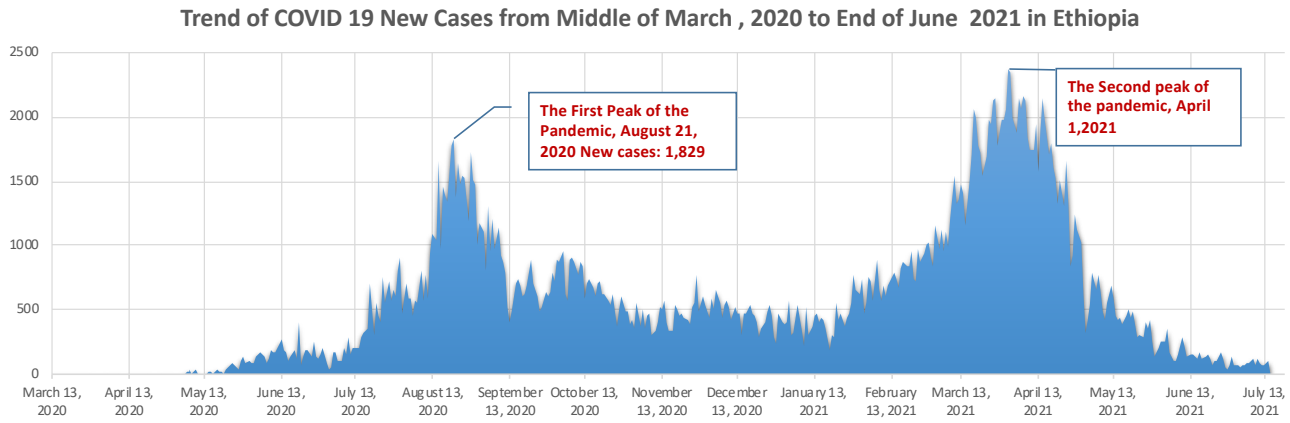


Figure 24. COVID-19 National Case Tracking Dashboard

Starting from the introduction of covid 19 in Ethiopia, we have experienced two waves of the pandemic. The first peak was August 21, 2020 and the second peak was April 1, 2021. More cases and deaths were observed in the second wave of the pandemic (see figure below)



2.16.9. COVID 19 Transition and Continued TA

DUP continued supporting the maintenance and implementation of the CSTS at COVID-19 testing laboratories and test-requesting facilities despite the move to integrate COVID-19 surveillance activities with routine health services. DUP also technically supported the COVID-19 data management activities in Addis Ababa Regional EOC through the temporarily hired consultants and covered the cloud-hosting costs for the majority of the year. The National Implementation Team managed and provided oversight on the implementation of the COVID-19 digitization efforts while working closely with the EPHI team to facilitate a smooth handover/transition of the system to EPHI's digitization team. As DUP's COVID-19 project came to an end in March 2021, DUP primarily focused on technical assistance.

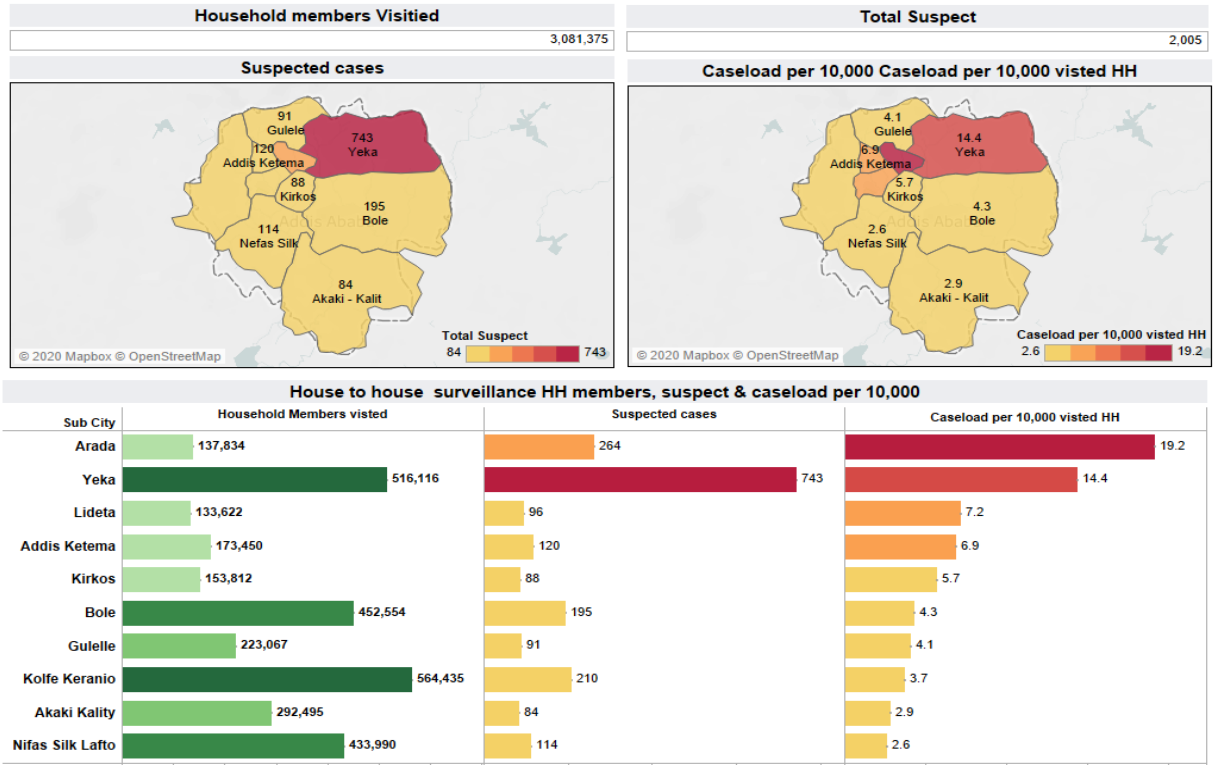
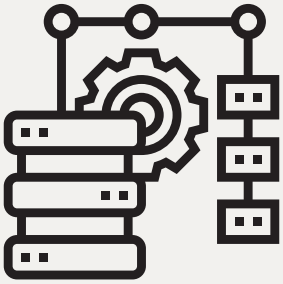


Figure 25. COVID-19 community and workplace workers surveillance in Addis Ababa May 7 to June 30, 2020, suspected cases and suspected caseload per 10,000 household visited by *woreda*.

SECTION III

GOVERNANCE OF THE IR



SECTION III: GOVERNANCE OF THE IR

A well-functioning HIS governance requires the presence of an HIS governance framework, HIS governance structures, and relevant governance documents such as policies, legal frameworks, protocols, and standards both at national and regional levels as appropriate. DUP's support in Year IV spanned across nearly all of these areas, achieving encouraging results.

Highlights

1. *Endorsement of the revised National HIS Governance Framework along with the revised national HIS governance structures*
2. *Technical support in two rounds of national HIS Steering Committee meetings*
3. *Support on the preparation of the HIS Strategic Plan and Digital Health Strategy*
4. *Assisted the customization of HIS governance frameworks to the regional context of seven regions*

3.1. Support MoH to endorse the revised HIS Governance Framework

DUP provided technical support on the revision and endorsement of the HIS governance frame that was endorsed the first time three years ago. Among the amendments on the first version are:

- Inclusion of National Advisory Group (NAG) as the HIS governance structure;
- Merge of the various types of related, but redundant TWGs into three groups;
- Revision of the frequency of meetings of the HIS Steering Committee, NAG, and HIS Governance TWG; and
- Definition of the relationship between the national and regional level HIS governance structures, among others

The revised framework was presented to the recently held National HIS Steering Committee meeting and was regarded as endorsed after incorporating input.

3.2. Support the IR National Advisory Group (IR-NAG) and TWGs meeting

DUP provided technical support in agenda-setting, presentation of the EFY 2012 performance of PPMED and HITD, and write-up of the NAG meeting minutes. The meeting was held on July 28 and attended by 41 participants representing donors, implementing partners, PPMED, and HITD.

DUP also provided financial and technical support to the IR-NAG meeting that focused on soliciting input on the DHBp from the IR- NAG members. The meeting was attended by 39 participants from PPMED, HITD, Office of the State Minister for Operations, and other NAG members. The State Minister for Operations and the Advisor for the Minister also attended the meeting. The presentations made during the meeting focused on the building blocks /pillars, enablers, implementation strategies, milestones, and on the general M&E framework section of the blueprint. Participants provided valuable feedback and comments to be considered in the DHBp document. In addition, DUP provided technical support to MoH for the Data Use, CHIS/eCHIS, DHIS2, MFR, and NHDD TWG meetings, which were held during the reporting period. These forums are serving as a means to mobilize support from stakeholders and for aligning priorities.

3.3. Support IR partners'/HIS Steering Committee meeting

HIS governance provides a structure to discuss and achieve consensus on appropriate policies, strategies, and interventions. DUP continued to support MoH and RHBs to establish functional structures to steer and coordinate HIS development through a participatory, transparent, and accountable process. During

the reporting period, DUP provided financial and technical support to conduct IR partners'/HIS steering committee meeting in November 2020. Close to 40 individuals from donors (BMGF, CDC, UNICEF, WHO, Italian Cooperation), implementing partners (DHA, DUP, L10K, etc.), MoH directorates, and agencies attended. Participants discussed the status of the three pillars of IR; DUP supported the preparation and presentation of an update on the status of digitalization, data use, and governance. This forum was an important opportunity to raise critical concerns with senior MoH management directly and to further DUP's coordination and engagement role. Major challenges raised during the discussion included:

- Presence of several governance documents that are not yet endorsed.
- Lack of standards to guide development of electronic medical recording systems.
- Need for better human resource capacity at RHB level for a smooth rollout of national digitization efforts.
- Need for improved coordination within MoH units and to manage partners.
- Resource mobilization effort from partners during the planning phase instead of mid-course requests, which presents challenges to partners.
- Need for a robust data sharing-protocol that supports access to data for both national and international stakeholders.

Immediate action items agreed upon were:

- Map partners that are working on different HIS/digital health initiatives, including their area of support.
- Check the status of different HIS/digital health governance documents and ensure they are endorsed and enforced.
- Identify and prioritize key challenges in the IR initiatives (digitization, data use, and governance) and propose solutions.
- Organize the prepared documents by interoperability of different HIS sub-components, identify the priority-use cases, and share with the steering committee.
- Propose necessary amendments to the current governance structures.

Progress on these actions included the merging of redundant HIS governance structures; preparation of a template for partner mapping, and setting of a timeframe for finalization of PPMED-related documents. DUP in collaboration with DHA mapped HIS governance-related documents that are in different stages of development (under development; completed but not endorsed; endorsed but requiring revision; and soon-to-be developed). Three documents are finalized but not endorsed, and around ten are under various stages of development.

DUP also provided technical support to the second of the HIS Steering Committee meeting which was held virtually. Around 20 participants from MoH, agencies, donors, DUP, and DHA attended the meeting, which was chaired by H.E, Dr. Lia Tadesse. The meeting was to discuss and endorse the revised HIS governance structures and the national HIS governance structures as follow-up to the first meeting. Another agenda was the discussion and endorsement of the HIS maturity assessment result by the Steering Committee. Among the major inputs given were:

- To amend the naming of the structures and contents of the governance framework to reflect the broader digital health including digital health services such as telemedicine; and
- To institute mechanisms which prevent proliferation of substructures under Data Use and Digital Health TWGs

In summary, DUP is supporting MoH to have functional HIS coordination platforms, the most active of which are:

1. HIS Steering Committee: Expected to meet quarterly under the leadership of the Minister of Health. Among the few members are USAID and BMGF. This committee deals with high-level issues that need the decision of higher officials.
2. NAG: Meets twice monthly and is the largest forum that largely comprises government and nongovernment partners. It is co-chaired by PPMED and HITD and DUP is the secretary. Among its main objective are to align partner support with MoH priorities, track progress, and socialize policy and strategic documents.
3. Data use and digitization TWGs: These are the technical arm of the NAG and the Steering Committee. Detailed technical discussions and decisions are made at their monthly meetings.
4. Other TWGs and taskforces: In addition to TWGs on DHIS2 TWG, MFR, eCHIS, eHRIS, and governance, there are structures, which are established on an ad hoc basis to complete specific activities (e.g. eCHIS Steering Committee, Indicator revision task force, National Classification of Disease (NCoD) revision task force,etc.).

3.4. MFR Governance Protocol

During the reporting period, technical support was provided on the MFR Governance and Management Protocol before it was presented and endorsed by the Management Committee of the MoH. The Health and Health Related Institutions Regulatory Directorate (HHrIRD) led the presentation and endorsement of the document

3.5. Support MoH to finalize and endorse Data Access and Sharing Guideline

During the reporting period, DUP supported the preparation of a draft data access and sharing directive. It is intended to maximize use of data; avoid duplication of efforts; improve efficient and effective use of resources; increase accountability and better decision-making by enhancing data governance; and improve access to health data. It clearly outlines roles and responsibilities and processes for making routine, research, survey, and surveillance data sharable and accessible while ensuring confidentiality and data security.

The initial title of the document was changed to 'guideline' from 'directive' based on feedback from the legal directorate of MoH and the content was amended accordingly. Additional input was also obtained from AHRI, one of the agencies of the MoH. The document was also shared with the Federal Attorney General through the legal directorate of MoH for further input, including on the title and scope of the document. Due to other competing priorities, MoH and EPHI could not meet and discuss to resolve their differing opinons concerning the data warehouse and data flow, which is a key section of the guideline.

3.6. Support regional HIS governance activities

DUP supported the Oromia, Amhara, Gambella, Harari, SNNP, and Sidama regions and Addis Ababa City administration by organizing consultative workshops to discuss and endorse their respective regional HIS governance frameworks. One-hundred and thirty nine participants, drawn from the seven RHBs and HIS partners, supporting the seven regions attended the workshops, which were held in the respective regions. The workshops were concluded by reaching a consensus on the respective regional HIS governance frameworks, but also included the preparation of ToRs for HIS governance structures of SNNP and Oromia and a plan of action on IR implementation and improvement for the Gambella region.

In addition, DUP supported the customization of the national HIS governance document to the regional contexts of **Afar** regions. The HIS governance frameworks are expected to define the HIS governance structures and role and responsibilities of HIS stakeholders to strengthen the HIS in each region.

Oromia , February 2021

SNNP February 2021

Based on the HIS governance frameworks, six of the regions were able to hold meetings of their structures at least once during the reporting period.

3.7. Support to the HIS Strategic Plan and the National Digital Health Strategy

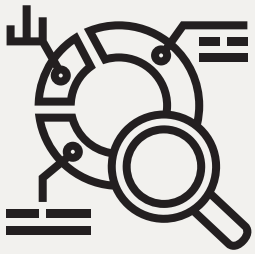
DUP provided technical support and also financial support for three consecutive workshops conducted to prepare the draft HIS Strategic Plan and Digital Health Strategy which are being prepared by PPMED and HITD respectively.

The support included the preparation of independent strategic plan documents by PPMED and HITD and the merging of the two documents after a decision by MoH management. The decision to merge the two documents was reversed again and final agreement was reached to finalize the HIS Strategic Plan inclusive of digital health information first, which DUP provided technical and financial support, and then the Digital Health Strategy. Preparation is underway to conduct a workshop in two weeks' time to gather input on the HIS Strategic Plan from MoH directorates and agencies. The document will be finalized after final input from RHBs and other HIS stakeholders.

Lack of clear decision by MoH management on the relationship of the two documents has caused substantial delay.

SECTION IV

MONITORING, EVALUATION, RESEARCH AND LEARNING (MERL)



SECTION IV: MONITORING, EVALUATION, RESEARCH, AND LEARNING (MERL)

In Year IV, DUP focused on strengthening the local research capacity in HIS through its broad research endeavor that engaged MoH, RHBs, CBMP universities, (Addis Ababa, Jimma, Mekele, Hawassa, Gondar, and Haromaya) and post graduate students. DUP also continued tracking the progress of IR learning and demonstration *woredas* supported by MoH, CBMP universities, and the project itself. Details of these activities is described as follows.

Highlights

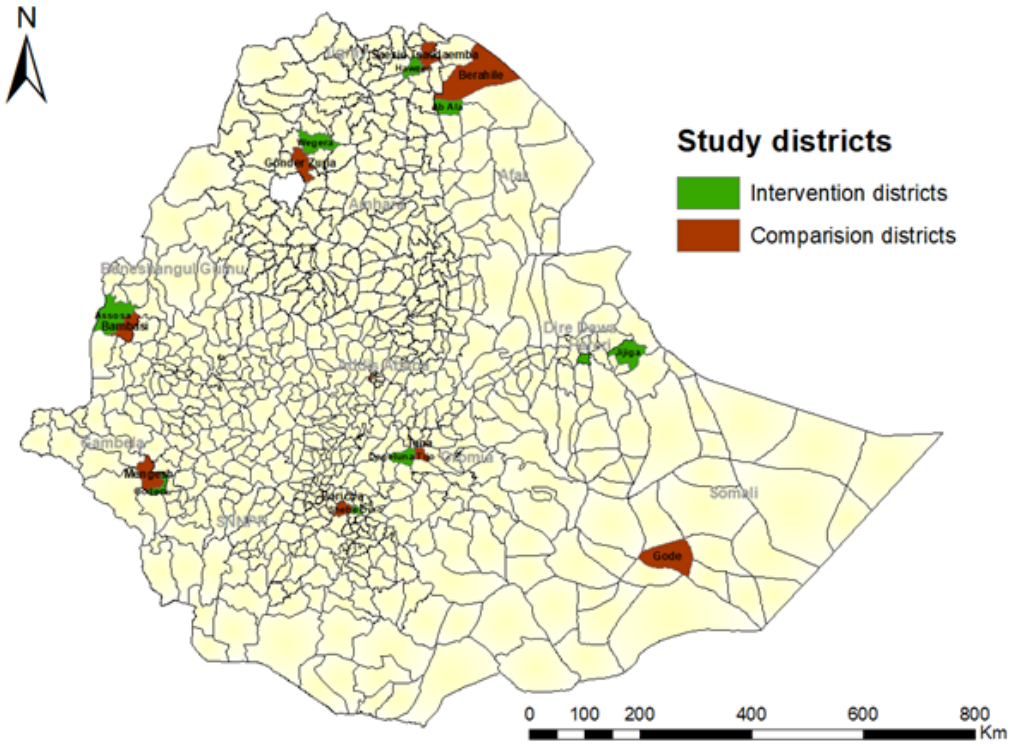
1. *Findings of the 2020 HIS Effectiveness Study disseminated*
2. *12 HIS implementation researches in progress*
3. *57 master students received grants from DDCF. 54% of them completed their thesis, 28% submitted manuscripts, and 12% published their researches.*
4. *24 published manuscripts uploaded in the publication depository of DUP*
5. *Four presentations made at the Global Digital Health Forum.*
6. *47% of project indicators are completed, 33% are progressing while 16% need attention and 4% are below 50%.*

4.1. Research Works

In the reporting period, DUP engaged in and supported several works of research using different modalities.

4.1.1. HIS effectiveness evaluation researches

DUP in collaboration with the MoH conducted an HIS effectiveness evaluation study in 33 *woredas* (19 intervention and 14 comparison *woredas*) in October 2020 (see the map below). The 19 intervention *woredas* involve eight learning and eleven demonstration *woredas*. The assessment covered 3,016 households; 31 WoHOs; 71 HCs; 5 hospitals; and 81 HPs.



Map of *woredas* included in the HIS effectiveness studies

Experienced data collectors and supervisors were trained and deployed to gather information using tablets. A team of experts from DUP and MoH ran different data analytics that showed the status of HIS performance in intervention and comparison *woredas*; current HIS performance status against baseline; MCH service coverage in intervention and comparison *woredas*; and associations between HIS performance and MCH service coverages.

HF-level HIS data collectors training, (left); household-level reproductive MCH data collectors training September2020, Adama.

A detailed report on the findings of the HIS effectiveness study was presented and shared during the dissemination workshop held in January 2021. A total of 60 participants, representing the MoH, RHBs, CBMP universities, and partner organizations, attended the workshop. The State Minister for Health Programs and directors of the three MoH directorates (MCHN, PPMED, and Women, Children, and Youth's Affairs) also attended this workshop.

In addition to the HIS effectiveness study, DUP shared the following reports of the different HIS studies it had conducted in the past two years with the workshop participants:

1. Performance of Routine Information System Management (PRISM) baseline studies in CBMP *woredas* (2018/2019)
2. Qualitative study on the drivers and barriers to improved information use for decision-making by health workers at the point of health service (2020)
3. Capacity building and mentorship for better information culture – a case study in Addis Ababa, Ethiopia (2020)

Participants appreciated DUP for undertaking the study, which according to most, had provided scientifically sound evidence on the status of HIS implementation and MCH service performance in the targeted *woredas*. See some of the major findings of the study (See Figures 26 and 27)

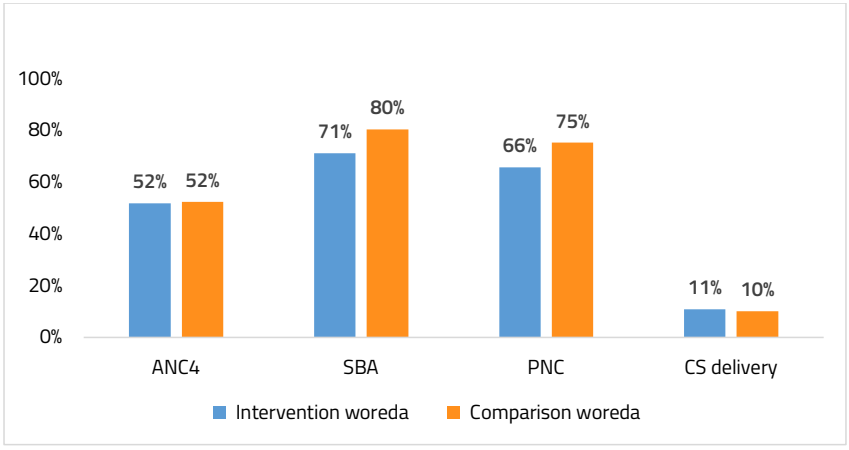


Figure 26: Maternal service coverage in the eleven demonstration and comparison *woredas*

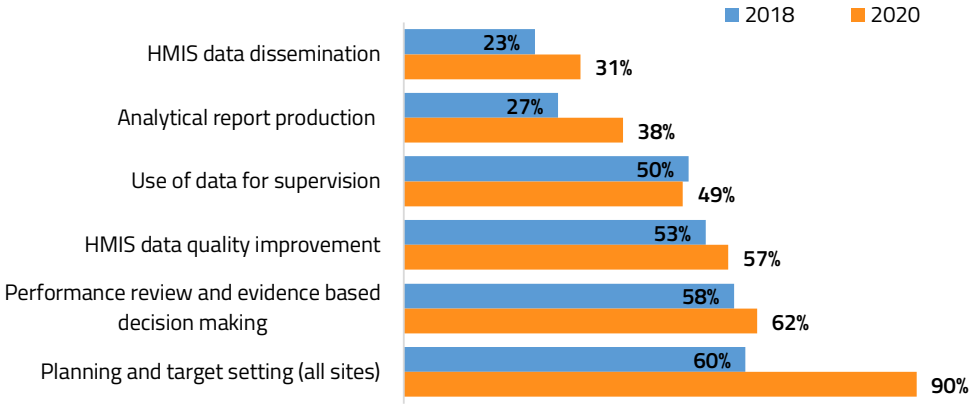


Figure 27: Trends of information use in health facilities

At the end of the workshop, participants worked in groups on the intervention packages to identify solutions to mitigate the HIS implementation gaps pointed out by the study. The action points identified during the discussion include:

HIS capacity: Strengthen infrastructure and enhance human resources in partnership with universities

Data quality: Intensive follow-up on quality assurance and documentation at health facilities including trainings to strengthen PMT at the lower level

Mentorship related gaps: Regular supervision and mentorship

Leadership commitment: Give adequate attention to data quality and use by the top leadership and strong partnership engagement with clear responsibilities and duties.

The State Minister for Health Programs concluded the workshop with remarks, appreciating the work done by DUP and reiterating the MoH's commitment to HIS and called for stakeholders' collaboration to enhance HIS implementation and research.

H.E. Dereje Duguma (State Minister of MOH) and Naod Wonderad (Director of PPMED) attending the HIS Effectiveness Studies Dissemination Workshop, January 26-27, 2021, Adama

For further documentation and dissemination of the HIS Effectiveness Study in the future, clean datasets and do-files from the HIS effectiveness study were archived. Three manuscripts were also submitted to peer-reviewed journals to share the lessons with the global community. DUP has begun drafting other manuscripts based on the data sets.

4.1.2. HIS Implementation Researches

Establishing linkages between academic and implementing institutions to build IR implementation capacity is one of the unique features of DUP. To this end, DUP continues to provide intensive technical and financial support to collaborative research teams that are composed of CBMP partner universities, RHB, MoH (HITD &, PPMED), and DUP staff to conduct 12 implementation science research projects on selected IR topics. This year, DUP organized a series of workshops to build the capacity of research teams and designed a monitoring system to track their researches.

University Research Teams Revising Their research documents at the Implementation Research Capacity Building Workshop, February 2021, Bishoftu

Status of ongoing implementation researches

Currently all of the 12 implementation researches received IRB approval and eight teams started conducting their research. In four of the researches, baseline assessment is completed and an implementation strategy was introduced. In six of the researches, baseline data analysis was completed and the implementation strategy is revised and ready. One of the researches started collecting baseline data while one completed preparation to collect data. The detailed status of each research is presented in the table below.

Table 4: Status of DUP funded implementation research projects, June, 2021

No.	Research Title	Status	University
1	Strengthening Performance Monitoring Team through Quality Improvement Model Implementation in Selected Health Facilities of Addis Ababa	Monitoring implementation strategy	Addis Ababa
2	Motivating the Performance Monitoring Team to Improve Data Use at Selected Public Health Facilities in Dire Dawa and Harari Regions: An Implementation Research	Analyzed baseline data (both qualitative and quantitative) and revising implementation strategy	Haromaya
3	On-Site Training Mentoring to Improve Quality of Data in Selected Public Health Facilities of Somali Regional State	Analyzed baseline data (both qualitative and quantitative) and revising implementation strategy	Haromaya
4	Improving Data Use through Enhancing Performance Monitoring Team Function in Sidama Region, Ethiopia	Monitoring implementation strategy	Hawassa
5	Ensuring Sustainability of Health Information System Changes in Capacity Building and Mentorship Program *Woredas*, Southern Ethiopia	Completed preparation of data collection tool and ready to collect baseline data	Hawassa
6	Improving Data Quality through Implementation of Data Quality Assurance Strategies at Health Facilities in Digalu Tija Woreda, Arsi Zone, Oromia Region, Ethiopia	Analyzed baseline data (both qualitative and quantitative) and revising implementation strategy	Jimma
7	Improving Data Quality through Implementation of Data Quality Assurance Strategies at Health Facilities in Godere Woreda, Majang Zone, Gambella Region, Ethiopia	Analyzed baseline data (both qualitative and quantitative) and revising implementation strategy	Jimma
8	Improving Health Data Quality Through Optimizing Mentorship and Supportive Supervision in Health Facilities of Tigray Region	Analyzed baseline data (both qualitative and quantitative) and revising implementation strategy	Mekele
9	Improving Health Data Quality Through Optimizing Mentorship and Supportive Supervision in Health Facilities of Afar region	Analyzed baseline data (both qualitative and quantitative) and revising implementation strategy	Mekele
10	Performance-based Non-financial Incentive Intervention for Improved Data Quality and Information Use, in Wogera District: Amhara Region	Monitoring implementation strategy	Gondar
11	Capacitating HIS Leaders to Improve Healthcare Data Quality and Use in Assosa District	Monitoring implementation strategy	Gondar
12	Optimizing eCHIS Implementation to Improve RMNH Service Delivery and Data Quality; a Hybrid Implementation-Effectiveness Study in Amhara and Oromia Regions	Started baseline data collection	MoH and DUP

DUP is tracking the progress of these implementation researches by designing an online monitoring system, through organizing a standing monthly virtual meeting and via a Telegram chat room created for research team members. These research projects are expected to be completed by the end of this fiscal year.

Implementation research capacity building workshop

In February 2021, DUP organized an Implementation Research Capacity Building Workshop for 34 research team members from all CBMP universities and representatives from RHBs and MoH. The aim of the workshop was to share updates on research conducted by the universities, clarify principles, techniques, and practices in implementation research and support the universities to refine their research work.

University research teams revising their research documents at the Implementation Research Capacity Building Workshop, February, 2021, Bishoftu.

Participants engaged in productive discussions on the concepts of implementation research, the updates made by research teams and the expected deliverables from each research project. Subsequently, based on the common understanding created and comments provided, research teams have revised their proposals and shared the revisions with the wider group. The workshop, principally, gave DUP and research teams the opportunity to get together and polish their research work by clarifying their misunderstandings and confusion on implementation research.

In their closing remarks, University of Gondar and MoH representatives highlighted the importance of standardizing and defining the HIS performance measurement indicators that are used by all research projects. Accordingly, DUP and MoH staff have begun preparing the measurement indicator guideline. Moreover, both speakers advised the research teams to be realistic and focus their questions, methodologies, and tools to be successful in research.

4.1.3. PhD and Master students research works and capacity building activities

As part of HIS research capacity building initiative, DUP supports the research work of ten PhD and 60 Master's students through funding from the DDCF. The support is provided through CBMP universities.

Status of students and research activities

Thus far, 57 Master's students received grants from DDCF/DUP. Of these students, 31 (54%) completed their thesis, 16 (28%) submitted manuscripts, and seven (12 %) published their researches. DUP availed research grants to 18 Master's program students in the current academic year. Efforts are being made to present their findings in regional annual review meetings to link research to policy and decision-makers.

Eight PhD students, enrolled in five CBMP partner universities (two students each in Addis Ababa University, University of Gondar, and Hawassa University and one student each in Jimma and Haromaya Universities), were awarded a PhD research grant based on their PhD concept notes/proposals. Currently, all students have registered and started coursework. In this year, DUP oriented the PhD students on the support that they will receive from DUP, expected outcomes, and next steps. DUP provided technical advice to these students to refine and link their research proposals to IR priority areas. Some of the students have developed protocols for their dissertation. PhD students also participated in DUP's research work and evidence dissemination workshops to gain experience.

Table 5 : Masters research grant supported by DDCF

University	# Masters grant awarded	Thesis submitted	Manuscript submitted	Manuscript published
AAU	11	5	3	-
Haramaya	12	4	3	-
Hawassa	7	4	3	2
Jimma	5	2	-	-
Mekelle	8	8	-	-
University of Gondar	14	8	7	5
TOTAL	**57**	**31**	**16**	**7**

PhD Students Research Capacity Building

With the financial and technical support of DUP, a qualitative research methods and analysis course in two phases in May and June of this year was organized by Addis Continental Institute of Public Health (ACIPH) for the eight sponsored and three additional PhD students. The objective of this course, was to acquaint doctoral students with qualitative research methodology and analysis. In the first phase, the course covered the theoretical and methodological concepts of qualitative research. In the second phase, detailed coding approaches, data analysis approaches, and appraisal were provided.

PhD students with their trainers, May, 2021.

4.1.4. Research Documentation and Dissemination

DUP acknowledges the importance of the documentation and dissemination of research findings not only for future reference, but to also share lessons with the global community. Likewise, DUP is following the progress of ongoing research work done by sponsored Master's and PhD students, implementation researches, evaluation researches, and other researches done in collaboration with CBMP universities. Currently there are 24 published manuscripts uploaded in the publication depository (link below)

https://drive.google.com/drive/folders/1L6JHsxlwnq3NuWCU-bXx-kzvEjvqhK2V?usp=sharing Submission of HIS research articles and manuscripts to peer reviewed journals or conferences is ongoing.

In this year, four learning reports were presented at the Global Digital Health Forum. The presentations were on the implementation experiences of the digital health response to COVID-19, IR model woreda creation strategy, DHIS2, and eCHIS. As described in 4.1.1., datasets and do-files from the HIS effectiveness study, published and unpublished manuscripts, and process documentation are archived for references and further work.

4.1.5. University of Gondar Sub-contract to support pre-service training of health information technicians (HITs)

Since the Health informatics curriculum was developed with DUP support in 2017, more than 10 universities adopted the curriculum and currently, there are more than 700 students enrolled in universities and colleges. Last year, the Ministry of Science and Higher Education introduced around 7 additional mandatory courses and there was a need to revise the overall content of the curriculum accordingly.

In line with this need, DUP organized a workshop in Bahirdar where University, MOH and RHB representatives reviewed the list of courses. However, in order to ensure consistency across universities and further refine the curriculum to get approval by MOSHE, it was important to bring all universities together. Accordingly, DUP through its partnership with the University of Gondar organized a three-day workshop which was attended by 27 participants from universities, the Ministry of Science and Higher Education, and RHBs. Finally the curriculum was finalized and shared to the Universities for action.

4.2. Monitoring and Evaluation Activities

DUP tracks its performance and evaluates it against its targets using different M&E approaches. Supporting MoH/PPMED to coordinate CBMP activities, supportive supervision, review meetings, regular reporting, and monitoring progress using indicators are the major M&E activities.

4.2.1. Supervision and supporting MoH in coordinating CBMP

DUP was part of a team that conducted onsite supportive supervision to the six local universities that participate in the CBMP. The supportive supervision included site visits to a HF and discussions with the respective university management, RHB, WoHO, and HFs. Following the site visits, the PPMED led a CBMP review meeting in Bahir Dar town that was attended by universities, RHBs, MoH, and partners. During the meeting, participants reviewed CBMP implementation status and progress towards creating Connected *woredas* and identified and discussed gaps and challenges. It was agreed that despite the visible progress, concerted effort was still needed to bring these *woreda*s to Model status. Universities also shared the new approaches they have introduced to implementing CBMP, including embedding mentorship into RHB and WoHO structures; creating a multi-disciplinary mentoring team; diffusing best practices and experiences; integrating quality improvement initiatives; and conducting data day or data week forums to promote an information culture. DUP also provided technical support to the universities in finalizing their annual work plans ensuring that they integrate practical and proven data use interventions and lessons from the research projects supported by DUP.

DUP meets regularly with the six local universities to monitor their implementation of DDCF's grant. In the year, three rounds of meetings have been held to review project performance, challenges, and priority activities.

4.2.2. Conducting review meetings

In the reporting year, DUP organized several internal and integrated face-to-face and virtual review meetings. DUP conducted two quarterly and one semi-annual internal review meetings for project staff to reflect on project accomplishments, best practices, challenges and next priorities. Additional virtual sessions were organized to orient staff on donor reporting requirements and revised monitoring tools. As a result, reporting quality is improving.

DUP's Midyear internal review meeting in January 2021 at Executive Hotel of Adama

Moreover, DUP facilitated virtual review meetings with PPMED, HITD, and Dr. Ruth of the Minister's Office at different times, and discussed the smooth transition of the IT Internship Program, partnership between UiO and MoH, supporting PhD and Master's students, the mentorship curriculum, packaging interventions for demonstration *woreda*s, HIS implementation researches, and regional IT laboratories.

4.2.3. Monitoring progress using indicators

DUP measures its performance on a quarterly basis using a results framework (tracker) having 55 indicators and linked for 52 outputs and eight intermediate outcomes. The indicators are categorized under the four project operation domains; (1) Transformation of data use culture, (2) Digitalization of HIS, (3) HIS governance and (4) HIS M&E, research and learning, documentation and dissemination. Despite the challenges posed by the COVID-19 and political conflict this year, DUP's regional and central teams worked hard to collect and analyze data for all of the indicators in the tracker (Figure 28).

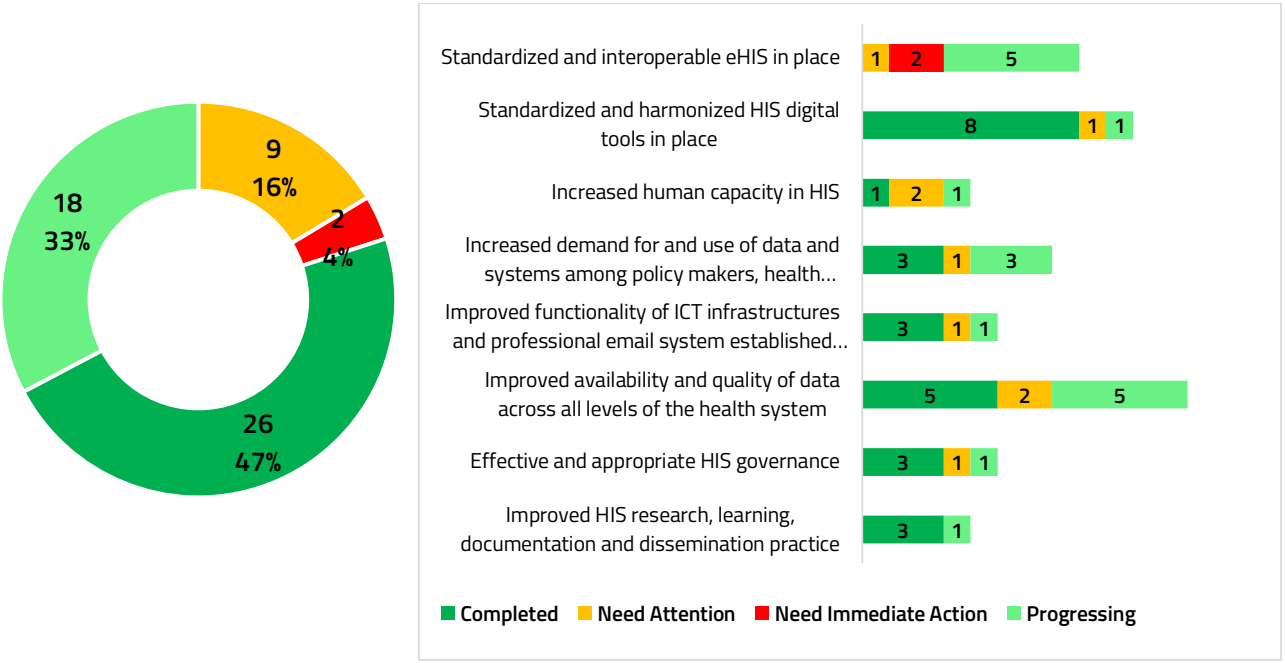
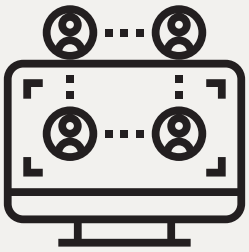


Figure 28. DUP performance monitoring indicator progress as of June 2021

The summary of the tracker shows that out of the 55 indicators, 26 (47%) of them are completed (≥100%), 18 (33%) of them are progressing (75%–99%) while nine (16%) of them need attention (50%–74%). Unfortunately, two (4%) indicators' performance was below 50% that need immediate action. Part of the work is done for these two indicators, but there are plans to address them with other partners and MoH. The detailed result framework is also attached with this report.

SECTION V

COMMUNICATION, LEARNING AND KNOWLEDGE MANAGEMENT



SECTION V: COMMUNICATION, LEARNING, AND KNOWLEDGE MANAGEMENT

In Year IV, there were several progresses recorded in documenting and sharing project accomplishments. Seven success stories showcasing the improvements in health service delivery due to contributions and efforts of DUP were prepared and shared. More importantly, this year, DUP technically and financially supported the development and roll-out of a knowledge management (KM) tool for the MoH. Following are the detailed activities.

Highlights

1. *Seven success stories showcasing different IR initiatives produced*
2. *Developed and launched a KM system for the MoH*
3. *A documentary film and a newsletter on IR produced and shared at the ARM*
4. *Process documentation on the IT internship and data use was prepared*

5.1. Communication

Produce and share success stories on the implementation and progresses of IR

During this reporting period, DUP prepared and shared seven success stories from across different interventions in the country— three additional stories than what was planned for the year. Primarily, the stories focused on how optimized and strengthened PMTs improved use of quality health data for informed decision-making that ultimately enhanced health service delivery. The stories were also shared through different modes of dissemination. For example, four of the stories were shared during the 2020 ARM (Table below).

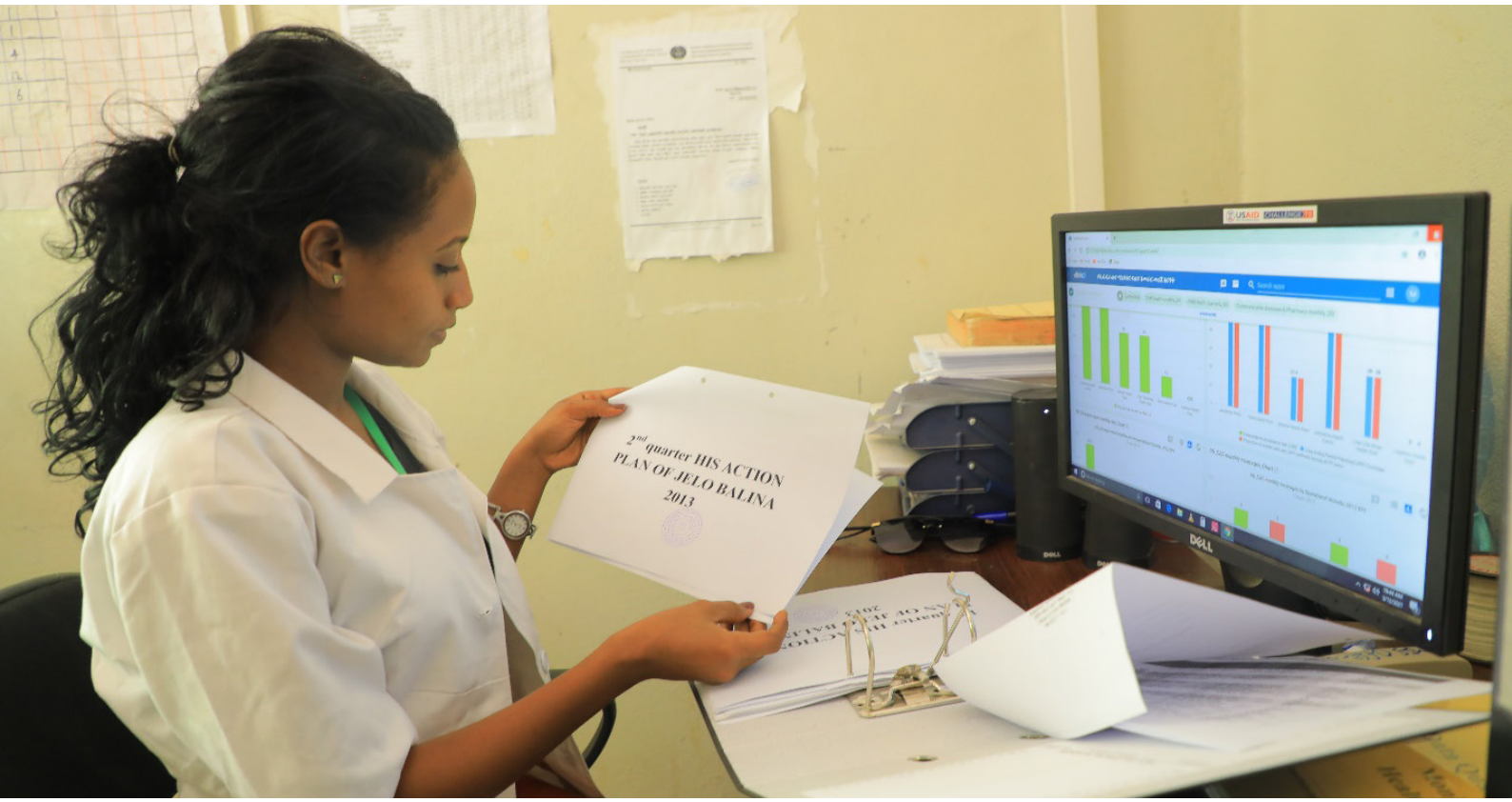
Table 6: Produced and shared success stories on the implementation and progresses of IR

S.N	Title	Date	Dissemination Mode
	Improving Health Service Delivery in Ethiopia through Strengthened Performance Monitoring Teams	May, 2021	https://www.jsi.com/improving-health-service-delivery-ethiopia/
	Improving A Data Use Culture Through Building Technical Capabilities And Optimizing Dhis2: a success story form Amhara Regional Health Bureau (ARHB)	July, 2020	Shared at the 22nd ARM, 2020
	A Pathway To Transforming Woreda Health Data Management Systems: Aleltu Woreda's Experience And Story	Aug., 2020	Shared at the 22nd ARM, 2020
	Using Quality Health Data to Improve Health Service Outcomes	June, 2021	https://www.jsi.com/using-quality-data-to-improve-health-service-outcomes/
	DHIS2 data visualization on mobile phone	June ,2021	2020/21 Annual Report
	Over Turning Misery to Success: A Recitation of Wolayita's Experience in Provision of Access to Improved WASH Services	Oct., 2020	2020 PRCR Annual Magazine
	Leveraging Popular Social Media in the Information Revolution: Digitalizing the Health Information System and Improving Data Use in Ethiopia	Sept., 2020	Shared at the 22nd ARM 2020

Sofo Mohammed, HEW, under Jelobelina Health Center in Dera Dewa City admin, taking action to enabling the stagnant water flow to avert cholera outbreak. This was one of the actions informed by data and evidence

In February, DUP organized a virtual training on success story writing to foster capacity of documenting success through stories. Following this training, DUP staff, particularly those at the regional level were expected to identify, capture, prepare, and share the success stories - a process from which three more success stories were prepared and shared.

On top of the success stories, several news pieces and updates were prepared and widely shared through various communication outlets, including the JSI website. A news article on the inauguration of Digital Health Innovation and Learning Center (https://www.jsi.com/ethiopia-launches-digital-health-innovation-and-learning-center) https://www.jsi.com/ethiopia-launches-digital-health-innovation-and-learning-centerand a blog piece on the IT Internship Program closing ceremony (https://www.jsi.com/jsis-ethiopia-data-use-partnership-jointly-hosts-the-first-it-internship-program-appreciation-and-exit-ceremony/ https://www.jsi.com/jsis-ethiopia-data-use-partnership-jointly-hosts-the-first-it-internship-program-appreciation-and-exit-ceremony/) were some of these. DUP also actively promoted national IR initiatives and major updates and events through various social media outlets, including the DUP Twitter handle (@DUP_Ethiopia) (https://twitter.com/DUP_Ethiopia/status/1397176545668644865 , https://twitter.com/DUP_Ethiopia/status/1389483136422141952, etc.)



Yodit Tadesse, HIT Expert in Jelobelina H.C. in Dire Dewa Reviewing DHIS2 Dashboard against reports

In addition, DUP organized a dedicated field visit to its supported sites to capture photos that depicted IR practices and progresses. These pictures will supplement success stories and other communication materials that highlight project accomplishments.

Prepare and share IR Newsletter

In this reporting year, DUP prepared and shared one IR newsletter during the MoH's 2020 ARM. The newsletter presented briefings on implementations and progresses of the IR agenda at the national level.

Produce and share one documentary film on selected IR topics

A documentary film that reflects on the implementation and progress of the IR in the last five years has been produced and shared. The documentary film which is produced with Amharic narration and English subtitles was presented to the ARM 2020's participants, broadcasted on Fana Broadcasting Corporate (FBC), a national broadcasting media in Ethiopia, and shared on the MoH's YouTube account, Facebook page, Twitter, and website (https://www.youtube.com/watch?v=P0y3QmcCKOc&t=1s). The film was also shared through DUP's and JSI's outlets.

Furthermore, three different infographic videos were produced and shared. The short infographic videos focused on PMT, data quality and eCHIS. The infographics were also shared during the ARM 2020 forum and via various channels of the MOH, DUP and JSI (https://www.youtube.com/watch?v=eUhZRx1HxbY, https://www.youtube.com/watch?v=I_PUNhf6FeQ, & https://www.youtube.com/watch?v=0QjlmDPa7BY).

Support design and visualization of IR promotion and communication materials

Over the last fiscal year, design and visualization support were offered to the government based at various requests. Some of the materials designed and visualized are: IR Booklet, PPD Core Plan, Oromia 2012EFY Annual Health sector Performance Report, and data quality and use posters.

Support the Public Relation and Communication Directorate (PRCD) based on need and request

DUP supported the MoH's PRCD in preparing an article, *Over Turning Misery to Success: A Recitation of Wolayita's Experience in Provision of Access to Improved WASH Services*, that was shared on different outlets of the MoH, including in the ARM magazine. In addition, support on COVID-19 communication response was also provided. Particular attention was given to strategizing the COVID-19 Pandemic Response Communication guidelines and standards. In addition, support was provided in developing a project proposal for a COVID-19 Response Communication grant.

Support the preparation of ARM of the MOH

DUP has been a close partner of the MoH on the preparation and organization of the 22nd ARM in November 2020. Accordingly, DUP provided both technical and financial support to help realize the 2020 ARM. DUP through its communication staff prepared and shared the IR Success Story Magazine that focused on IR implementation success stories. Similarly, DUP provided support in the editing and designing of communication and promotional materials, such as core plan, special bulletin, the Health and Health Related Indicators report, annual performance reports, and executive summaries, etc.

5.2. Documentation and Learning

Several documentation activities were undertaken in the reporting period. The HIS effectiveness studies dissemination workshop that took place in January 2021 was documented and a brief summary of the meeting was prepared and circulated within the wider MoH and partners' group.

DUP's HIS maturity assessment workshop, refresher training on implementation research, DHIS2 academy level training, and DHIS2 customization training, and Oromia region's HIS Transformation (HIST)-II planning workshop were major events documented in this year.

IT Internship Program Close-out and Documentation

The IT Internship Program that was implemented jointly by DUP, MOH, and RHBs from December 2019 –December 2020 phased out last year. DUP organized a colorful closing ceremony from December 21–22, 2020 in Addis Ababa. The ceremony, which was marked by the presence of high-level dignitaries, H. E. Alemtsehay Paulos, State Minister of Operations of MOH and Rahel Kebede from BMGF, was attended by close to 300 participants from the MOH, RHBs, donors, implementing partners, and interns.

IT interns presented their achievements and contributions to participants on eight roller-up banners installed in a gallery walk session. Noting the impressive contribution of the IT Internship to the country's HIS strengthening efforts, DUP conducted a process documentation explaining the inception, design, implementation, and outcome of the program. (See Annex) Additionally, five case stories were also prepared (Table 7).

Table 7: List of success stories developed by DUP in Year IV

No.	Story Title
1	Ensuring Health Information Communication Technology (ICT) towards Improving Data Quality and Use Practice: An IT intern testimony from the SNNP region
2	Fighting the COVID-19 Pandemic in Addis Ababa: An IT intern's experience in COVID-19 surveillance and tracking using digital tools
3	Acquiring a Career Opportunity via the IT Internship Program: A testimony from an IT intern based in Harari National Regional State
4	Bridging the Information Gap through the Development of a Health Application: Sharing one intern's experience in Borena zone (Oromia)
5	Strengthening the Health Information System: An effort of IT interns in West Gojjam zone of Amhara region

Documenting the Inauguration of the Digital Health Innovation and Learning Center

In August 2020, dignitaries from MoH, Ministry of Innovation and Technology, and BGMF inaugurated the DHILC that DUP established in Saint Peter's Hospital. Invited media houses, including Ethiopian Broadcasting corporate (EBC), Fana Broadcasting Corporate (FBC), and Oromia Broadcasting Network (OBN) participated in the inauguration ceremony and produced various media reports on the objective and benefits of the center. In addition, news updates were shared on various DUP and MoH media outlets, including the social media handles.

DUP Monthly Learning Forum

With the aim of fostering a culture of learning within DUP itself, a monthly internal learning forum was created by DUP. The forum is also enabling staff to gain a constant update on how the project is progressing. Thus far, four learning forums were conducted and seven learning topics were covered since February 2021.

Table 8 : Topics presented on DUP's monthly learning forum in 2021

S.N.	Learning Topic
1.	Success Story Preparation
2.	Standardized DUP Report Formats
3.	Measurement and Definition of HIS Indicators
4.	Gender in Project Management
5.	Gender Mainstreaming
6.	Basics of Data Visualization
7.	Demonstrating DUP KM Tool

5.3. KM System Development and Operationalization

During the year, DUP supported the MoH in designing, developing, and operationalizing a KM system. The KM too,l known as alfresco software, was developed for the ministry, shared with and endorsed by the leadership of the MoH. In February 2021, the MoH officially launched the tool across its different functions as its main organizational KM system. The KM system has gained a good reputation and DUP will continue to engage in, lead, and support this crucial endeavor.

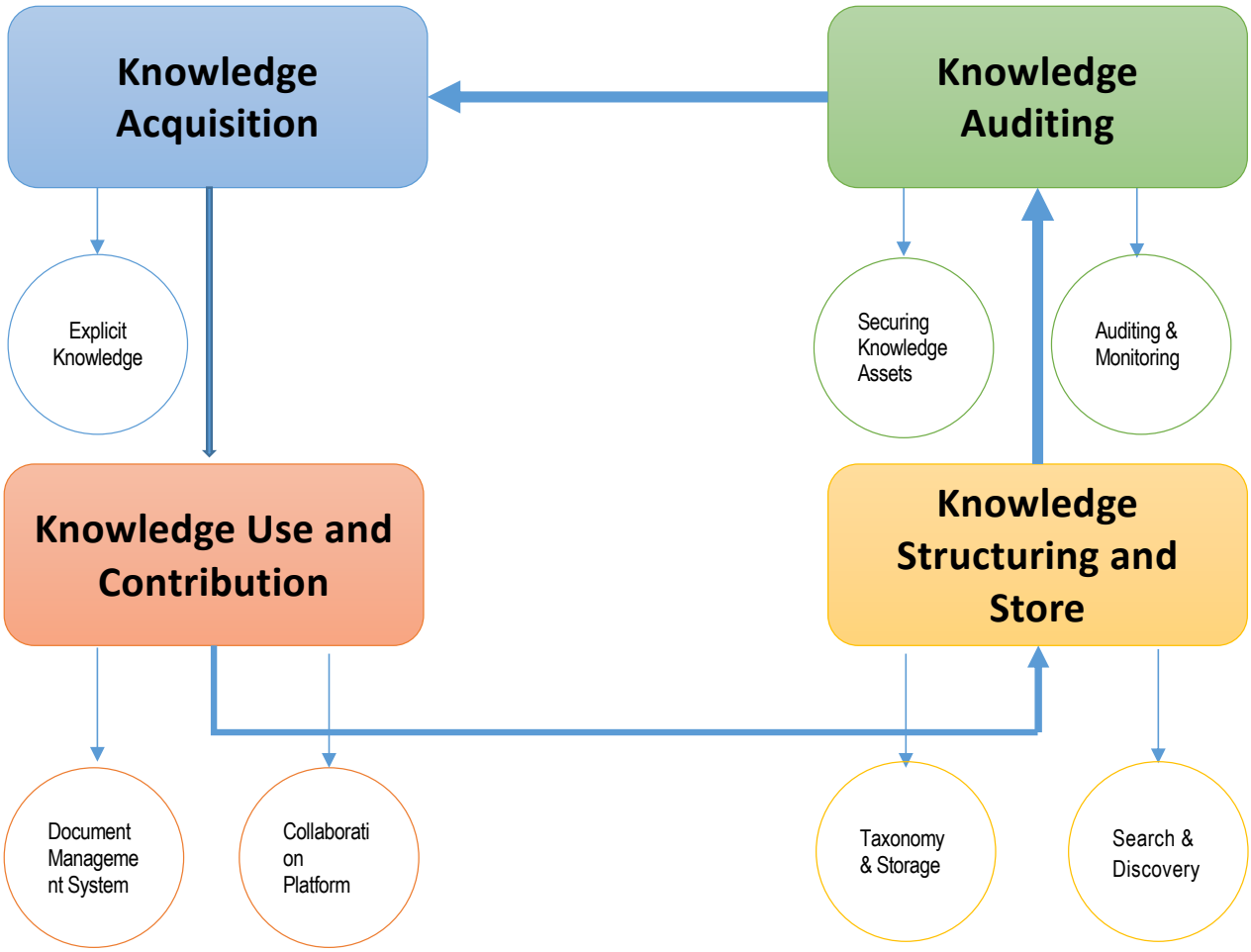
A ToR that maps-out the roles and functions of the KM system and tool in the Ministry was developed and shared with the leadership of the MoH. To ensure effective management of the KM tool and practice, a Core Technical Working Team (CTWT) was established in which DUP is a member. The CTWT agreed to roll-out and implement the KM tool in different phases for the steady and continual expansion of scale-up. These are:

- **Phase One:** Rolling-out and setting-up the KM system first in 12 directorates of the MoH in 2021 (completed).
- **Phase Two:** Scaling-up the KM system in the remaining 13 directorates of the Ministry until January 2022.
- **Phase Three:** Scaling-up and implementing the KM system in the Ministry's agencies by June 2022.
- **Phase Four:** Assessing the implementation of the KM system and its impact on KM within the Ministry, then cascading to RHBs by 2023.
- **Phase Five**: Re-assessing and making the KM system accessible to external partners and actors 2024.

Gemechis Melkamu, Director of HITD at MOH, making remarking on the KM review meeting from May 25-26, 2021, in Adama

DUP provided capacity building trainings on the KM tool for 30 participants from 12 directorates on May 25–26, 2021 in Adama. In addition, DUP also supported a meeting to review and evaluate Phase One performance. Reporting indicated that most of the directorates uploaded most of their documents into the KM System.

Knowledge Management System Workflow



SECTION VI: ADDITIONAL RESOURCES MOBILIZED BECAUSE OF DUP'S EFFORT

Doris Duke Charitable Foundation (DDCF): after the launching of DUP, DDCF was interested to support the national HMIS work through strengthening implementation research and building capacity by supporting preservice postgraduate level education on health informatics and related areas. Based on this, DDCF gave 5 million USD to DUP and this is being implemented in collaboration with six local universities.

Capacity Building and Mentorship Program (CBMP): DUP facilitated establishment of collaborations between the Ministry of Health (MOH) and six lead universities and four collaborating universities. In this arrangement MOH is providing grants to the six lead universities to support implementation of the information revolution in 36 woredas. Through this collaborative engagement, significant resources are mobilized both from the local universities and from MOH.

Resources for health information technology infrastructure: to support access to internet connectivity to more than 5000 sites in the country, DUP facilitated the mobilization of resources from government and non-government source.

Launching of USAID's Digital Health Activity: USAID was encouraged to come-up with a large health information system project because of the ground work done through the support of DUP. The clear strategies and governance protocols, coordination platform, eHealth architecture, and related roadmaps prepared with the support of DUP has motivated USAID to invest heavily in this area. Based on this, USAID has launched a 63 million USD five-years grant in 2020 to support Ethiopia's health information system and digital health.

Children's Investment Fund Foundation (CIFF) Ethiopia eCHIS Scale-Up for Health Extension Program (HEP) Performance Improvement: DUP is playing a key role in the coordination of the implementation of eCHIS and also in leading the software designing process by supplementing MOH's capacity by hiring two full time staff. Encouraged by the smooth and coordinated implementation of eCHIS, CIFF has launched a five-years 8 million USD grant in 2021 to support the implementation of eCHIS.

MOH's Investment in Health Information System, Digitization and Evidence Generation: DUP project with its unique embedment approach model, has supported MOH in the development of health information system strategic and operational plans. DUP makes sure that these plans are well consulted by relevant HIS stakeholders and include prioritized and the high impact interventions. One major activity undertaken during the planning phase is the plan alignment process. In this process, development partners align their resources and budget with the national plan so as to make sure that the high impact interventions are prioritized and avoid duplication of effort and resources. These in turn resulted in improved effectiveness and efficiency of the investment on HIS. One good example, between 2020-2021 is a massive capacity building training called integrated data quality, data use and DHIS2 training which was given to program experts across the country. To accomplish this task, technical and financial resources worth about 2 million USD were mobilized from the government and non-government sources.

In addition to the above mentioned resource mobilization activities, DUP assisted MOH to develop a long-term health information system and digitization investment plan

By playing a coordination role, DUP also helped MOH to mobilize more than 1 million USD to generate evidence on COVID-19.

SECTION VII: CHALLENGES AND ADUSTMENTS

The effects of COVID-19 on the activities being implemented at all levels of the health system are ongoing. DUP is taking a cautious approach to mobilizing staff and connecting with the MoH and RHBs while adhering to COVID-19 protection guidelines. Due to the travel restriction, a significant number of central-level DUP staff worked from home during the first quarter of the reporting period. In the regions, most DUP staff worked from RHB offices. Throughout, DUP worked with MoH in adapting, prioritizing, and implementing key initiatives. Some of the challenges faced include:

- Increasing transmission of COVID-19 affected hands-on training and other field activities, including data collection for the research work and supervision/mentorship.
- Project implementation in Tigray ceased because of the unrest in the region since November 2020. Sporadic security issues in other parts of the country also slowed implementation of planned activities limiting the project team's mobility to different parts of the country for HIS strengthening purposes.
- The changes in MoH management (HITD, PPMED, and the new arrival of the State Minister for Operations) demanded DUP's intensive engagement to help new staff understand the project and support its efforts. DUP turned this challenge into an opportunity by helping the new management engage in key DUP efforts.
- Due to lack of coordination and several competing priorities between HITD and PPMED, it was impossible to set up a forum with EPHI and to agree on the data warehouse and data flow section of the Data Access and Sharing Directive and thus delayed the finalization of the document beyond its expected timeline.
- Engagement in unforeseen and competing priorities at the Ministry and RHBs hindered completion of the project's planned activities.
- Lack of clear direction on the alignment with the National Digital Health Strategy slowed the pace and finalization of the HIS strategic plan.
- The emergence of the DHBp as the main strategic document that drives the HIS of the country, significantly delayed the finalization of the merged HIS Strategic Plan and National Digital Health Strategy documents and subsequent activities. While this report is being prepared, there is an ongoing discussion among MoH's leadership to finalize the draft strategic governance documents, including the HIS and Digital Health Strategy documents. There is hope that most of these documents will be finalized over the next few months although it remains difficult to set a defined date.

SECTION VIII: NEXT YEAR PRIORITY ACTIVITIES

TRANSFORMATION OF HEALTH DATA USE CULTURE

- Support IR in learning/demonstration *woredas* and hospitals: Tailored intervention plan; IR experience sharing forum; quarterly RDQA, training on the revised HMIS and NCoD; generate regular monthly data analytics reports; and provide feedback, regular mentorship, and documentation
- Support data quality, data use, and data analytics practices at national and regional levels: Implementation of revised HMIS and NCoD, preparation and dissemination of data analytic reports, provision of periodic feedback on data quality, performance, completeness and timeliness of report, etc. based on monthly review of HMIS data, strengthen PMT, conduct RDQA
- Support DHIS2-related activities for data use: requirement and validation rule preparation, training and support MNCH team on Power BI data analytics, provision of DHIS2 academy and executive level trainings
- Improve use of data for health sector planning

DIGITIZATION OF PRIORITY HIS

- Support MoH to maintain functional HIS governance structures
- Support MoH to finalize, endorse, and disseminate the data access and sharing directive
- Support regions to endorse their regional HIS governance framework and maintain functional HIS governance structures
- Support MoH & RHBs to finalize and endorse HIS strategic plans

GOVERNANCE OF THE IR

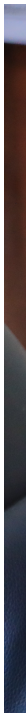
- Support MoH to finalize, endorse, and disseminate the data access and sharing directive
- Support regions to endorse their regional HIS governance framework
- Support MoH & RHBs finalization and endorsement of HIS strategic plan
- Support the finalization and endorsement of regional HSTP2

MERL

- Conduct HIS effectiveness evaluation researches (endline PRISM assessment and HIS effectiveness study, and qualitative studies)
- Conduct 12 implementation research studies (with universities)
- Support graduate-level training (15 master's and eight PhD)
- Organize six review meetings and workshops

COMMUNICATION AND KM

- Documenting and sharing of four case stories, best practices
- Support quarterly IR e-Newsletter and other communication materials to regularly share updates, best practices, and upcoming events
- Produce one documentary film
- Support MoH in preparing KM user manual and building staff capacity to use the newly established KM system.



SECTION IX: ANNEXES
SUCCESS STORY

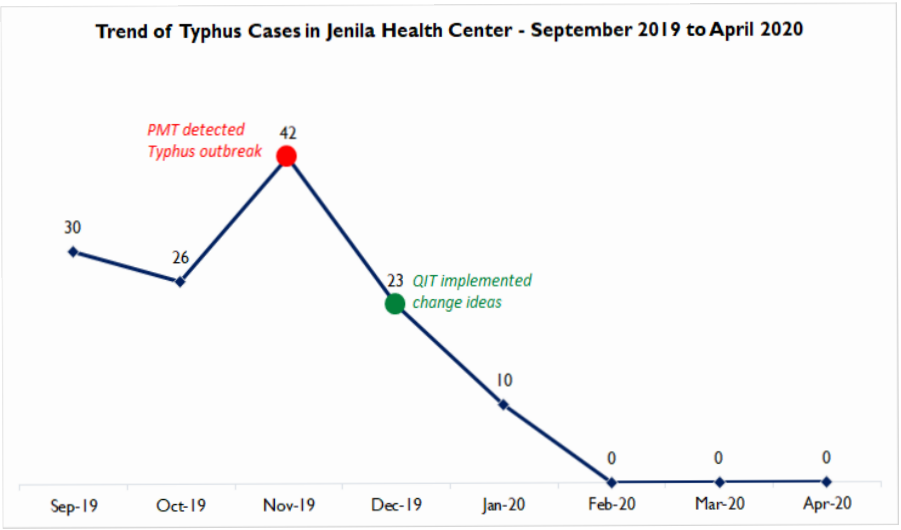
Using Quality Data to Improve Health Service Outcomes

Amal Amhed, director of Jinella Health Center

The Jinella Health Center serves nearly 30,000 residents of the city of Harar in the Harari National Regional State, Ethiopia. Recently, it was lauded for its response to a typhus outbreak and increasing malaria cases. With the help of the Ethiopia Data Use Partnership (DUP), a joint initiative of JSI and the Ministry of Health (MOH), the center has improved its data quality and use of high-quality health information, empowering a practice of evidence-based decision-making.

> “It was the all-time record high”

In November 2019, Jinella's performance monitoring team (PMT) noticed a surge in typhus cases. Reports indicated that cases had increased from 30 to 42 in two months. "It was the all-time record high for our health center. We found it very alarming and it needed to be addressed urgently," says Amal Ahmed, director of the center and PMT chairperson.



Jinella quickly deemed the typhus outbreak a public health emergency and formed a quality improvement (QI) team within the PMT to determine the source of the outbreak and to map and implement interventions. With this hefty assignment, the QI team worked tirelessly, reviewing piles of records and a plethora of data to discern the leading cause of the outbreak. As part of its approach, the QI team applied the information use cycle, a process to improve performance adopted by Ethiopia's Ministry of Health (MOH) that involves identifying gaps; prioritizing problems; investigating root causes; and recommending and implementing interventions.

"The team traced the data to Bote Area, a street where homeless people dwell in the city of Harar," says Haregawin Hailu, health information technology expert at Jinella and QI team member. Not only did the team's meticulous efforts lead to the identification of the initial location of the outbreak, they also found that the lack of access to proper hygiene and sanitation services were its root causes. The QI team recommended sanitizing the area, making facilities accessible, and providing fresh clothes to the people who dwelled there. The team also said that these citizens' access to services and facilities would need to be maintained to further contain the typhus' spread.

However, these recommendations—especially providing permanent access to sanitation and hygiene services—seemed impossible due to scarce resources and limited capacity. So Jinella launched a resource mobilization campaign that yielded various sanitation and hygiene items, including soap and clean clothes, from the Harari Regional Health Bureau (RHB), local partners, and community members.

In December 2019, following the resource mobilization, Jinella organized a week-long campaign to implement the QI team's recommendations. During this time, Jinella supported efforts to clean the streets and provided a means for people who were homeless to wash themselves, receive a haircut, and change into clean clothes. Over a few weeks, the health center provided essential items to sustain the effort. Jinella also used the campaign to raise public awareness of the need for personal and environmental hygiene.

The return on this investment was impressive; in January 2020, the typhus caseload fell to ten. By the next month, it dropped to four cases; ultimately reaching zero in March 2020. Since then, there have been no new cases of typhus.

> "We found it puzzling. Contrary to the efforts, cases never seemed to slow."

Around the same time, reports indicated that despite the health center's best efforts, malaria continued to be on the rise. "We found it puzzling. Contrary to the efforts, cases never seemed to slow down," says Amal. Confounded, Jinella decided to pause and review its actions against its data.

Again, Jinella turned to its PMT to find answers. The team thoroughly reviewed and analyzed the health data related to malaria and uncovered the mystery: only nine of 169 cases reported from July to December 2020 originated in locations under Jinella's jurisdiction. Fifty-two percent of cases were from other districts in the Harari region, and 48 percent were from adjacent districts in the Oromia Region.

In total, case data were coming from 12 districts in the two regions, which explained why Jinella's interventions in its catchment area had failed to reduce the number of malaria cases. This information made it obvious that malaria prevention could be achieved only in coordination and collaboration with stakeholders. Jinella realized it needed to segregate data by source location; and share the data and seek solutions with responsible persons in each location.

Samiya Baker, health officer of Jinella Health Center, checks a woman's blood pressure.

Halfway through 2020, Jinella presented its discovery and intervention ideas to the Harari RHB during the regional monthly essential health review meeting, a performance review of the health sector in the Harari region. Jinella and the Harari RHB devised a plan to collaborate with the other woredas and Oromia Region to curb the spread of and ultimately eliminate malaria.

Accordingly, Jinella began sharing data, including data from other districts in the region, via a regional platform. Similarly, the data generated from adjacent districts in Oromia were shared via an existing platform shared between Harari RHB and the Eastern Hararge Zone health departments of Oromia.

Thanks to Jinella's efforts, malaria reports are now prepared in relation to the case's origin. This disaggregation has made it possible to reallocate resources to other priority health services. "The fact that we are relieved of the stress of trying to tackle the disease that largely comes from outside our catchment area helped us to refocus our efforts," says Samiya Baker, health officer at Jinella.

> "PMT has become a reliable force behind all these successes. In fact, now it is where it ought to be."

Jinella's response to both the typhus outbreak and rise in malaria cases demonstrates its progress in creating a data-driven culture in which actions are based on evidence. Over the last couple of years, the health center also recorded significant improvements in other health services, including family planning and skilled birth attendance. This resounding progress is directly attributed to its optimized PMT, a team that has increased its capacity and strengthened its commitment to review, analyze and translate health data.

Before 2019; however, Jinella had a poor record of data use, and its PMT was ineffective. According to Amal, PMT review meetings were held regularly, but discussions were not translated into action until DUP and the Harari RHB helped the health center build its capacity to generate high-quality data and use it to inform actions. This assistance included on-the-job-training with regional DUP staff to enhance the PMT's overall performance. Jinella also became one of the health institutions that participated in the Capacity Building and Mentorship Program, which was implemented by DUP, MOH, and local universities. In December 2020, Haramaya University helped organize a week-long training event that was largely credited for promoting a data use culture at Jinella.

Today, the PMT has become the forum that reviews the facility's performance; identifies and prioritizes health service gaps; and recommends and implements improvement mechanisms. It is where the health center turns to for guidance. "PMT has become a reliable force behind all these successes. In fact, now it is where it ought to be," says Amal. The health center's strong family health team and its recognition of high-performing individuals have also contributed to Jinella's success. To ensure progress and sustainability of its data culture, Jinella has started incentivizing data use behavior. A weekly ceremony recognizes high performers in data use as "Stars of the Week," and displays their photographs in the health center.

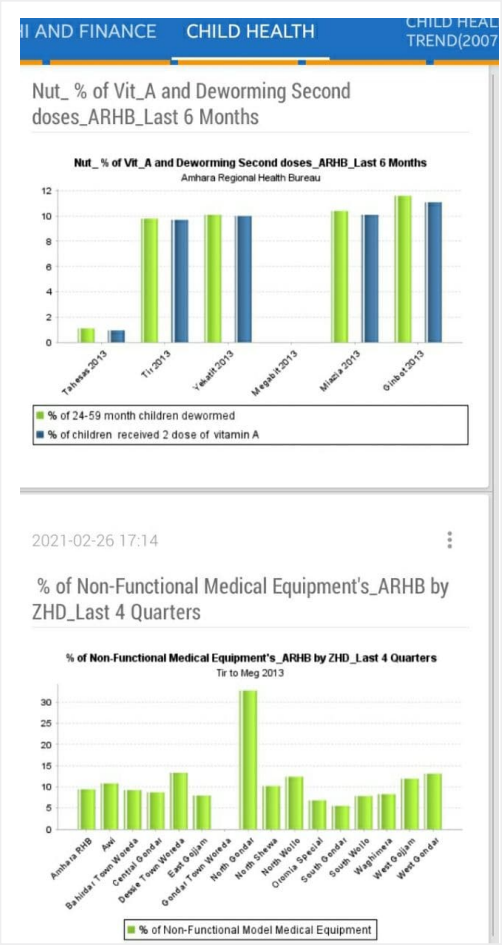
By Benti Ejeta

Improved Health Data Accessibility & Visualization Using DHIS2 Mobile Dashboard App for Evidence Based Decision

THE CONTEXT

Amhara Regional Health Bureau (ARHB) has been implementing different Information Revolution (IR) initiatives across the regional health systems since 2018. These multifaceted efforts target ensuring quality health data; creating culture of data review; and using data for decisions and actions. One area where more attention and resource exerted over the last three years is the implementation of District Health Information Software-2 (DHIS2) – a health information management tool that captures, stores and analyzes routine service data; and enables information visualization to support evidence based decision making goals.

Pertaining to the huge investments that went to implementing this digital health tool, DHIS2 has taken its rightful place as a main data source across most of the regional health systems. As a result the quality of service data in the region in terms of representative completeness and timeliness has improved much and remains above the national targets (90%) for the last several months. However, this progress was hampered to some degree by due to the fact that the data were inaccessible and invisible on different display tools other than desktop and laptop computers. Ensuring easy access to the health data needed availing data visibility on various display tools, including mobile phone. It was believed that this would facilitate easy access to data for the health leaders and Program experts to make timely and accurate decisions.



MITIGATING THE SITUATION

By partnering with Amhara RHB, Data Use Partnership (DUP) worked to realizing data access and visualization on smart mobile phones and tablets. The team that cobbled together for DUP and regional health bureau identified a suitable application that can fetch data directly from the regional DHIS2 database and make displays of analyzed data. This application was a DHIS2 dashboard app and was installed on smartphones and tablets of 32 program managers including bureau heads. The DHIS2 Mobile Dashboard which was identified from the DHIS2 application store has made the health data collected using DHIS2 accessible all the time everywhere surpassing geographical and infrastructural disparities.

However, before rolling it out, the application was tested for effective functionality as Ethiopia's DHIS2 instance is different from the global one due to the different calendar Ethiopia uses. In addition, it was

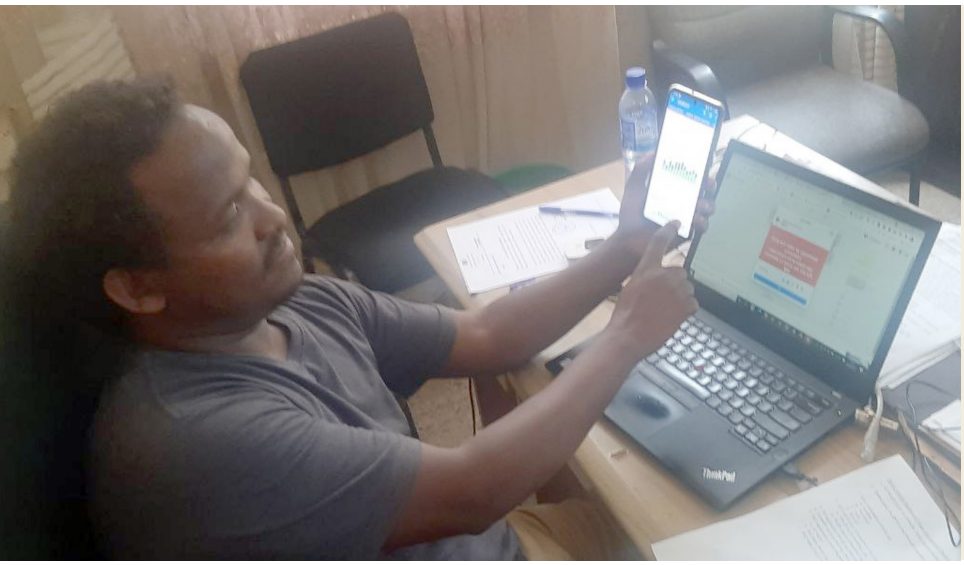
Evaluated against synchronization of all DHIS2 dashboards; synchronization of dashboard contents and data regularly as soon as data is updated on DHIS2; visibility of data properly; and visibility of the dashboard offline without internet connectivity.

With this testing, all criteria boxes ticked affirming the suitability of the application to best serve the purpose it needed for. To further confirm the applicability of the tool, decision was made to implement it at a lesser scale. This implementation built confidence in the app. Then, DHIS2 Mobile Dashboard app was implemented on much larger scale.

THE BENEFIT

Currently directors and program experts from Disease Prevention and Control Directorate (HPDP), Planning Monitoring & Evaluation Directorate (PMED), Curative & Rehabilitative Directorate (CRD), logistics Directorate, and Resource Mobilization Directorate are using this app to access, review and use DHIS2 data on their smartphones. Accordingly, it enable the health leaders and program experts to access selected key performance indicators status regardless of internet connectivity on smartphones and tables.

Directorate	# of staff who're using Mobile dashboard
PMED	**10**
HPDPD	**10**
Curative	**3**
Supply Chain	**3**
Head, Bureau	**2**
Regulatory	**1**
Multi-sectoral and HIV	**1**
Advisory	**2**
Total	**32**



"I am using Mobile dashboard ever since I installed it on my Mobile Device. I benefited a lot from this app to get visualization of key performance indicators on my hand which helps me a lot to take evidence based decisions irrespective of where I am"

says Teklehaymanot Gebrehiwot, PMED director.

Teklehaymanot Gebrehiwot, PMED Director, speaking about the benefit of using the app

Kassahun Tamir is a specialist at the directorate of the Mothers, Newborn and Child Health in Amhara regional health bureau. He has been using the DHIS2 Mobile Dashboard application ever since it came to the scene.

> *"It gives me confidence while I am at meetings, training and other events since I can refer to the status of selected program indicators easily on my smartphone,"*

says Kassahun. He also believes that the app has helped him and his coworkers to make timely and accurate decisions.

ETHIOPIA DATA USE PARTNERSHIP (DUP)

YEAR IV

ANNUAL REPORT