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The Information Revolution (IR) led by Ethiopia’s Ministry of Health (MOH) was one of four key transformation agendas in the first Health Sector Transformation Plan (HSTP). The IR agenda was launched in response to increasing demands for health information and opportunities to leverage advancements in information and communications technology (ICT). To advance the IR objectives, the MOH developed a national IR Roadmap (2016-2020) identifying two pillars of focus with actionable and measurable interventions: (1) enhance the culture of information use for decision making, and (2) implementation and scale-up of prioritized health information systems (HIS) and tools. The IR agenda continues to be a major priority in HSTP-2 to bring fundamental cultural changes and accelerate the process of data use within the health sector.

**IR PILLARS**

**PILLAR 1:**
Enhance the culture of information use for decision making.

**PILLAR 2:**
Implementation and scale-up of prioritized HIS and tools.

**HIS Governance**

**IR GOALS**

- Improving performance of the health system
- Enable equitable access to high quality health care services
- Improve patient and population health outcomes

This is a summary of the IR Roadmap Booklet highlighting key accomplishments and learnings from the last five years, as well as recommendations for the next five years. More detailed information is available in the IR Roadmap Booklet. Information provided in the IR Roadmap Booklet and this summary IR Progress Report is intended to be used by the federal government, donors, partners, and other stakeholders supporting the health sector.
The Connected Woreda Strategy is Ethiopia’s program to support and implement the IR agenda and HTSP priorities at the woreda level. The program aims to:

- Improve the quality and transformation of health information at all levels.
- Improve the culture of using health information for decision at all levels.
- Strengthen HIS infrastructure through improved connectivity and digitization of health information system tools.
- Strengthen IR implementation and expansion to all regions.

A woreda that has established a data use culture and is taking advantage of digital tools at 90% of the facilities within the woreda are credited as Model Facilities.

**CONNECTED MOREDA – IMPLEMENTATION PHASES**

<table>
<thead>
<tr>
<th>EMERGING FACILITY</th>
<th>CANDIDATE FACILITY</th>
<th>MODEL FACILITY</th>
<th>CONNECTED FACILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical Profile</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Facilities working to improve core Measure &amp; Evaluation (M&amp;E) infrastructure and practices across the board</td>
<td>• Facilities have basic M&amp;E infrastructure in place, but have room to improve in data quality, and administration and clinic data use.</td>
<td>• Highest-performing facilities</td>
<td>• Model Facilities</td>
</tr>
<tr>
<td>• Score less than 65% on assessment criteria</td>
<td>• Score between 65% and 90% on assessment criteria</td>
<td>• Can access and share data offline (e.g., paper, flash drive)</td>
<td>• Can access and share data</td>
</tr>
</tbody>
</table>

**Interventions Focus by Assessment Category**

<table>
<thead>
<tr>
<th><strong>M&amp;E Systems &amp; Capacity</strong></th>
<th><strong>Data Quality</strong></th>
<th><strong>Administrative Data Use</strong></th>
<th><strong>Clinic Data Use</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Capacity building to strengthen HIS infrastructure and supportive supervisions</td>
<td>• Capacity building for data completeness and timeliness, and performance of Lot Quality Assurance Sampling (LQAS)</td>
<td>• Capacity building for PMT processes and information products presentation and dissemination</td>
<td>• Data monitoring tools such as charts/reports to support service delivery performance</td>
</tr>
<tr>
<td>• Targeted support for lower-performing facilities. (Assumes M&amp;E infrastructure is mostly in place at this level.)</td>
<td>• Targeted support for lower-performing facilities. (Assumes most facilities are meeting data quality standards at this level.)</td>
<td>Adds:</td>
<td></td>
</tr>
<tr>
<td>• Document Model Facility best practices</td>
<td></td>
<td>• Capacity assessments</td>
<td>• Data completeness and timeliness, and performance of Lot Quality Assurance Sampling (LQAS)</td>
</tr>
<tr>
<td>• Provide a site to test, demonstrate and diffuse data-use best practices</td>
<td></td>
<td>• Tailored training materials (job aids)</td>
<td>• Other support (e.g., person-to-person sharing, support for data analytics)</td>
</tr>
<tr>
<td>• May demonstrates how digital tools complement processes at Model Facility levels, such as:</td>
<td></td>
<td>• Testing data use incentives</td>
<td>• Testing data use incentives</td>
</tr>
<tr>
<td>» IVR/SMS for monthly/ PHEM reporting</td>
<td></td>
<td></td>
<td>• Range: Intermittent data connectivity and electricity → full connectivity across the woreda</td>
</tr>
<tr>
<td>» HMIS dashboards</td>
<td></td>
<td></td>
<td>• Health Extension Workers (HEW) basic literacy and numeracy</td>
</tr>
<tr>
<td>» eCHIS and DHIS2 data exchanges</td>
<td></td>
<td></td>
<td>• Woreda Health Office (WoHO) has digital reporting capabilities to replace paper submissions</td>
</tr>
</tbody>
</table>

**Digitalization**

- Range: Intermittent data connectivity and electricity → full connectivity across the woreda
- Health Extension Workers (HEW) basic literacy and numeracy
- Woreda Health Office (WoHO) has digital reporting capabilities to replace paper submissions
- HEWs use standard processes (i.e., non-standard processes may not function correctly with eCHIS)
- Minimum training requirements met by relevant health workers and administrators

**Graphic acronyms**

- DHIS2 = District Health Information Software 2
- eCHIS = Electronic Community Health Information System
- HMIS = Health Management Information System
- IVR = Interactive Voice Response
- PHEM = Public Health Emergency Management
- SMS = Short Message Service
Health and health-related data in Ethiopia are gathered through different institutions and processes, including surveys and surveillance systems to improve evidence-based decision making at all levels. Over the last five years, updated and new survey and surveillance data were collected in alignment with the IR agenda.
Improving data quality and promoting the culture of information use are the center of the IR agenda. The following graphic provides information on the quality assurance.

**Data Quality Assurance – Timeline**

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>2017</td>
<td>2018</td>
<td>2019</td>
<td>2020</td>
</tr>
</tbody>
</table>

**Five Years HSTP**
- Baseline & endline assessments
- PRISM

**Woreda Based Planning and Annual Health Sector Review Meetings**
- Annual assessment (MOH/RHB)
  - Annual DQR
- Quarterly assessment by RHBS
  - Routine DQA
- Monthly supervision by WoHO
  - Supportive Supervision
- Monthly self assessment by health facilities
  - LQAS

**Graphic acronyms**
- Annual Data Quality review (DQR)
- Data Quality Assessment (DQA)
- Lot Quality Assurance Sampling (LQAS)
- Performance of Routine Information System Management (PRISM)
- Regional Health Bureaus (RHBs)
- Woreda Health Office (WoHO)

**GOVERNANCE**

HIS governance encompasses national-level coordination of investments and strategic planning activities. The MOH endorsed a HIS governance framework two years ago to further define and document HIS governance functions, principles, and structures in a consultative process with stakeholders.

**HIS governance framework approved**

**LAUNCHED**
- an HIS Steering Committee led by the Minister and national technical working groups (TWGs) established

**PROMOTING**
- HIS Accountability and Transparency

**DEVELOPING**
- HIS Legislation and Regulation

**FOSTERING**
- HIS Coordination and Partnerships

**Digitalization TWGs**
- Designed to support the digitalization pillar of the IR

**Data Use Cultural Transformation TWGs**
- Designed to support the data use cultural transformation pillar of the IR

**HIS Governance TWGs**
- Follow up, monitoring and flagging of the existence of the various HIS governance functions
The eHealth Architecture is a blueprint for Ethiopia’s health information needs, software and hardware requirements to coordinate IT choices, ensuring appropriate resource utilization, and facilitating access and integration of data. The MOH made progress over the last five years developing and refining the eHealth Architecture blueprint and making investments in the components.

**Shared Services**
- MFR system customization completed
- Data about health facilities collected from different sources and being reconciled
- A plan to generate an authoritative list of all health facilities by the end of the current fiscal year
- National Health Data Dictionary (NHDD) is up and running and National Classification of Diseases (NCoD) is loaded; indicators are loaded into NHDD.
- A mobile app to access the data dictionary
- Develop client registry and shared health records in the later years of the project

**Interoperability Services**
- Data exchange between different systems being demonstrated
- Additional priority use cases have been identified and planned to be implemented
- eHealth Architecture (eHA) and interoperability academy established at Mekelle University

**eHealth Architecture**
- Conduct eHA maturity assessment
- Develop a roadmap for national eHA implementation
- Strengthen development and adoption of national data and interoperability standards
HEALTH INFORMATION TECHNOLOGY SYSTEM STANDARDS & INTEROPERABILITY

HIS and ICT standards promote collection, exchange, use and reuse of health data across unaffiliated organizations and technologies, reducing fragmentation. The MOH advanced guidelines and protocols supporting HIS standards over the past five years to advance interoperability of health data.
**Planned Activities:**
- Upgrade eRIS to address new requirements and new modules
- Implement i-Import integration with electronic single window
- Finalize the development and deployment inspection module in eRIS with automatic synchronization to i-License and i-Register
- Implement i-License (health facilities) in 100 woreda level offices to register all public and private facilities

---

**eRIS is the umbrella system at Ethiopia Food and Drug Administration (EFDA) comprised of multiple sub-systems which work together:**

- **i-License**: Enables entities to apply for a certificate of competence to register and import products.
- **i-Register**:Used to manage the food, medicines and medical devices registration processes when an applicant seeks to register those products in Ethiopia for later import.
- **i-Import**: Used to manage the import process, once registered in Ethiopia.
- **i-Verify**: Used to verify and check the authorization status of medicines by EFDA and monitor the movement of medicines from manufacturer to the point of issue.
An HMIS supports routine collection, aggregation, analysis, presentation and utilization of health and health related data for evidence-based decisions by health workers, managers, policy makers and others. Since launching the IR Roadmap, Ethiopia deployed the electronic DHIS2 to support HMIS activities.

**DHIS2**
- System consolidating two systems into one for HMIS data collection, analysis and reporting
- 3,605 ONLINE, 1,600 OFFLINE DHIS2 access sites
- 7,000 DATA WORKERS trained on DHIS2 use
- 4,000 DATA WORKERS trained on DHIS2 data analytics tools
- 131 CORE HMIS INDICATORS established
- IMPROVED QUALITY OF HMIS DATA (i.e., DHIS2) completeness and timeliness of data collected
- DHIS2 ACADEMIC CENTER OF EXCELLENCE opened at Gondar University

**ACCOMPLISHMENTS**

**EVIDENCE-BASED DECISIONS BY HEALTH WORKERS**
The eCHIS is a mobile platform that assists in the management of health extension programs through the collection and use of demographic data, health services delivery information and service utilization. Over the last five years, the MOH expanded eCHIS functionality and the number of implementation sites.

**ACHIEVEMENTS:**
- Development of eCHIS to support agrarian, urban and pastoralist communities
- Implementation of eCHIS in agrarian, urban, and pastoralist health posts
- Develop and implement eCHIS governance protocols and standard operating procedures (SoPs)
- Provide optimization and server side tech support

**ELECTRONIC COMMUNITY HEALTH INFORMATION SYSTEM (eCHIS)**

**FAMILY FOLDER, RMNCH and COMMUNICABLE DISEASES (TB and MALARIA)**

**HEALTH POSTS**
health posts using eCHIS across 4 agrarian regions

**1,250**

**ACHIEVEMENTS:**

- Development of eCHIS to support agrarian, urban and pastoralist communities
- Implementation of eCHIS in agrarian, urban, and pastoralist health posts
- Develop and implement eCHIS governance protocols and standard operating procedures (SoPs)
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**eCHIS Components**

- **FAMILY FOLDER**
  - Household info, Household properties, Household members

- **SETTING**
  - Data element list, data element to form mapping, user management, access to users, organization units

- **DATA SYNCHRONIZATION**
  - Data sync between tablets and to central server

- **SERVICES**
  - RMNCH, CDs, NCDs, NTDs, logistics supply and management

- **REPORTS**
  - Demographic report, Service coverage report, disease report, HMIS reports, CHIS reports etc

- **DASHBOARD**
  - Charts, graphs, maps, indicator analysis etc

**Graphic acronyms**

- **CDs** - Communicable Diseases
- **NCDs** - Non-Communicable Diseases
- **NTDs** - Neglected Tropical Diseases
- **RMNCH** - Reproductive, Maternal, Neonatal and Child Health
MASTER FACILITY REGISTRY (MFR)

The MFR is a platform for collecting, storing and sharing authoritative information on health facilities in the country. The MFR data can be used by public and private sector stakeholders to align their systems and programs.

Deployed the MFR with a public portal

Developed MFR data accuracy and approval protocols

ELECTRONIC MEDICAL RECORDS (EMR) SYSTEM

An EMR is a digital version of a paper chart or register created and managed by health services providers at a health organization to capture and store patient health information.

- Deploy EMR in selected learning hospitals and health centers
- Development of national EMR requirement and standards
- Develop and implement standard EMR in selected health facilities as per MOH requirements

ACHIEVEMENTS:

470 ANTIRETROVIRAL THERAPY (ART) SITES DEPLOYED

updated EMR software to maintain patient records of People Living with HIV (PLHIV) taking antiretroviral medications
HUMAN RESOURCE INFORMATION SYSTEM (HRIS)

An HRIS enables users to manage human capital and track the health workforce. In recognition of the need to better track and manage the health workforce, the MOH made strides in planning for an electronic HRIS.

**Planned activities:**
- Complete the development of the human resource administration, development, and licensure modules
- Implement HRIS at MOH, agencies, RHBs, zonal health departments (ZHDs), WoHOs and HFs

PUBLIC HEALTH EMERGENCY MANAGEMENT SYSTEM (PHEM)

The MOH deployed the country’s PHEM in 2018 to capture and analyze public health emergency data.

Deployed the electronic PHEM in 2018

Developed PHEM data entry and PHEM Export to facilitate process of mapping and translating data between the Ethiopian Calendar in DHIS2 and epidemiological weeks in PHEM

Developed a COVID-19 surveillance and tracking system using DHIS2 with the opportunity to use post-COVID-19 for other disease tracking activities. The system includes a situation monitoring dashboard, geospatial analysis and risk mapping, and key performance indicators.
Ethiopia’s Digital Health Response to COVID-19

Across the globe, digital health has been brought to the forefront as a crucial tool to combat the COVID-19 pandemic. In Ethiopia, critical digital tools were developed and implemented to mitigate the effects of the pandemic:

### Critical Item Availability

- **Hand sanitizer quality control:** a system to enable the EFDA to monitor and control hand sanitizer quality
- **Expedited product registration:** Simplified process to expedite licensing and registration of COVID-19 supplies

### Surveillance and Tracking

- **National COVID-19 surveillance and tracking system:** supports the enrollment and tracking of suspected cases; captures symptoms, demographics, risk factors, and exposures; creates lab requests; links confirmed cases with contacts; and monitors patient outcomes
- **Surveillance follow-up app:** an application which builds on the case surveillance and tracking system of COVID-19 and facilitates registration and follow-up of suspects and contacts of confirmed cases who will be followed for 14 days
- **Toll-free recording app:** an app which records and stores data from individuals who call 8335 and 994 short codes to report their COVID-19 status and/or concerns
- **Data analytics and visualization:** a dashboard for EPHI and MOH to monitor the COVID-19 situation in the country
- **Port-of-entry health declaration for COVID-19 case surveillance program:** an application that travelers use to record personal identification information including phone number; travel history; illness symptoms; and their place of residence
- **Health facilities reporting app:** an application used by health workers to report suspected cases at health facilities to the rapid response teams
- **Community house-to-house screening app:** a mobile application for Health Extension Workers that helps in data collection and serves as job aid for nationwide door-to-door COVID-19 screening campaigns

### Health Communication and Education

- **WhatsApp helpline:** to support users on health queries or concerns and direct them to accurate information sources
- **Rumor and suspected cases reporting and investigation application:** developed for community members self-reporting when they have COVID-19 symptoms
The MOH has been working with Ethio Telecom to provide internet connection to all health facilities and health administration units across the country via HealthNet, a Virtual Private Network (VPN) service. HealthNet allows these sites to access digital tools such as DHIS2 to timely enter data and submit reports.

DHIS2 and LMIS are the two systems using HealthNet

3,605 HEALTH INSTITUTIONS have been connected to HealthNet

Key benefits of HealthNet

- Improve timeliness of reports
- Improve accuracy and completeness of health data
- Timely feedback to hospitals, health centers and woreda offices and improved data quality and use
- Use by multiple systems
- Data access during emergency internet shut-down
- Future uses of improved network connectivity via HealthNet
Ethiopia deployed and enhanced a suite of interoperable ICT systems for managing health system supply chain information in support of the IR agenda.

**SUPPLY CHAIN SYSTEMS**

- **Vitas** is an enterprise level procurement, inventory and warehouse management technology system.
- **mBrana** is a mobile inventory management system for vaccines.
- **Dagu** is an inventory management system for health commodities at the facility level.
- **Fanos** is a supply chain dashboard for decision making.

EXPANDING FUNCTIONALITY on Vitas to support Global Standards 1 (GS1) enabled tracking of select program commodities and online ordering.

**DAGU IS BEING REDESIGNED** to be interoperable with Vitas and Fanos.

**DEPLOYED mBrana** to track distribution of bed-nets in malaria risk areas.

**FANOS**

- **EFDA**
- **Suppliers**
- **ErIS**
- **EPA Center**
- **EPA Hubs**
- **Hospital**
- **Clinic**
- **Health Posts**
- **Woreda**
- **Service Delivery Point**
GUIDELINES AND PROTOCOLS

Through additional supportive policies, laws, regulations, and guidelines, the MOH enhanced the enabling environment for health information systems to operate.

- HIS governance framework
- Data access and sharing directive
- MFR management and governance protocol
- National HMIS mentorship guidelines
- HMIS indicator reference guide
- Woreda-based health sector planning guidelines
- NHDD standard operating procedures
- eHealth Architecture

CAPACITY BUILDING

Ethiopia launched several capacity building programs to enhance the knowledge and skills of the health workforce to increase use of health information for decision making.

- ST. PETER’S COMPREHENSIVE HOSPITAL LAUNCHED A NATIONAL DIGITAL HEALTH AND INNOVATION CENTER
- DHIS2 CAPACITY BUILDING trainings at the national and sub-national levels
- 30 PARTICIPANTS across 6 universities participated in an implementation research and capacity building workshop in 2019, to identify priority learning questions.
- 8 UNIVERSITIES began offering pre-service health informatics programs using the nationally harmonized, Ministry of Education approved bachelor’s level health informatics curriculum.
- 6 UNIVERSITY GRANTEES implemented the Capacity Building & Mentorship Program to support woredas and health facilities
- 10 COMPUTER LABS established at teaching institution
- 2,000 INDIVIDUALS UPGRADED to a bachelor’s degree in health informatics
- 6 PHD
- 43 MASTERS

STUDENTS RECEIVED a research grant to document learnings from IR initiatives.
LESSONS LEARNED

The following key lessons were learned through the implementation of the IR agenda between 2016-2020:

Engaging stakeholders at different levels of the health system increased buy-in for the IR agenda, and mobilized resources to advance key priorities.

Investing in capacity building programs to enhance workforce knowledge and skills improved data use practices.

Prioritizing data for decision making, maximized the use of limited human and financial resources.

Integrating the transformation agenda into the health system improved the overall performance and health outcomes.

Enhancing data and ICT system governance and national leadership improved coordination and collaboration across stakeholders and led to more effective implementation of the IR agenda.
The MOH in collaboration with other health sector stakeholders will work to coordinate, collaborate, invest in and advance these key priorities.

Accomplishments and lessons from the past five years have helped shape future priorities. Looking forward, the IR strategic objectives outlined in HTSP 2 are as follows:

→ Ensure existence and functionality of the HIS/digital health governance’s structure
→ Establish learning and knowledge management system at national and subnational levels
→ Improve confidence on the quality of the data generated through routine sources by instituting sustained and comprehensive implementation of data quality assurance techniques at all levels in the health system
→ Create awareness and build capacity of health workers on data quality and information use through continuous training, Mentorship, and coaching
→ Strengthen initiatives to improve the culture of use of data for action at point of service delivery and administrative levels
→ Create model Woredas and hospitals on improved data quality and information use
→ Advance data analytics approaches and practices from the routine descriptive and exploratory analytics to big data, predictive data modeling, data mining, and machine learning to respond to the growing demand to generate evidences to solve complex public health problems
→ Generation and translation of evidence to policy and action by triangulating data from routine, survey, surveillance, and research
→ Advance the eHealth Architecture and interoperability framework
→ Develop standards and guidelines for selection, development and use of digital health solutions
→ Strengthen digitization of routine and non-routine data collection, management, analysis and use
→ Develop digital solutions for health worker decision support on prioritized health services
→ Digitize digital health interventions for clients that improve client-provider interaction and increase health literacy
→ Establish eLearning systems for the health workforce on Continuing Professionals Development (CPD) programme for pre-service and in-service training and education
→ Digitize and implement an individual level health data system
→ Strengthen ICT infrastructure at all levels of the health system
→ Establish a national health data warehouse
INFORMATION REVOLUTION
FIVE YEAR PROGRESS REPORT

Disclaimer:
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