Ethiopia's electronic community health information system: a tool to achieve universal health coverage

1. Why

Health Extension Workers (HEWs) are at the heart of Ethiopia's community health system. HEWs implement Health Extension Packages, including household registration; reproductive, maternal, newborn & child health; administering immunisation; malnutrition; and communicable and non-communicable diseases. They provide care both in people's homes as well as at health posts. For example, at the clients' home they will monitor the use of long-lasting insecticidal nets, health education, household hygiene and sanitation. Activities at the health post include vaccination, family planning and child health. HEWs have a clinical nursing diploma or 12 months pre-service training and are crucial to improving vaccination coverage within Ethiopia.

The Ministry of Health (MOH) in Ethiopia started using digital health systems for maternal and reproductive health in 2016, and a variety of systems were developed. In 2018, the MOH advised that there should not be multiple, often fragmented systems for community health in the country; instead, one integrated approach was needed. This led to the development of the electronic community health information system (eCHIS) which has been implemented since 2018. Before eCHIS was introduced, all the HEWs' records were on paper, held in a family folder, cards and registers.

This move to a digital system for community health is aligned with a broader information revolution occurring within the health sector of Ethiopia, as outlined in the Health Sector Transformation Plan[1] which has wide support from the Ethiopian government.

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1 Health Sector Transformation Plan II 2020/21 – 2024/25. See here

2. What

eCHIS is a suite of mobile applications which captures data on 18 Health Extension Program (HEP) and other community-level health services, along with a web-based portal for supervision and monitoring. The main functionality of eCHIS is to support and track services that HEWs deliver.

As a by-product of services delivered, the mobile app collects data which informs follow-up visits and is aggregated on web-based dashboards. This improves data quality and assists the limited human resource capacity to collect, analyse, and use data, thus promoting a culture of data use at the community level.

There are three related apps within eCHIS:

- HEW app: This is the primary application. It supports HEWs provide services for the 18 health extension programmes mentioned above. eCHIS works as a job aid for the HEWs that guides service delivery through step-by-step guidance based on the client.

- Health centre referral app: HEWs are based at health posts, the lowest level of facility. When a patient needs to be referred for greater care, they go to a health centre (each health centre supports 3 – 5 health posts). This app manages the referral to the health centre, with the result subsequently reported back to the HEW through the app.

- Focal person app: This application is designed to guide the HEW supervisor / focal person to provide programmatic and technical support, monitor HEW activities, complete supportive supervision checklists, device troubleshooting, follow-up for late program visits, and monitor the progress and performance of the HEWs under their supervision.

To support immunisations, HEWs register children within their catchment area and deliver immunisations at the health post. Auto-generated vaccine reminder messages are sent to parents (if they have a mobile phone) and HEWs based on the child's age and the immunisation schedule. The app also captures data on the date vaccinations are received. The registration of children on eCHIS also allows much better estimates of the child population to plan appropriate amounts of vaccines for distribution. Overall, eCHIS integration enhances HEWs' capacity to deliver immunisation services efficiently, contributing to Ethiopia's goal of achieving universal coverage and better health outcomes.

These three apps work on a tablet or mobile phone. There are dashboards to visualise the data).

3. How

A Technical Working Group was formed to direct the eCHIS programme, with representatives from many programme directors of the MOH, including implementing and funding partners Gavi, The Vaccine Alliance and The Global Fund to Fight AIDS, Tuberculosis and Malaria. JSI and USAID have also supported eCHIS. The MOH drove the project, with the steering committee chaired by the Minister of Health.

There were several stages to the evolution of the program:

1. National Level Planning and Stakeholder Alignment. This included a Specification Requirement Analysis and the development of the eCHIS software by the MOH software team (comprised of 48 staff) on the CommCare platform, which is supported by Dimagi.

2. Identify resources for program operational costs, including procurement of tablets, SIM cards and costs for training.

3. Provide Training of Trainers (TOT) at the national level for national officials and focal people in each region who champion eCHIS, then cascade to mid-level TOT, and finally cascade training to end-user HEWs at health posts and health workers and supervisors at health centres. Training in eCHIS takes 7 – 10 days for HEWs.

4. Implementation. Usage of eCHIS by HEWs with data recording and reporting. Ongoing monitoring and support by supervisors, regional and national managers.

The implementation is different in three types of regions – Agricultural/rural, Pastoralist and Urban. There are different implementation guidelines in the three types of regions, and therefore, eCHIS apps are customized according to implementation guidelines following the geographic setup. eCHIS has been implemented the most in Agricultural areas.

The data is stored on servers at a data centre in Addis Ababa run by the MOH.

"eCHIS is designed to support frontline health workers at the community level. It collects data and presents data at many different levels. It supports the health extension workers as a job aid. It enhances the continuum of care."

— Gemechis Melkamu, Lead Executive Officer, Digital Health at the MOH

4. Results

As of March 2024, approximately 25,000 HEWs and health professionals are currently using eCHIS. It is used in over 1,500 health centres and 8,086 health posts across 13 regions, covering around half of all health facilities in the country. Approximately 22 million people are registered in eCHIS.

HEWs using eCHIS have immunised over 100,000 children. By tracking when vaccines are given, the digital system can easily identify defaulters – children who start but do not complete the full vaccination schedule – a major challenge within Ethiopia. Automated SMS reminders help to improve completion of immunisations, and areas with particularly high levels of defaulters can be identified for corrective action such as a door-to-door campaign. This is only possible through the digitally-generated data which highlights key areas within program dashboards; there are no mechanisms with paper records to track child immunisation dropouts. In addition to following up on missed doses, the digital system provides a much better population estimate which helps in planning for vaccine distribution and reduces wastage.

Enablers and challenges

A study[2] was conducted in 2022 on the acceptability, usability, barriers, and facilitators of eCHIS. The study found that 94% of HEWs have high acceptance of eCHIS. However, significantly fewer regularly use eCHIS in their routine work. This "acceptance - use gap" is attributed to various barriers at different levels in the healthcare system.

Challenges for the project include:

- **Infrastructure**, especially internet connectivity, is a problem in remote areas of Ethiopia. The MOH has been working closely with Ethio telecom, the main mobile network operator, to improve connectivity with signal boosters in several areas;

- **Weak capacity building:** there were some examples of poor training and supervision;

- **Duplicate paper and electronic recording:** HEWs are expected to use both the digital system and paper records, which increases the time it takes to complete a visit;

- **High workload:** HEWs already have many tasks and eCHIS can be an additional burden.

- **Financial constraints** (especially the cost of tablets): The cost of replacing tablets is high. Some donated or discounted tablets have less memory than the minimum specification required, which have had to be replaced at a higher cost.

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2 Medhanyie AA, Little A, Yebyo H, Spigt M, Tadesse K, Blanco R, Dinant GJ. Health workers' experiences, barriers, preferences and motivating factors in using mHealth forms in Ethiopia. Hum Resour Health. 2015 Jan 15;13(1):2. doi: 10.1186/1478-4491-13-2. PMID: 25588973; PMCID: PMC4325949. Available here

Factors that have enabled eCHIS include:

- **Support** from the MOH and the wider Ethiopian government. eCHIS is seen as a flagship project using digital technology to bring services to the population, and receives strong political backing.

- HEWs are more likely to use eCHIS extensively due to **improved data quality and retrievability of data** (more easily than on paper), when they are encouraged by supervisors and where they have a positive image in the community from using the tablets in their work.

Since this review of the eCHIS programme came out in 2022, a policy brief[3] has been written and several initiatives taken to improve usage among HEWs. Training has been enhanced with more supervision and support for HEWs using eCHIS.

Data duplication, with data captured on eCHIS and also written into paper forms, is necessary in many areas due to unstable internet connection. The MOH has the ambition to go completely paperless by the end of 2025 which depends on the availability of tablets, SIM cards, servers and technical staff. There is a pilot currently underway (in March 2024) in 12 woredas (districts) to only enter data in eCHIS without any paper records. At the end of 2024, this will be evaluated to see if this digital-only approach has been successful and can be scaled.

A 'Centre of Excellence' in eCHIS has been launched at Jimma University. New features are tested here and the team supports the use of eCHIS in several woredas.

By March 2024, MOH officials believe that usage of eCHIS by HEWs had increased following these interventions in response to the 2022 research.

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3 Policy brief: OPTIMIZING eCHIS IMPLEMENTATION IN ETHIOPIA: MAJOR DETERMINANTS AND RECOMMENDED STRATEGIES. Available here

5. So what

This case study on eCHIS shows that Ethiopia, a resource-constrained country, has been able to implement a national scale digital tool for community health workers. With strong leadership from the MOH and support from donors, this system supports improved levels of care to 22 million people.

A candid review was carried out on the programme in 2022 which showed high levels of acceptance of eCHIS by the HEWs, but much lower usage. The recommendations coming out of this have been acted on through more extensive training, improved hardware, pilots of going digital-only to reduce duplication of work, and a centre of excellence set up at a local university to support implementation. There are many barriers to building a cadre of 25,000 HEWs and health professionals using digital tools in low-resource areas, though in Ethiopia they have learned how to address these challenges to offer improved health services to millions.

"eCHIS has led to better data collection, aggregation, data analysis and reporting that helps to optimize the quality of data and improve service delivery at the community level".

— Mr. Chaluma Kumela Mengesha,
Senior Health Information System Specialist,
Ministry of Health Ethiopia

Future developments include finalising the eCHIS versions for agricultural and urban regions; developing a 'lite' version of eCHIS for low storage devices; and developing more robust and informative dashboards. There is a plan to increase the capacity of the data centre, including having a duplicate server at Ethio telecom that syncs daily for data resilience. The MOH also intends to use Artificial Intelligence and big data techniques to explore the large data set of patient records now in eCHIS.