

SUMMARY REPORT

Impact and Learning Review

Biometric-based electronic Community Health Information System (eCHIS) in Ethiopia

April 2022





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List of Abbreviations

Арр	Application
CIFF	Children's Investment Fund Foundation
СВНІ	Community Based Health Insurance
eCHIS	Electronic Community Health Information System
FMoH	Ethiopian Federal Ministry of Health
FGD	Focus Group Discussion
НС	Health Centre
HEW	Health Extension Worker
HP	Health Post
КІІ	Key Informant Interview
LED	Light Emitting Diode
М2М	Machine to Machine sim card
SNNPR	Southern Nations, Nationalities and People's Region
4G	Fourth Generation



Executive Summary

Within the framework of the broader eCHIS implementation in Ethiopia, Simprints have been piloting the integration of biometrics within eCHIS in six learning woredas with direct funding from CIFF since July 2019. In April 2022, at the close of the pilot, Simprints embarked on an impact and learning review to examine overall effectiveness, impact and key learnings from the pilot, focused on three key questions: i) To what extent and in what ways have the integration of biometrics added value to the eCHIS programme? ii) To what extent is biometrics accepted by the local community and users and iii) What lessons learned could be used within and beyond the pilot area?

The review methodology consisted of qualitative research conducted by an independent researcher in two of the six learning woredas and quantitative analysis of data stored on Simprints server.

Key findings

- Levels of user adoption and motivation to use the technology are high. Low capacity of tablets or insufficient devices for the number of users have been the main barriers.
- While the project faced some initial community resistance due to complex cultural perceptions, community sensitisation activities have been effective and levels of acceptance are now very high.
- The use of a Telegram group for users and supervisors for monitoring the performance of HEW, sharing challenges and learning was established and identified by both users and stakeholders as a highly effective monitoring and learning platform.
- The most externally visible impact of the pilot on the health system has been the **efficiency gains** that biometric identification has offered. Respondents unanimously agreed that biometrics have improved the efficiency of HEW by saving time in locating clients records. The review observed that HEW were able to pull up records **10x times faster through biometric authentication** compared to manual name search.
- Community members and users indicated that biometrics has played a role in enabling **higher levels of client satisfaction**, due to reduced queueing times.
- All key informants reported that biometrics have improved data quality through the reduction of false reporting by verifying service recipients. One FMoH official reported that annual Routine Data Quality Audits showed data discrepancies in the woreda reduced from 39% to less than 5% within the last 3 years and attributes this result to the use of a biometrically enabled eCHIS.

Overall the review found the integration of biometrics into eCHIS to have been largely successful, however some key challenges were also identified including low specification and storage capacity of tablets, data synchronisation challenges, insufficient number of devices and scanners for some health posts, inability to charge devices, and high workloads of HEW which have challenged implementation in some way.

Recommendations

Several recommendations have been developed based on the findings of the review including; i) the need for early community sensitisation activities in future projects; ii) continued strong collaboration with the FMoH to resolve challenges, for example around data syncing; iii) ensuring an adequate number of scanners and tablets that meet minimum specifications to each health post; iv) advocating for national legislation on biometric data protection; and v) further leveraging on evidence and learning opportunities to facilitate and engage donors in funding discourse for the continuation and scaling of a biometrically enabled eCHIS.



Introduction

The Ethiopian Federal Ministry of Health (FMoH) are currently rolling out an Electronic Community Health Information System (eCHIS) in 160 woredas of Ethiopia. Within the framework of the broader eCHIS implementation, Simprints have been piloting the integration of biometrics within eCHIS in six learning woredas with direct funding from CIFF since July 2019 with field-level implementation beginning in January 2020.

The pilot project aimed to implement biometrics integration with eCHIS by creating digital unique identifiers for individuals above the age of 2. The project intended that trained HEWs used fingerprint biometrics to register and later identify individuals to quickly locate client's health records, supporting improved efficiency of service delivery, improve data quality and reporting and strengthen the continuum of care by accurately tracking and verifying service uptake.

Objectives and Methodology

The impact and learning review was designed to examine overall effectiveness, benefits and learning generated throughout the pilot and sought to answer three key questions:

- 1) To what extent and in what way has the integration of biometrics added value to the eCHIS programme?
- 2) To what extent is biometrics accepted by the local community and HEW (users?)
- 3) What lessons learned could be used within and beyond the project area? In particular what factors support or hinder the feasibility to scale up the use of biometrics to new areas?

Further sub questions were developed along with a research matrix that guided the review methodology, consisting of two key approaches described below:

Primary data collection through qualitative study: Simprints commissioned an independent researcher to conduct primary research in two pilot woredas, namely Lume woreda in Oromia and Lemo woreda in SNNPR. The woredas were selected based on the maturity of the pilot, with both woredas implementing for the longest time. Data collection methods included Focus Group Discussions (FGDs), Key Informant Interviews (KIIs), observation in health posts (HPs), and case studies. In total, 15 health posts were visited and a total of 8 FGDs conducted with programme participants, 20 interviews with Health Extension Workers (HEW) and 17 interviews with relevant expert stakeholders. Data was compiled and analysed using thematic and content analysis.

Quantitative analysis of biometric data:, Simprints Monitoring Evaluation and Impact unit conduct analysis on key metrics to add further insight to key findings within the review. Data from Simprints backend was transformed, cleaned, analysed and in some cases developed into data dashboards. One key point of analysis was the comparison between model and standard kebeles. Five model kebeles were selected in each woreda, in collaboration with the woreda health office based on their potential to improve their biometric performance. Model woredas have received more targeted technical support and attention and can be seen as best practice examples within the pilot.



What did we learn about user adoption?

The impact of new tech fatigue and mistrust at the start: Initially users were not fully convinced of the practicality and sustainability of the technology. Most users confessed to taking the initial trainings very lightly; many thought this was just another tech initiative that they had encountered before and would not last more than a few months. But when they saw continued successful biometric integration and implementation with the eCHIS app, their misconception changed.

"We did not pay more attention to the training at that time thinking that such technology will not work and could not be practical given the rural setup we are in.....No electricity, no internet, even no telecom networkI have to walk some 14km to get network. So how come... such technology could be implemented and sustained"

- User, Lume woreda

The importance of hands-on, practical training for users with low levels of digital literacy: With most users engaging with smartphones for the first time, users reflected on the critical role of the demonstration sessions, with some requesting more days for practical sessions.

Going the extra mile with monitoring and supervision: Respondents valued the consistent periodic monitoring reports with field supervisors and project partners since it helped them align on the progress of implementation. Key informants from both woreda health offices noted that Simprints trained and supported capacity building of their woreda supervisors and HEWs focal points to provide ongoing close support to HEWs and troubleshoot problems. In addition, respondents mentioned the weekly progress reports that Simprints shared with supervisors helped monitor user performance and progress.

Ease of use and efficiency gains were key drivers for user adoption: HEWs adopted the technology well as it simplified their job and enabled them to provide more efficient services for their communities. Most users reported that the fingerprint scanners are easy-to-use and simple to operate. Furthermore, the Simprints ID app was well-integrated to the eCHIS app and worked smoothly. The option to directly connect scanners to the mobile phones via bluetooth allowed users to promptly scan fingerprints of their clients both during enrollment and identifications.

"In my view, the technology is easy to operate.... now we are enjoying it. It has simplified our job; We can easily locate client's records to provide them services they need within seconds compared with name search, which may take us several minutes" - User, Lemo woreda

Technology alone is not enough, support in delivery has been critical: Key informants and users noted how critical on-hand technical support and troubleshooting has been to ensure successful implementation.

"In my view, above training, the technical support by woreda supervisors and Simprints staff including troubleshooting support were irreplaceable... had it not been for their backstopping, I don't think we can see these results". - User, Lume woreda



Availability of scanners and capacity of devices were a limiting factor for user performance: Only one scanner per health post was available in most health posts for the two study woredas. As most health posts are usually manned by two HEW this sometimes created delays in delivering services or in the case that one HEW would be conducting house to house enrolments, the HEW in the health post would not be able to biometrically enrol or identify clients who visited the health posts. The lower spec tablets, especially in Lume woreda led to challenges in completing the biometric workflow; often leading to very slow performance or the app crashing.

Rethinking incentivisation through user performance recognition: Simprints factored in providing non-financial incentives like T-shirts and airtime to users to compensate for data sync costs and boost morale. While users reported this did improve their motivation most stated that they would prefer regular recognition of best performance.

User performance in model and standard kebeles



Fig 1: A comparison of enrolment and exit rate per user in model and standard kebeles : As can be seen in Figure 1, a relationship exists between high user performance and lower exit rates (incomplete sessions). With each dot representing a user in either a standard (blue) or model (red) kebele we can see that users with high rates of biometric enrolment tend to have lower exit rates. This indicates that a key component of understanding exit rate is not only client consent or presence but also user motivation and support.



What did we learn about community acceptance?

Some level of community resistance existed at the start of the project: Both community members and users report some initial resistance from large portions of the community due to misunderstanding and rumours about the scanner and the purpose of biometric data collection which spread widely. In some cases the red LED light of the scanner was thought to be sucking blood from clients fingers and in other cases the fingers used for scanning (two thumbs, two index fingers) could make a shape, locally associated with the devil. In other cases, it was thought that the device was secretly being used to test a person's HIV or COVID-19 status. Youth involved in opposition politics were concerned that their data could be used by the Government to identify them.

"Initially, there were some rumours in our community about the device, me and my wife visited our health post and asked the HEWs about the rumours. They explained to us the purpose and benefits and reassured us by taking their own fingerprints. We realised that was really a rumour. We trust our HEWs as they have been with us for more than a decade." - FGD participant, Lume woreda.

Gender and age are important considerations when it comes to community acceptance: FGD participants and users noted that women of all age groups were most likely to agree to giving their fingerprint compared to men; and older adult men were more likely to agree to giving their fingerprint than younger men.

Community sensitisation activities conducted by HEW were critical to the success of the pilot: Some HEWs reported that they used different activities including engaging community and religious leaders, health development committees, schoolteachers, and community groups such as village savings and loans groups to deliver key message and information on the purpose and benefits of biometric enrolment. All respondents in both woredas consistently endorsed that the community sensitization activities had worked well, and fingerprint biometrics is currently well accepted by the community, however challenges at the start of the project could have been avoided if community sensitisation activities had started earlier.

Observable results, such as reduced waiting times at health posts have supported community acceptance over time. Community members both report that the use of biometrics has helped HEW deliver faster services and reduced queuing, which has helped reinforce and strengthen community acceptance and willingness to biometrically enrol.

"In my observation, currently, everyone is agreeing to give their fingerprint regardless of [previous resistance]. I don't think giving fingerprints to the HEWs is anymore an issue as most of our community members are happy to receive quick service using their fingerprints" - FGD participant, Lemo woreda



Investigating exit rates and reasons

Exploring exit reasons can provide insights into barriers to community acceptance of biometrics. While the project has an average all time exit rate of 47.7% this had gradually improved over the lifetime of the project, decreasing to 26.5% in April 2022, almost reaching our target to achieve an exit rate of less than 20%.



Figure 2. eCHIS Exit Reasons (all time): illustrates the reasons (as submitted in the exit form) for non-completion of biometric enrolment or identification

While the person not being present in the household or the client being too young to enrol were the predominant reasons for not completing biometric enrolment throughout the project, reasons linked to individual decisions to opt-out (i.e., data protection concerns, refused permission and religious reasons) comprise 11% of exits across the lifetime of the project. In the final month of implementation (April 2022) however, this proportion was just 1.4% indicating individual and community resistance as a much less significant issue.

When comparing between standard and model kebeles¹, on average individuals opting out comprised 11.2% of exits for standard kebeles compared to just 8% in model kebeles. Both percentages reduced considerably in the final month of implementation to 1.6 and 0.9% respectively.

A note on interpreting exit reason data: When interpreting this data it is worth noting that all exit reasons submitted in the exit form remain unverified; that is, we assume the user has selected the correct reason on the exit form but this assumption may not hold true in all cases. When interpreting the data from a community acceptance lens this may be less of an issue as there are limited reasons for a user to not select the correct option, all reasons are as legitimate as each other. However, if the data is used to understand user behaviour, more caution is needed. Insights from the project team suggest that often when a user wants to bypass biometrics due to frustration, time limitations, or simply not knowing how to proceed, they are likely to press the top reason, "not present" in order to exit the workflow. The review did not specifically ask users for feedback on the exit form and thus we have excluded this data from our analysis on user behaviour.

¹ Full comparison of exit rates and reasons in model and standard kebeles can be found in the following dashboard: <u>https://datastudio.google.com/u/0/reporting/1d2da8c5-3033-4742-8fb9-2cf348c9cafe/page/IIHnC</u>



What impact has biometric integration had on eCHIS?

Efficiency gains in service delivery: Observations in a sample of Health Posts (4 sites, 10 samples per site) showed that users were able to pull up client records on average **ten times faster through biometric authentication** compared to a manual search (21 seconds compared to 265 seconds). All key informants consistently underlined that biometric technology improved the efficiency of HEWs by saving time in locating client records.

"Fingerprint biometrics has really simplified our life in service delivery. I don't need to waste my time in searching the name of the clients by scrolling up and down among thousands of names. Here in our community, you can find over tens of people with similar names up to their grandfather which complicated our search using the clients' name. Fingerprint does this within a few seconds" -HEW. Lume woreda

Improved client satisfaction: FGDs and user surveys indicated that biometrics has played a role in enabling higher levels of client satisfaction, due to reduced queueing times. HEWs also noted that at times, even when they have been in the community for many years, often they can forget a client's name which can cause embarrassment; the ability to find a clients record through their fingerprint, instead of having to ask for their name outright has helped in maintaining good relationships with their clients. Some users and stakeholders reported that this has subsequently led to improved service uptake, however more research is needed to verify this impact.

"I think the fingerprint-based services have more benefits for us. It speeds up the service delivery and improved the quality of services we are receiving. Nowadays, after they started fingerprint, all my household members gave their fingerprints. When we come for services, we only need to touch the fingerprint device and get the fast services. We all are happy about this." -FGD participant, Lemo woreda

Improved data quality: All key informants reported that biometrics had reduced duplication of records and meaningfully prevented false reporting by verifying the service recipient. While it should be noted that deduplication analysis has not been a component of the pilot, biometrics has reportedly improved the quality of data in two ways; i) duplicates less likely to enter the system as biometric identification is a more accurate method than name search ii) the biometric system in itself deters false reporting from users. The Head of Lume Health Office noted a remarkable reduction in data discrepancies in Lume's data between 2018 and 2021 and attributes this result to the use of biometrics within eCHIS.

"In 2018, the RDQA focused on community health services depicted a data discrepancy of about 39% in our woreda, but the recent RDQA conducted last year by higher experts from federal and region identified the data discrepancy of less than 5%. No other justification for this, it is after we started the eCHIS and fingerprint-based community health services." - Head of Lume woreda health office

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Improved user accountability and fraud reduction: Stakeholders, including supervisors note the biometric system has acted as a deterrent for users to submit intentionally inflated service delivery data. Overall, regular monitoring reports provided by Simprints on user's biometric performance have strengthened the monitoring capabilities of supervisors and strengthened accountability.

"There are a number of reasons why biometrics should be sustainable and scaled-up, just to mention a few from my observation; the efficiency of our HEWs improved, reduced duplication of records, and false reporting. We will be very happy if we can apply the biometrics-based service delivery for our Health Centres," -Woreda Supervisor, Lemo

Key Project Performance Statistics



2 Training of Trainers for **22 participants**

 \triangle \triangle and **6 step** down trainings conducted.





172,560 people biometrically **enrolled by April 2022**; (one-third of the total eligible population!).



48% average exit rate reduced to 26% in the final month of the pilot (April 2022).



77% of scans performed are of good quality.



What innovative and promising practices were identified?

One objective of the impact and learning review was to identify innovative and effective practices that had supported the pilot to succeed. A variety of innovative practices were identified including:

- The use of a Telegram group for monitoring the performance of users, sharing challenges and learning in both Lume and Lemo woredas. Each week users are encouraged to post the number of biometric enrolments and identifications they completed and the extent to which they have progressed towards their individual targets. Supervisors provide feedback and support accordingly.
- The use of community and religious leaders and community structures, such as schools, health committees and village saving and loans groups to conduct community sensitization activities proved to be very effective.
- Incorporating biometric performance into supportive supervision and mentorship checklists at woreda and Health Centre level helped to strengthen local ownership and accountability.
- Lume Woreda Health Office organised an internal orientation for all programme experts at the woreda level to create a sense of shared responsibility.

What challenges has the project faced?

Poor capacity of devices: The number one challenge reported by almost all respondents was related to the capacity of the tablets the HEW had access to; those with lower spec devices running into various challenges including regular crashing of the app, and very slow processing times. This has been partially addressed through on site technical support and better device management, however for some HEW the fundamental issue of a poor capacity device remains.

Shortage of devices (tablets and scanners): An insufficient number of functional tablets and fingerprint scanners were commonly reported as a major barrier to achieving biometric targets. In particular, many health posts in the two study woredas had one scanner between two HEW, which in addition to creating a bottleneck at the health post, should one HEW be conducting house to house enrolment there is no scanner available at the health post.

Data sync issues: The project has faced several challenges related to data sync, but in particular machine to machine (M2M) sim cards which support the transmission of data to server but cannot be used for browsing or calls, have faced an issue that while data could be synced to eCHIS server it could not be synced to Simprints cloud server. Workarounds have been found, and a longer term solution is being discussed between Simprints and FMoH.

Poor ICT and electricity infrastructure: A key challenge for HEWs has been keeping devices charged. Recently, this has been partially resolved as the FMoH distributed high watt power banks to health posts in both woredas.

High workload and competing priorities for HEW: HEWs have many responsibilities beyond health service delivery, including mobilising the community for upcoming elections, running various campaigns, such as polio or COVID-19 and supporting enrolment into the government's Community Based Health Insurance scheme, which impacts the extent to which the attention of HEW can be focused on biometric registration.



Recommendations

Community sensitization before project implementation: Effective community mobilisation and sensitizations about the purpose and benefits of biometrics should precede implementation to prevent misunderstanding and rumours that could impact levels of community acceptance.

Procurement of devices with required performance specifications: Smartphones used for data collection by HEWs should be standardised, as far as possible, in terms of its data processing and storage capacity. As suggested by some of key informants the devices should meet the specification of at least 6GB RAM and above 64GB storage capacity.

Continued strong collaboration with the FMoH is the key to sustainability: It is crucial that Simprints continues its work with the FMoH eCHIS development team to solve any technical issues that arise, such as data syncing using M2M sim cards which has been more sustainable than using 4G sim cards. Additionally it is important for Simprints and the FMoH to collaborate on including biometrics-based performance reporting features at woreda and user level dashboards to better facilitate field monitoring, data driven local decision making and evidence-based planning.

Standardise best practices throughout FMoH structures: The FMoH eCHIS team should emphasise the top to bottom reporting channels across regions, zones and woredas to build on the success factors and best practices including user commitment, close monitoring and supervision, mentorship, and performance review by pilot woredas.

Ensure adequate number of smartphones and scanners: At scale, the FMoH should ensure adequate numbers of devices/ smartphones and scanners based on the number of HEWs and client outreach. That is, the number of biometric devices/fingerprint scanners distributed to HP should at least equate to the number of HEWs in order to optimise biometric enrollment and identifications.

Data protection policy development: Legislation on biometrics data protection policy should be advocated for and developed by the Ethiopian government to safeguard the privacy and confidentiality of health care clients.

Disseminate learning and evidence to facilitate and engage donors in funding discourse: The FMoH in collaboration with Simprints should invite and organise learning visits to these sites for potential donors to identify potential partnerships. Learning exchange visits to pilot sites should also be considered for senior regional government officials to advocate for and promote domestic financing for implementation of biometrics at scale.