# Building a Learning Health System Through Implementation Research

## Ethiopia's Journey in Transforming the National Health Information System

MINISTRY OF HEALTH-ETHIOPIA

JSI

ETHIOPIA DUP | DATA USE PARTNERSHIP

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## Foreword

The Ethiopian Ministry of Health and the John Snow Research and Training, Inc. (JSI) have been implementing the Data Use Partnership (DUP) with funds mainly from Bill and Melinda Gates Foundation (BMGF) and supplementary grant from Doris Duke Charitable Foundation (DDCF) to transform the national health information system and realize the Information Revolution agenda. Thus, collaborating with the local universities through the Capacity Building and Mentorship Program (CBMP). Implementation of the program involves conducting embedded implementation research - an approach in which researchers collaborate with implementers in the health system to generate and translate contextual evidence.

To this end, different capacity building trainings on the design, methodology, application and scale up of implementation research was provided to collaborative research teams that include diverse experts from the MOH, RHB, CBMP universities, and DUP were formed in each region. These teams have designed and conducted 12 embedded implementation researches on topics that focus on understanding and addressing data use bottlenecks for evidence-based MNCH interventions. DUP has played an instrumental role in the inception, planning and execution of the embedded research. DUP not only provided technical guidance for all the studies, but also financed the implementation research activities.

Our years of experiences indicated that by embedding research into the health system, implementers and researchers were able to work together to generate robust evidence and lessons to improve the health system. This approach was used to identify priorities of the national health system, address different aspects of the system's gaps, and document lessons learned. The involvement of implementers in health systems research created ownership; and enabled the smooth translation of the generated evidence to improve program implementations, planning, and development of national strategies. Moreover, embedding research served as a means to build the capacity of implementers at all levels of the health system.

In an attempt to promote and scale up embedded implementation research approaches, Data Use Partnership jointly with the Ministry of Health organized a national level implementation research dissemination workshop on February 22-23, 2023. As part of the national level dissemination workshop, DUP prepared a booklet for the result summary of the embedded studies.

**Addis Ababa City
Administration Health Bureau**

# Strengthening Performance Monitoring through Quality improvement model in selected health facilities of Addis Ababa, Ethiopia: An Implementation Research

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## Background

The use of health information systems (HIS) has the potential to improve efficiency and reduce health expenditures significantly. To improve healthcare outcomes at the community level, low information use continues to be a major obstacle. Building capacity through various modalities is thought to be effective in improving information use culture of health professionals and managers.

## Objective

This implementation research aims to develop a model that will result in a functional and effective performance monitoring team (PMT) to improve data quality and information use culture in selected health facilities in Addis Ababa by the end of June 2021.

## Methods

An implementation research is used to improve the quality of data and information use. A quasi-experimental facility-based study design was employed among health professionals at all public health facilities and selected health workers at the sub-city health office. Baseline data was collected before implementing the intervention using qualitative and quantitative methodologies.

For the quantitative section of the study, health workers in the selected health facilities were stratified by their workplaces and professions. Individual employees were selected from each stratum using simple random sampling based on a predetermined sample size. A total of 180 health professionals from six selected health centers have participated in the study. The number of key informants for a qualitative interview was determined based on the saturation of relevant information. Both quantitative and qualitative data collection tools were adapted from Measure Evaluation's PRISM assessment tool, specifically the OBAT tool, and the national connected Woreda assessment tools.

During the evaluation of the implementation research, data were collected electronically using an open data kit and analyzed using STATA version 14.1. Difference in differences statistical techniques were used to estimate intervention effects by comparing the observed changes in the outcomes between treatment and control groups across pre-treatment and post-treatment periods.

## Implementation Strategy

Gaps were observed in knowledge and skill of health professionals in generating, managing, analyzing, and using health and health-related data. This implementation research designed a Quality improvement (QI) model with tailored interventions to address the identified gaps. The model includes training, mentorship, supportive supervision, quality improvement experience sharing, and a capstone research project. The model was implemented in selected health facilities in three sub-cities of the Addis Ababa City administration. Hence, the research aimed to ensure the contribution of this model towards improving data quality and information use for future scale-up of the program at the project-targeted areas through formative research and program evaluation.
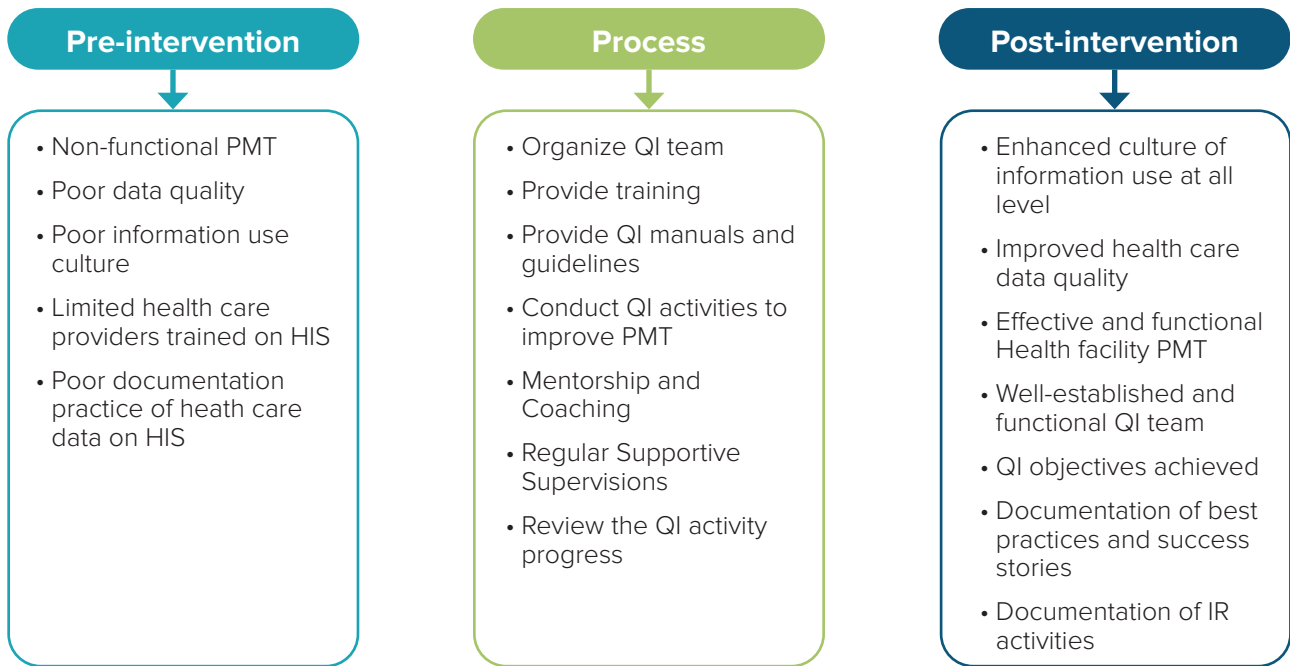
**Pre-intervention**

- Non-functional PMT
- Poor data quality
- Poor information use culture
- Limited health care providers trained on HIS
- Poor documentation practice of heath care data on HIS

**Process**

- Organize QI team
- Provide training
- Provide QI manuals and guidelines
- Conduct QI activities to improve PMT
- Mentorship and Coaching
- Regular Supportive Supervisions
- Review the QI activity progress

**Post-intervention**

- Enhanced culture of information use at all level
- Improved health care data quality
- Effective and functional Health facility PMT
- Well-established and functional QI team
- QI objectives achieved
- Documentation of best practices and success stories
- Documentation of IR activities

**Figure 1:** Implementation Research Process Framework for Health Centers of Addis Ababa, 2020-2021.

In the QI model, site teams (QI team at HC level) worked out ways to implement PMT strengthening strategies to help overcome challenges of data quality and information use culture in their local settings. The teams tested the changes by applying an improvement or change model, known as the Plan-Do-Study-Act (PDSA) cycle. This strategy begins by identifying opportunities for improvement based on the measurement of the individual steps in those work processes in which an organization is underperforming.

In this implementation research on the functionality of PMT, the Theory of change (TOC) principle tells us how and why the selected capacity building model can be empirically tested by measuring indicators for every expected step on the hypothesized causal pathway to impact.
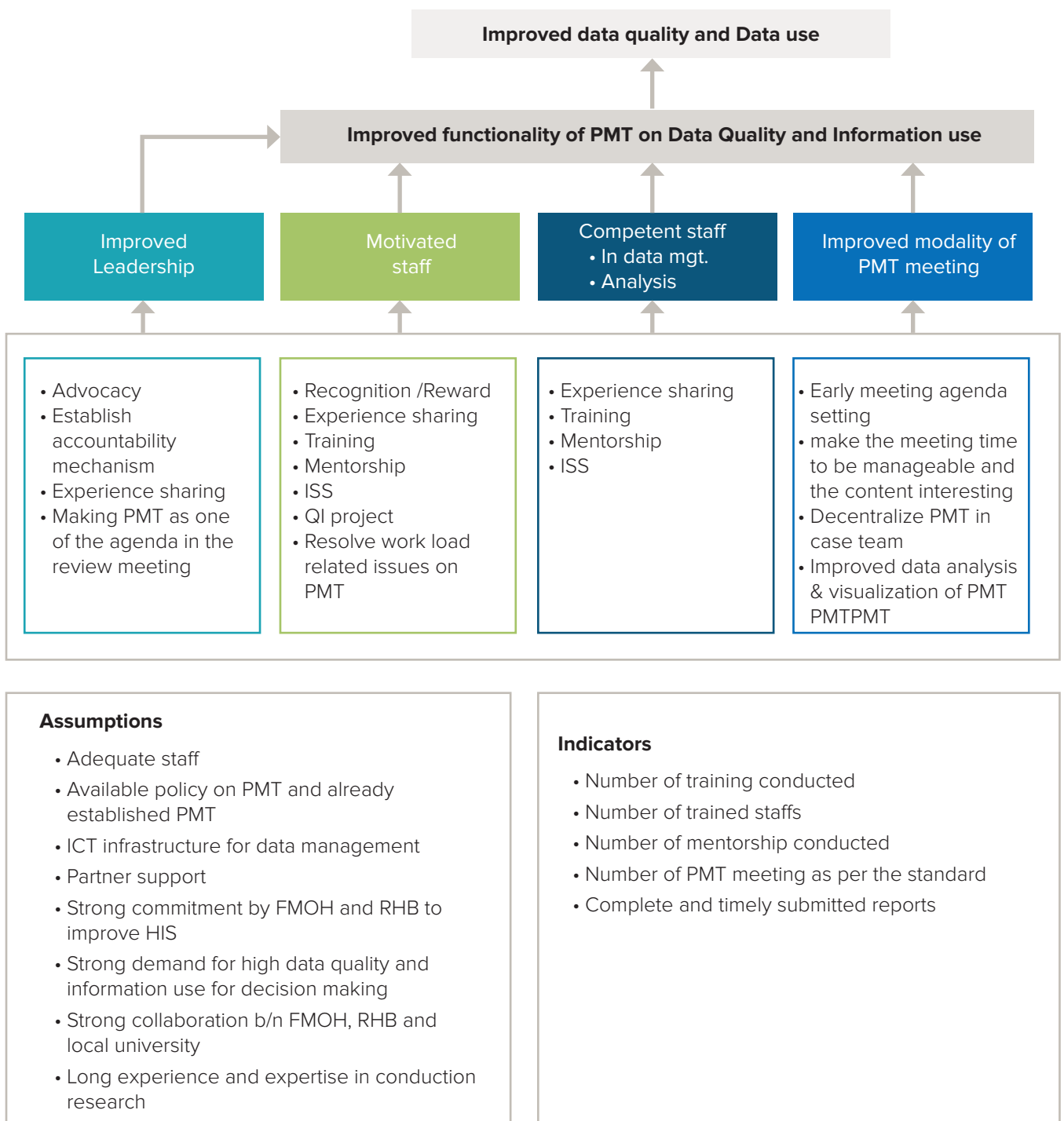
**Figure 2:** Figure showing Theory of Change (TOC) concept/ Frame of Implementation Research (IR), 2021.

## Results

A total of 180 respondents participated in the study with a response rate of 100%. Composite scores were used to determine health worker knowledge, attitude, and practice toward data quality and information use. Content analysis of the coded and sorted qualitative data was conducted, and results were summarized based on the emerging contents complemented by the triangulation of the quantitative and qualitative parts. Specific case stories were briefly documented and put in text boxes.

The study finding shows that of the total, 66% of respondents had received formal RHIS/HMIS/CHIS training Compared to the baseline value of 56.1%. Overall knowledge regarding Routine health information utilization among respondents improved from pre-intervention (61.70%) to post-intervention (79%). All intervention HCs prepared data visuals compared to the baseline of only three HCs (50%). Information use culture among respondents has improved from 56% at baseline to 77% after intervention (Figure 3).
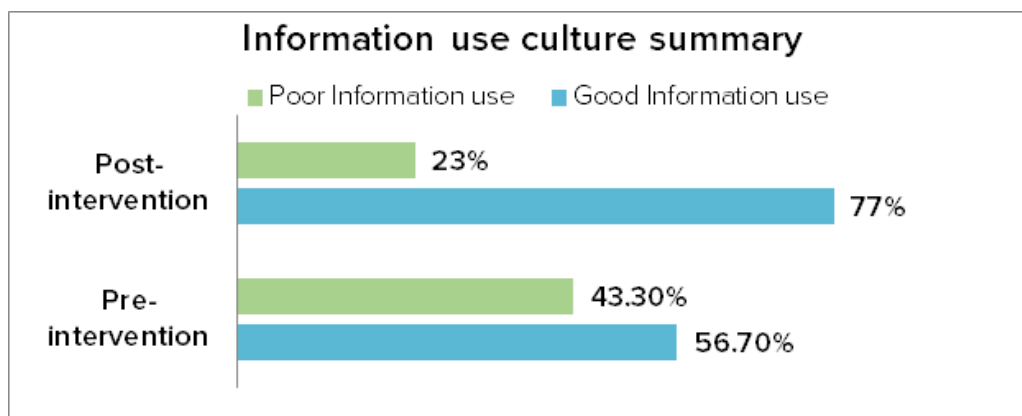


**Figure 3:** Overall healthcare information use culture among respondents in Addis Ababa, 2021.

All of the five selected HCs have a performance monitoring team that was fully functional, as opposed to the pre-intervention period. The PMT meeting is scheduled to take place monthly in all HCs which is (100%); the meeting is very often chaired by the medical director/head of the facility, and there was also a topic of discussion on HIS management in all HCs PMT minutes/records with follow-up on decisions and feedback on how things are going on at the grass root level. The study findings suggest that the quality improvement initiative strategy has brought a change in the Routine health information system Knowledge, RHIS skills, and information use.

The knowledge and skill of health professionals on data use have considerably changed after the intervention. The data quality, information generation, and utilization, including for local decision-making, showed encouraging improvement after the implementation of the QI initiative in the health facilities.

## Lessons learned

The QI initiative helped the health centers to capacitate the staff towards data quality and information use. Through the QI initiative, research sites improved the quality of health services through the provision of evidence-based decision-making. A core process lead of a health center witnessed that the initiative was powerful enough in terms of demonstrating the value of quality data as a foundation for planning, policy-making, guidance, and a mirror through which leaders and individual experts see themselves in the healthcare system.

### "Whether you want to prioritize things or make decisions if you don't have quality data, you simply will be hand-tied!"

The research sites/ Health centers QI teams practiced to state their facility information use and data quality-related problems, conducted problem analysis for the identified gaps and set intervention mechanisms for their problems. Facility card rooms were also renovated through the QI initiative. Furthermore, because implementation research sites carried out the activities using the resources they currently have, the project did not result in new expenses for the HC (primarily the health center budget). The commitment of the QI team members as well as the QI site's documentation practice of health care service-related activities was greatly improved as a result of this research.

### Challenges

Despite the benefits of the intervention, monitoring and evaluation of the implementation process showed the presence of both internal and external challenges to the implementation of this treatment-reporting intervention. The challenges in terms of resources, infrastructure, and knowledge encountered are listed below.

- Internet connection, Shortage of computers
- Lack of management support
- Lack of adequately trained professionals
- Activities could not be performed as planned

because of the COVID-19 incidence, specifically in the first two quarters;
- The health workforce has been assigned to the COVID-19 response and it has affected PMT meetings and performance monitoring activities very much.
- The unstable working environment due to system restructuring.
- Lack of supportive supervision and low management support for IR sites to work with QI initiatives.
- The workload of QI members
- Some centers, such as Hidassie Fire HC in the Lideta sub-city, have become a Covid-19 centers and interrupted IR activities for a long period.

### Recommendations

- The PMT should be strengthened and dedicated to regularly monitoring and evaluating the implementation of the QI initiatives and the overall data quality improvement pillars.
- The QI initiative needs to be integrated and harmonized with other routine activities to maintain the sustainability of the performance in improving data quality, information generation, and evidence utilization for local decision-making.
- Furthermore, training and mentorship should be provided for the health workers and administrative staff and required resources like dedicated rooms, computers, internet connection, and personnel need to be fulfilled to improve the performance in data quality
- This implementation research should be conducted at a larger scale at the health center and hospitals to benefit all health facilities.

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Benishangul Gumuz Regional
Health Bureau

# Performance-Based Non-Financial Incentive (PBNI) on data quality and information use, in Wogera District, Amhara Region, Ethiopia

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## Background

Healthcare data that is collected and stored at each level of the health system is critically important to use for decision-making in the health system which in turn helps to improve individual and community health status. To strengthen routine health information system performance, the country has been implementing multiple strategies for a decade to enhance the performance of routine health information systems at different levels. Health workforce motivation is one of the behavioral and moral factors that can affect data quality and information use practice.

## Objective

This research aimed to measure the effectiveness of PBNFI on data quality and information use at the healthcare facilities in Wogera district.

## Methods

A pragmatic type II hybrid effectiveness implementation and quasi-experimental study designs were employed between October 2020 and July 2021. The study was conducted in Wogera and Tach-Armachiho districts which are located in Northwest Ethiopia and are adjacent to each other. Wogera district (intervention) constitutes 51 Kebeles and has a total population of about 278,942. There is one primary hospital, 8 health centers, and 41 health posts in the district that provide preventive, promotive, and curative services. Regarding the health workforce, there are 108 health extension workers (HEWs), 678 health workers (HWs), and 215 support staff.

The Tach-Armachiho (comparison) district has 24 kebeles with a population of 121,321. There is one primary hospital, 6 health centers, and 28 health posts. A total of 53 HEWs, 202 HWs, and 141 support staff work in the primary healthcare system in the comparison district.

Non-financial incentives were provided to individuals, departments, and health facilities based on their performance. **Four incentive packages were delivered** for the intervention group including an award, certification, scholarship, and promotion for the best-performing individual, department, or health facility.

## Findings

The average data quality score for Month1 in intervention districts increased from 47% to 62% and from 48% to 60% in the comparison district during the baseline and end-line periods, respectively. Similarly, for Month2, the average change in data quality score for the intervention and comparison districts between the baseline and the end line survey was 25 and 9 percentage points, respectively. Departments and facilities heads who evaluated their performance by comparing a target with achievement increased from 28% to 56% and 65% to 78% from baseline to end line in Tach Armachiho and Wogera districts, respectively.

The average value of the use of information for the second and third round assessment increased from 40% to 43% (P=0.001) and 87 % (P=0.001), respectively. Likewise, the average value of information used for decisions significantly increased from the baseline of 31% to 61% (P=0.008) in the end line assessment.
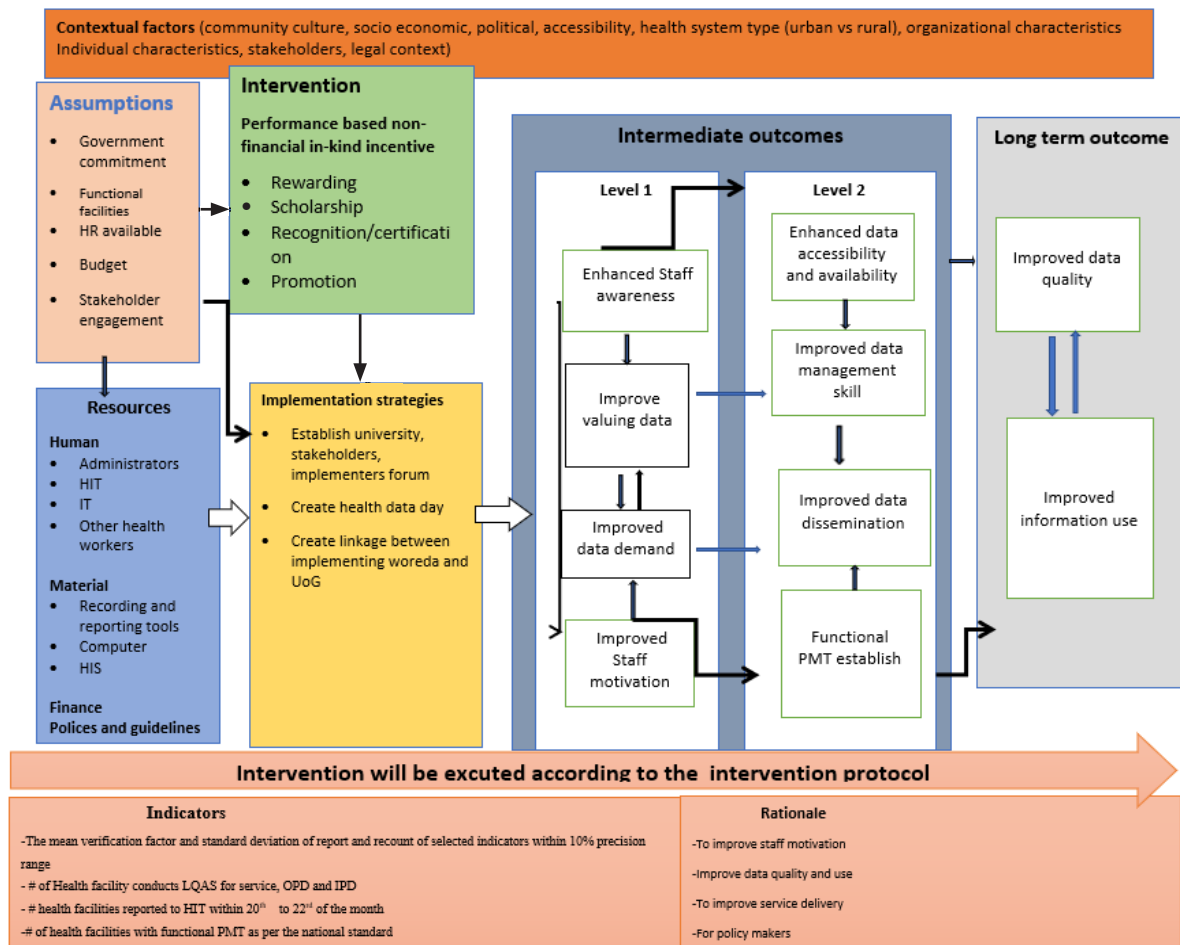
**Figure 1:** Theory of change for improved data use through performance based in-kind incentive intervention in Wogera woreda, 2021

The average level of information used at the baseline assessment for Tach Armachiho and Wogera districts were 37% [24%, 50%] and 33% [30%, 58%], respectively. For the end line assessment, the level of information used in Tach Armachiho and Wogera was 43% [30%, 58%] and 59% [40%, 70%], respectively. The DID analysis showed that the PBNFI resulted in a 25 percentage points (2%, 47%), P=0.003 net program change on the average level of use of information in the intervention district compared to its counterparts.

The average cost-effectiveness ratio for PBNFI intervention was 14,874.2 ETB per unit percentage improvement in HIS performance, and that was 39,774.4 ETB for the status quo or comparator group.

Conclusion and lessons learned: The performance-based non-financial incentive has brought significant change both in health data quality and information use in the Wogera district.

The majority of health workers utilized available evidence while they were making decisions, and calculating target and program coverage in their departments. The data quality dimensions such as report timeliness, completeness, and consistency were significantly improved from the baseline to the end line period.

The lesson learned from this study includes assumptions considered during the introduction of the program that didn't work well when assessed after implementation. For instance, the health facilities were not well equipped with the necessary inputs and resources relevant to quality health data production and use. Budget and human resources shortages and negligent and unhelpful woreda health offices were observed. Therefore, engaging local administrators brings a significant change in the implementation process.

Proper handling of evaluation and recognition complaints were lessons that needed clarification and a transparent process for the participants. Moreover, the study indicated that the morals and commitment of health workers were boosted when they got recognition in front of higher officials and in large gatherings. We also learned that genuine identification of awardees is vital to create healthy competition among health workers. The use of triangulated modalities to get information and data from the woreda health office, PHCU directorate, and two months' performances on data quality and information use practice of the individuals were another lesson to properly measure the performances accordingly.

Compliant management during the process and recognition in front of the higher official also boosts the morale and commitment of health workers that leads to the effectiveness of an intervention.

Therefore, scaling up this intervention to other similar contexts is possible. However, it needs consideration of the lessons from this study. Health facilities should be well-equipped with the necessary inputs and resources relevant to quality data production. Moreover, budget, human resource, and local administration engagement are crucial for the success of the intervention.

By considering the local context and customization this intervention can bring the intended objectives of data quality and information use, thus we recommend scaling up of this intervention while considering the above critical points.

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# Capacitating health sector leaders to improve healthcare data quality and use in Assosa district: An implementation research

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## Background

Engagement of leaders and support on healthcare data management in the health system is one of the ways to improve data quality and its utilization. Engaging equipped leaders and creating accountability for quality healthcare data and utilization is considered the most critical driver in health sectors; which also leads to better health outcomes. However, it is unclear how training health workforce leaders improve the generation and use of quality health data in resource-limited settings of Ethiopia.

## Objective

The aim of this study was to assess the effect of implementing training and post-training follow-up of the health sector leaders to improve healthcare data quality and its utilization in the Assosa district, Ethiopia.

## Methods

This research employed quasi-experimental with pragmatic effectiveness-implementation type II hybrid design. Specifically, there was a training and post-training follow-up intervention on HIS for leaders. Data were collected during pre-intervention and post-intervention periods. The baseline and end-line quantitative data were collected in November 2020 and August 2021, respectively.

The study was conducted in Assosa city administration which is the capital of Benishangul Gumuz Regional state, Ethiopia. It is located in the West part of the region, and based on the 2019 report of the ministry of health woreda base plan, it has a population of 104,147, of whom 49.1% were women. There are 2 health centers (HCs) and one hospital in the city.

## Intervention

The intervention was targeted at all individuals currently working at the woreda health office and healthcare facilities with managerial positions including those officially delegated. Leaders who had a position in the woreda health office and who influenced health workers at the facilities were also target groups for the intervention. Moreover, the zonal and regional health offices were taken into consideration because no intervention performed at the city administration level could ensure success without the willingness, cooperation and involvement of higher administrative levels.

Accordingly, the zonal health office and regional health bureau managers were approached to provide awareness about the intervention and help them understand its rationale. This is assuming that it would be easy for leaders in the woreda to implement the intervention and improve its outcomes. However, the number of participants and the intensity of intervention would be reduced as we go from lower (woreda) to higher (regional) level offices.
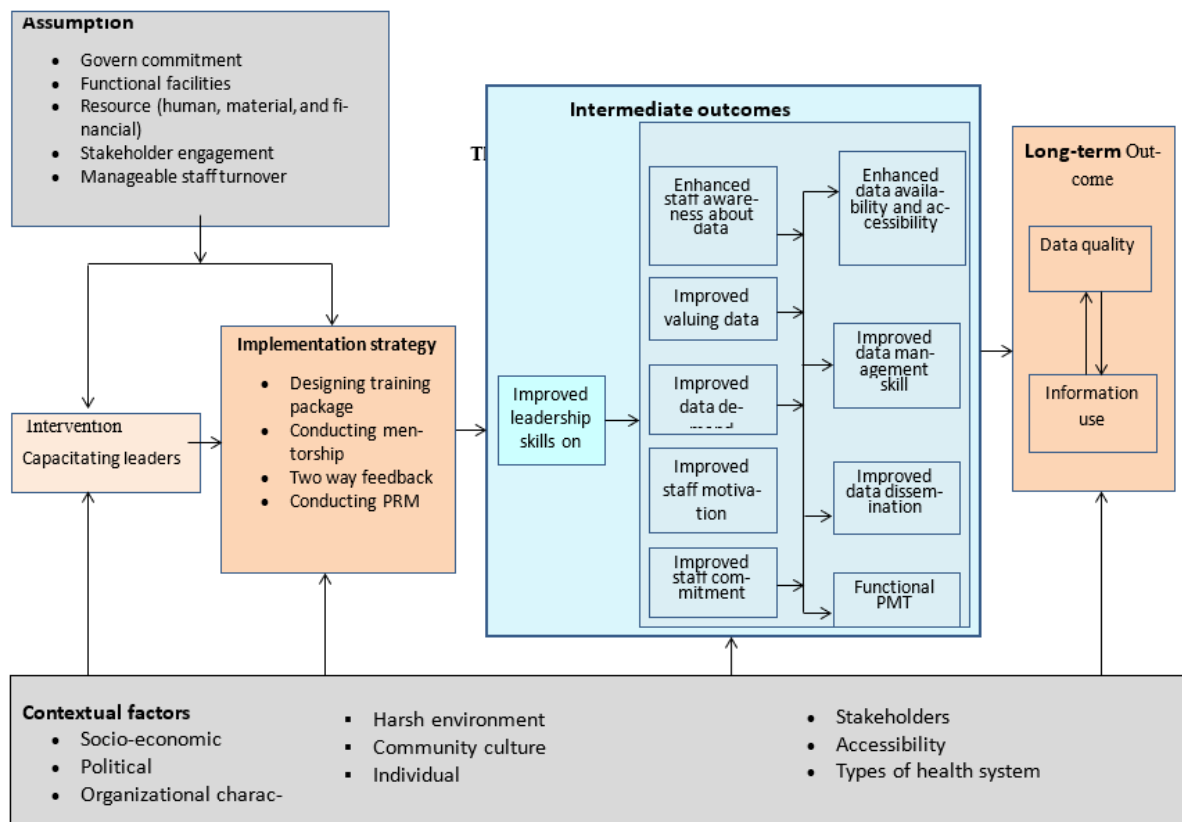
**Figure 1:** Conceptual Models for leadership and governance implementation research in Assosa city admiration, 2021

### Findings

In this study, one health center and one general hospital were included. The total number of units/departments in both facilities was 17. Of the total departments, 9 (52.9%) were from the health center, while 11(47.1%) of them were from the hospital. The study showed a 22.2% change in indicator identification in the intervention health center. The target versus achievement indicator showed that there is a 26.1% improvement at the health center level. Facilities' health coverage was estimated to be 33.4% at the health center and 72.7% at the hospital levels. After the intervention, the decision-making practice improved by 34.4% at the health center whereas 72.7% improvement was observed at the hospital level. Feedback provision of both health center and hospital improved after the intervention by 33.3% and 51.1% respectively. Moreover, our study indicated that overall information use practice was improved by 31.2% at health centers and 19.1% at the hospital levels.

### Conclusion and lessons learned

Feedback, mentoring, and performance review meetings (PRM) were found to be effective implementation strategies for training and post-training follow-up in improving data quality and information use.

The lessons learned from this study showed feedback, mentoring, and performance review meetings to be effective implementation strategies for training and post-training follow-up in improving data quality and information use. The coverage and effectiveness of the implementation were also promising to suggest that similar intervention and implementation strategies can be further scaled up in other districts of the Benishangul Gumuz Regional State where similar contexts and settings are common in it.

Since, we implemented feedback, mentoring, and performance review meetings as an implementation strategy we have difficulties identifying which one of the three brings more change, rather we recommended the combined effect. Thus, in a future implementation, it's recommended to test the effect of each implementation strategy and its effects on the outcome of interest.

Different leadership training was provided by different stakeholders during the implementation period which is difficult to assert the implementation outcome. Thus, consideration of the concurrent implementation of related interventions is important while using our recommendation. Moreover, regional and national level integration of implementations is critical to properly utilize resources and bring a synergistic effect.

The team also learned that many of the assumptions considered during the introduction of the program didn't work well while assessed after implementation. For instance, the health facilities were not well equipped with the necessary inputs and resources relevant to quality health production and use. Budget and human resources shortages were observed. Thus, providing training and post-training couldn't bring expected changes without sufficient inputs of human resources, material resources, and budget. Hence, it's highly recommended to fulfill the assumptions in line with the training and post-training follow-up.

Peace and security were other observed challenges to implementing the intervention and achieving the expected objectives of the project. Some areas of the Benishangul Gumuz region were insecure and unstable during the project implementation period which could make our implementation somewhat incomplete. Thus, we strongly believe the result of such interventions could be high if it is implemented in an environment where there is relatively stable peace and security.

Multiple duties by the regional officials were the other challenge with a significant effect on the result of the interventions. At the beginning of the intervention, there was a low engagement of regional officers, however, during the consecutive pieces of training and communications we managed it and that brought significant change to the implementation.

Moreover, engaging different stakeholders and creating a sense of ownership is another important part of the intervention implementation that we learned from this intervention.

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# Performance Monitoring Team Based Motivation Interventions to Improve Data Use for Decision making at Health Facilities in Harari and Dire Dawa: An Implementation research

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## Background

Health facilities need to cope with changing realities through organised management and leadership. This requires the use of reliable data for the development of a comprehensive policy package for planning, continuous monitoring and health sector reforms. Health data utilisation for local action-oriented performance monitoring is inadequate in many resource-limited contexts including Ethiopia, notably at the Woreda and health facility level.

In Ethiopia, improving the quality of health data for planning, monitoring, and informed decision making is the main role of the Performance Monitoring Team (PMT). Although the importance of data-driven decision making is acknowledged, there is paucity of studies on how best to achieve this goal. Hence, this implementation research aims to develop strategies that can enhance the competence and motivation of PMT members in order to improve the culture of information use.

## About the research

### Study Setting and Design

The details of the methods used in this implementation research can be found in a paper published in 2022 *(Abera, Admas, et al.).* A quasi-experimental study with a pre-post assessment was conducted at two hospitals and two health facilities in Dire Dawa administration and Harari region. Dire Dawa is located 453 kilometres east of Addis Ababa and has a population of 341,834 people, of which 68.23% live in the city. The administration has 2 public hospitals, 15 health centres, and 32 health posts, and serves an estimated 480,000 people. Harari region is one of the eleven Ethiopian states and is located about 518 km east of the capital.

The region has a total population of 183,415 people. More than half of its population reside in urban areas, which accounts for 54.18%. There are three government hospitals, one university teaching hospital, two private hospitals, eight health centres, and 24 health posts.

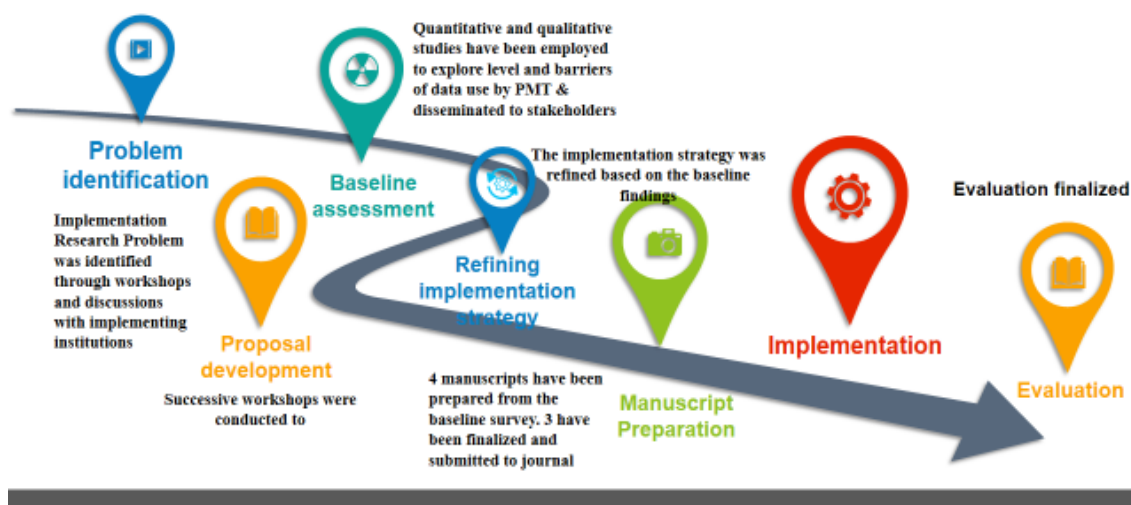## Data collection and Implementation strategies

The research was carried out in four phases, with the following approaches: (i) baseline situational analysis and prioritisation of HIS issues; (ii) data collection and identification of implementation barriers and facilitators guided by the Consolidated Framework for Implementation Research (CFIR); (iii) developing and implementing PMT-focused implementation strategies; and (iv) monitoring and evaluating implementation strategies using the Reach, Effectiveness, Adoption, Implementation and Maintenance (RE-AIM) framework.

Baseline data were collected through observation and desk reviews using both structured and semi-structured interviewer-guided questionnaires with the aim of assessing overall data use level, and level of competency, knowledge, and attitude of health workers towards data use. The Consolidated Framework for Implementation Research (CFIR) was used to identify the most important barriers and facilitators of data use and the implementation process.

The implementation strategies include

- Focused capacity building
- Best-performer recognition
- Data-day celebration forums
- PMT motivating interventions at the facilities

**PMT focused motivation interventions to improve data use at
Harar & Dire Dawa – followed steps**

**Problem
identification**

Implementation
Research Problem
was identified
through workshops
and discussions
with implementing
institutions

**Proposal
development**

Successive workshops were
conducted to

**Baseline
assessment**

Quantitative and qualitative
studies have been employed
to explore level and barriers
of data use by PMT &
disseminated to stakeholders

**Refining
implementation
strategy**

The implementation strategy was
refined based on the baseline
findings

4 manuscripts have been
prepared from the
baseline survey. 3 have
been finalized and
submitted to journal

**Manuscript
Preparation**

**Implementation**

Evaluation finalized

**Evaluation**

## Key findings

The study discovered that poor data quality; lack of accountability and commitment from the health workforce; and inadequate documentation practices are all barriers to effective data use. Moreover, as the majority of PMT members serve on multiple committees, their conflicting priorities negatively influenced data use practice at the facilities. The majority of the facilities stated that the targeted interventions made by PMT members to support the facility's information use culture helped their PMT and case teams.

The study found out that, after the intervention, there was an 11.76%, 8.69%, and 72% increase in the mean score of tools used for data processing and analysis, availability of up-to-date HIS documents or reports, and data analysis and visualisations scores, respectively (Table 1).

The average score of supervision and feedback and information domain increased by 28.30% and 18.75% respectively. There was a significant increase in the mean score of data analysis and visualisation (p-value=0.011), supervision & feedback (0.013), and decision-making forum score (P-value=0.02).

**Table 1:** The overall effect of motivation interventions on data use practice of facilities

| Variables | Pre-intervention 19 (mean) | Post-intervention 19 (mean) | Mean difference | Level of change | Paired sample t-test P-value |
|---|---|---|---|---|---|
| **Planning score** | 4.25 | 4.25 | 0 | 0 | No difference |
| **Tools used for data processing and analysis score** | 4.25 | 4.75 | 0.50 | 11.76% | 0.39 |
| **Availability of HIS documents/reports score** | 5.75 | 6.25 | 0.50 | 8.69% | 0.60 |
| **Data analysis and visualisations score** | 12.5 | 21.50 | 9.00 | 72.00% | **0.011** |
| **Supervision and feedback score** | 2.25 | 4.50 | 2.25 | 100% | **0.013** |
| **Decision-making forum score** | 26.5 | 34 | 7.50 | 28.30% | **0.02** |
| **Information dissemination score** | 4 | 4.75 | 0.75 | 18.75% | **0.06** |

**Policy insights**

Evidence gathered through this research indicated the critical importance of PMT capacity building, recognition, experience sharing, and data week forums. The following recommendations and policy insights are recommended to optimise and further scale-up implementation of these packages in existing organisational PMT structure.

- Strengthening onsite support and regular motivation of staff at all levels is essential for the sustainability of data use and quality improvement.

- Competency-enhancing focused capacity building and performance-based recognition including non-monetary incentives has the potential to motivate the PMT and hence improve data use.

- Rather than providing routine training that is planned at national level, regions and facilities have to design context-based attitude enhancing capacity building training such as knowledge management, and leadership in HIS.

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# Onsite Training-Mentoring Intervention Improves Data Quality in Public Health Facilities of Somali Regional State, Ethiopia: An Implementation Research

Tesfaye Gobena[1*], Daniel Berhanie[1], Abera Kenay[1], Hirbo Shore[1], Yakob Wondirad[2], and Mohammed Ayanle[3]

## Background

The use of high-quality data in decision-making is critical for transforming the health sector and ensuring equity and quality of health care. Thus, it is crucial to improve data quality for health system planning, monitoring, and continuous improvement. However, the quality of health data is inadequate in Low and Middle Income Countries (LMICs), particularly Ethiopia. Haramaya University in collaboration with the Ethiopia Ministry of Health, Regional Health Bureau and Woreda Health Offices conducted an implementation research to improve data quality using onsite training-mentoring in selected public health facilities and offices of Somali Regional State, Ethiopia.

## Approaches

An implementation research using Consolidated Framework for Implementation Research (CFIR) was conducted in the selected public health sector of Somali Regional State, Ethiopia. The CFIR was used as a guiding tool to the development of the intervention and assessment of the data quality determinants. Additionally, Reach, Efficacy/effectiveness, Adoption, Implementation, Maintenance (RE-AIM) was used to assess the outcomes of the intervention.

The implementation research was conducted in four phases 1) pre intervention, 2) intervention and 3) post intervention 4) scale up phases (Figure 1). Data quality metrics such as proportion of data accuracy, data content completeness, proportion of facilities with improved report timelines and report completeness were used to assess the outcome of the intervention.
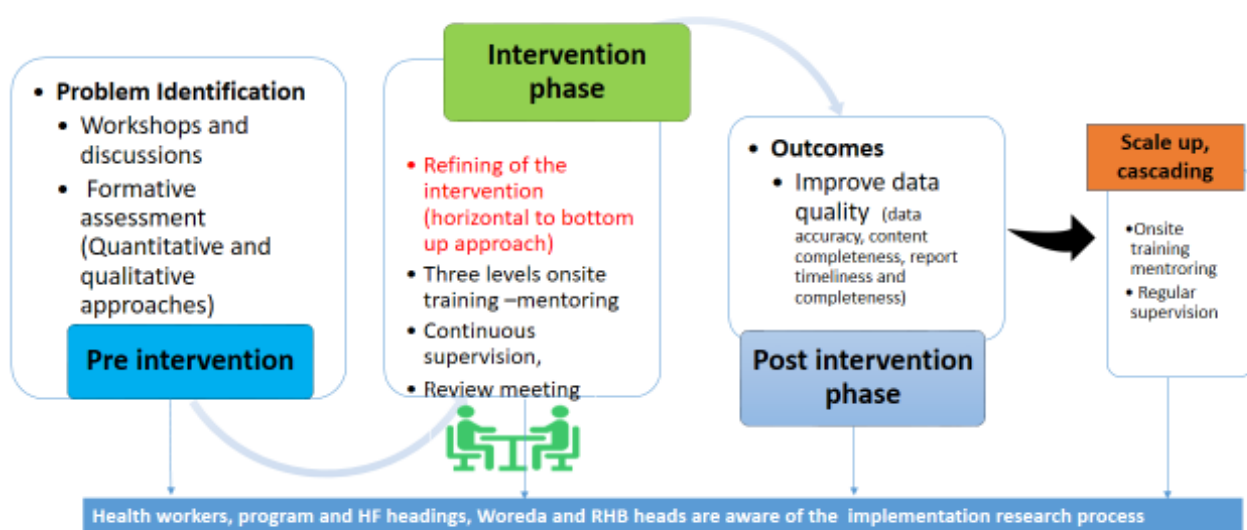


**Figure 1.** Process of onsite training-mentoring for improvement of data quality in Somali, Ethiopia

**Implementation strategies and measurements**

Onsite training-mentoring, continuous supervision and review meetings were the major implementation strategies of this study. The intervention used bottom up onsite training-mentoring strategy to improve data quality, including data registration, compilation, reporting, data analysis and data use in the public health sector. The strategies were continuously modified as we have learnt from the interventions and assumptions. Modifications were made in consultation with stakeholders and partners based on baseline findings.

Baseline and end line data were collected based on four data quality dimensions. The onsite training-mentoring was provided by trained and experienced public health professionals identified from Haramaya University, Regional Health Bureau, Woreda health Office, and Consortium University, Jigjiga University staff.

**Findings**

The overall data accuracy improved from 88.12% to 95.0% following the intervention while data content completeness increased from 75.75% to 89.9%. Accuracy of reported data was above 90% in all the health facilities. Data content completeness was 75% in Ayardaga, 83.0% in Jigjiga Primary hospital, and 99.0% in Kara Mara hospital. Timeliness of reports is 100% in all the three facilities.

The intervention has brought significant improvement on data quality related knowledge, attitude and skills of health workers. Most of the respondents stated that there have been visible changes in data registration; data compilation, documentation and reporting. Furthermore, the intervention improved health workers' confidence in conducting their regular HIS related activities such as basic data analysis and many health workers are now comfortable doing their routine data registration and compilation tasks rather than delegating them to someone else from the unit.

**Table 1.** Data accuracy, content completeness and report timelines among the selected public health facilities of Jigjiga Woreda, Somali Regional State

| Health facilities | Data Accuracy | | Content completeness | | Timeline report received | | Timeline report sent | |
|---|---|---|---|---|---|---|---|---|
| | Baseline | Endline | Baseline | Endline | Baseline | Endline | Baseline | Endline |
| Karamara General Hospital | 92.24% | 94% | 81.61% | 99% | 100 | 100% | 100 | 100% |
| Jigjiga Primary hospital | 83.10% | 96% | 81.21% | 83% | 100* | 97.2% | 100 | 100% |
| Ayardaga Health center | 79.81% | 98% | 69.7% | 75% | 100* | 100% | 100 | 100% |

## Lesson learned and best practices

The collaboration between academia and the sector has grown since the commencement of the project and now is exemplary to other sectors in the country and beyond. The proactive engagement of the region and facility heads made the research process very efficient and effective. The onsite training-mentoring intervention has changed the training modality from hotel based to facility based allowing hands-on training in the facilities and health offices. We observed that health workers in departments/units were more comfortable to record and compile data at the point of care. As a result, the overall data accuracy, completeness of data content and timeliness of reports were all greater than or equal to 90%.

## Challenges and solutions

COVID-19 pandemic has brought a considerable delay to the implementation research, especially the pre-assessment and intervention phases. However, efforts have been made to continue the program using all the precautionary measures of the pandemic. At the beginning of the intervention, few trainees were concerned about the objective of mentoring activity at the facilities. However, this negative attitude was improved through continuous discussion with the trainees and the employees of the respective units/departments. There was some transportation problem to routinely travel from the University to Jigjiga and to stay in the field. However, the Somali RHB filled the gap by providing a car for the field staff.

## Recommendations

Based on the tested strategies, the following recommendations are forwarded to MOH, partners, stakeholders and the Universities.

- This tested onsite training-mentoring strategy should be integrated into the HIS of the region to ensure data quality and information use in the sector rather than using a hotel based training approach.

- Enhancing the capacity of the health workers is important to achieve data quality by strengthening their knowledge and skills of HIS.

- Stakeholders, partners and academia should exert a collective effort to sustain the onsite intervention to ensure data quality in the sector.

- Trainers-mentors team should engage local trainers from RHB, Woreda, facilities, and consortium Universities

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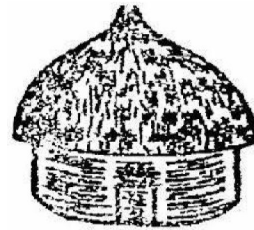
SNNP-Regional Health
Bureau



Sidama Regional Health
Bureau

# The Role of PMT function on the utilization of Health Information in the public health facilities of Shabedino and Hawela Districts, Sidama Regional State, Ethiopia

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## Background

Routine health information is vital for operational, tactical, and strategic decision-making. In Ethiopia, the PMT is in charge of ensuring quality data collection, analysis, presentation, and displaying timely data to decision makers in order to improve evidence-based decision making. The level of data quality in Ethiopia is poor at all levels. Health workers in the health system are either not utilizing routine health information at all or not in the best way to drive planning, performance management, and the delivery of services. This creates hindrances to the efficiency and effectiveness of healthcare delivery.

Addressing the quality and equitable distribution of health service delivery for all is a priority for the Ethiopia Ministry of Health (MoH). Therefore, this assessment, as part of implementation research, is aimed to improve data use by enhancing PMT Function using Innovative change approach (FADE-CSR Model).

## Methods

### Study setting and period

The study area included Shabedino and Hawela district health offices and health facilities located in Sidama region, Ethiopia. Hawella District has four health centers and eleven health posts, while Shabedino district has six health centers, one general hospital, and 23 health posts. The study was conducted from April 30, 2021 to April 30, 2022.

### Study design and Sample size

A facility-based mixed quantitative descriptive cross-sectional study and qualitative phenomenological design was used. All public health facilities found in Shabedino and Hawela districts as well as the two WoHOs were included in this study.

### Data Collection Tools and Procedures

Quantitative data were collected using a pretested, structured, and interviewer-administered questionnaire and an observation checklist. The tools were adapted from the Performance of routine health information System (PRISM) framework by the Measure Evaluation. A semi-structured interview guide composed of open-ended questions and probes to elicit in-depth responses guided the qualitative section of this study.

### Data processing and analysis

The quantitative data were entered into Epi-info version 7 and exported to STATA version 16 for analysis. Descriptive statistics and paired t-test were computed to determine the association between PMT function and data utilization. The audio taped qualitative data was translated to English and analyzed by using ATLAS TI. Version 17.

### Implementation Strategies (FGD-ESR)

The augmented FADE was implemented as a FGD-ECR model, which is Focused on a single facility, Gap analysis based on the standard, develop action plan, Execute and evaluate, Cascading the change, Recognize and reward the achievements. In addition, we used Theory of Change to guide this research (Fig. 1).

**Fig. 1:** Augmented FADE model will be implemented as FGD-ECR model to improve data use by enhancing PMT Function, 2020

**Monitoring and Evaluation**

Evaluation was carried out at the end of the project using RE-AIM Framework for the following objectives: Measured change in data use of health facilities, assessed adequacy of mentorship provided by mentors, measured acceptability/suitability PMT mentors, Assessed adherence level of PMT intervention.

**Findings**

**Section 1: Quantitative part**

**PMT Functionality status**

The study response rate was 100%. The overall PMT functionality level was 70.8% (95% CI; 67%, 75%). Among the health institutions, Hawela district health office has the highest level 97% (95%CI; 92%, 102%) and Dobetoga health center and Mero health center has the lowest level 51% (95% CI; 33%, 68%) of PMT functionality.

**Data Utilization status**

A total of 23 indicators at health facility level and 50 indicators at district health office were used to measure data utilization. The overall data utilization was 53% (95% CI; 48%, 58%). Hawela health center has good data utilization 74% (95%CI=56% 92%] and Hawela district health office has data utilization score of 67% (95% CI, 53%, 80%) while Dulecha health center has the least utilization which was 30% (95% CI; 10%, 51%).

**Association between PMT function and data utilization**

The finding showed the presence of a positive relationship between PMT function and data utilization status. The overall mean difference between PMT function and data utilization was statistically significant [Pr = 0.0005]. In Morocho HC, there was a statistically significant difference between PMT function and data utilization [(r(|T| &gt; |t|) = 0.0006]], HC [Pr (T &gt; t) = 0.0241]; Dulecha HC [Pr (T &gt; t) = 0.0000]; Telamo HC [Pr (T &gt; t) = 0.0184]; Wita HC [Pr (T &gt; t) = 0.0025]; Galuko Hireye HC [Pr (T &gt; t) = 0.0047]; and Hawela WoHO [Pr (T &gt; t) = 0.0245].

### Monitoring and Evaluation

Evaluation was carried out at the end of the project using RE-AIM Framework for the following objectives: Measured change in data use of health facilities, assessed adequacy of mentorship provided by mentors, measured acceptability/suitability PMT mentors, Assessed adherence level of PMT intervention.

### Section 2: Qualitative part

### Facilitators for PMT functionality

**Input related facilitators** include; direct PMT structure and organization related, budgetary and other resources, capacity building related variables, and availability of PMT guidelines. Factors related to PMT processes were experience of PMT in data quality follow-up for better information use; using PMT as an instrument for solving problems of routine health information system activities; setting up participatory discussion to share experience and knowledge; and staff commitment to the information revolution. Facilitating **factors related to PMT structure** include: PMT team composition; members' understanding of the role of PMT; PMT interest in and regularity of attendance; group meeting regularity and attendance; monitoring system of the members; and the usefulness of the log book for their activities.

### Barriers for PMT functionality

**Input/structure related barriers** include turnover of PMT members, scarcity of budget and other resources, shortage of PMT guidelines, lack of training for newly assigned staff and other motivational issues, PMT logbook formats, lack of appraisal and accountability framework guidelines. Consequently, **process and output related issues** include irregularity of PMT meeting, inappropriate use of LQAS, concern on data ownership, perceived sense of PMT as not a problem solver and lack of team spirit.

### Challenges

- Health professionals are overloaded due to horizontal activity COVID-19 epidemic campaign

- Staff turnover, and lack of motivation especially by IT staff due carrier development

- Frequently turnover of the leadership assignment (leadership turnover)

- Infrastructure shortage including internet, inputs/resources for digitization, like computer, printers

- Inequitable distribution of health professionals specially HIT.

### Key lessons learned and best practices

It is learned that the functionality of PMT is crucial for improving data quality and information use at all administrative levels and health care facilities. The following are considered as good practices.

- PMT Functionality in public health facilities

- Availability and utilization of PMT logbook

- Using PMT as an instrument for solving problems HMIS activities

- Follow up of data quality by PMT for better information use

**Recommended Implementation strategy for replication and scale up**

- Strong collaborative work/engagement between HU CBMP/DUP team, regional health bureau, district health office and Health facilities

- Policy makers, planners, and health service managers should improve inputs (including budget), capacity of health workers and process-related components.

- The PMT structure and availability of relevant guidelines should be strengthened.

- PMT members should be selected carefully and trained to avoid turnover and enhance their engagement

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# Ensuring Sustainability of Health Information System (HIS) interventions and changes in Health Care facilities of CBMP targeted Woredas in Southern Ethiopia

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## Background

A strong Health Information System (HIS) is critical for strategic information use and evidence-based decision making in service quality improvement, program management, and policy formulation. The Ethiopian Ministry of Health (MOH) has prioritized Information Revolution (IR) in its Health Sector Transformation Plan (HSTP) to strengthen the national HIS. In order to realize the IR agenda, the MOH launched an Academic- Government partnership program known as the Capacity Building and Mentorship Program (CBMP) in collaboration with the six local universities and regional health bureaus. Many donors are also supporting the goal of the MOH to transform data use culture in the country and improve HIS.

Although the sustainability of improvements/ changes from health system interventions is becoming an increasingly important need for policy makers, donors, and researchers, it remains a struggle to achieve. Thus, this implementation research aims to develop strategies to ensure the sustainability of HIS evidence based interventions in Health Care facilities of CBMP targeted Woredas.

## Methods

For the quantitative assessment, we analyzed data from four Woredas/districts (Shabedino, Wonago, Cheha and Sankura) having a total of 29 public health care institutions (4 Woreda health Offices (WoHo), 21 Health centers and 4 Hospitals) in Sidama and SNNPR regions of southern Ethiopia in which the CBMP is operating. Only two woredas (Wonago and Cheha) with lower IR (an assessment made using MOH's standard tool), and sustainability score were selected for intervention. A sample of 233 performance monitoring team members and other health staff were included. We employed a sustainability measure framework adapted from different literatures, organized around 7 domains to examine the level of sustainability of the observed changes in HIS. This means the framework guides us the potential areas of interventions for improving the sustainability of our intervention. These domains are: Staff related, Organizational, Leadership, Infrastructure, Partnership and funding stability, Effectiveness, of the system to monitor the change, Benefit, credibility, and adaptability

Qualitative data was collected from 44 Key Informant Interviews (KII) and three Focus Group Discussions (FGDs). We used a consolidated Framework for Implementation research (CFIR) to identify barriers and facilitators for the sustainability of change. CFIR domains; the outer settings, the inner settings, characteristics of individuals, and the processes were used to guide data collection and analysis. The data has been analyzed using ATLASti. Version 17. Interviews were transcribed in the interviewee's native language and then translated into English for analysis.

Based on the generated results, evidence based intervention that predominantly addressed the barriers, was done. Moreover, we utilized the dynamic sustainability framework (DSF) to help us investigate the sustainability of our implemented interventions for an ongoing change to the interventions in the targeted facilities/settings.

**Findings**

Figure 1 shows sustainability status of the observed changes using the seven domains. Accordingly, out of the maximum score of 4, the total domain average in the woredas was 2.75. Except the score of benefit, credibility and adaptability of the change (3.04) the overall domain factors average was below 3.

The first sustainability domain with least score in the woredas was infrastructure (2.15). This domain included availability or inadequacy of HMIS rooms, supply of materials/equipment like computers, printers, and shelves, availability of internet connection, health net and LAN. In addition, other supplies like standard registries, tally sheets, paper and inks, to support and sustain the interventions made were all mentioned in this domain (Fig 1).

The second domain with the least score was having partnership and funding stability (2.48). The major items analyzed under this domain included; having strong collaboration with other governmental and non-governmental organizations, Facility's ability to secure funds from multiple sources particularly from within with HIS specific budget line item.

The 3rd domain with low sustainability score was organizational factors (2.75). The major areas analyzed and found under this domain are; Organization's culture of resistance to HIS change, having a system in place to sustain the change, existence of policies, procedures and guidelines that are appropriate and available for sustaining the improvement, whether the Health care facility has demonstrated successful sustainability improvements before and has a "can do" culture.

The 4th domain with low sustainability score was leadership and management (2.92). Specific areas included in this finding were; visible involvement of heads and HMIS focals in their support for the change process, and whether the observed change has leadership support from outside of the facility, whether the leaders use their influencing power to communicate the effect of the HIS change and seek solutions to barriers, and whether the leaders regularly share information on the observed change and actively seek advice from staffs to make sure that the change is participatory .

Effectiveness of the system's experience to monitor the interventions using standard checklist to sustain the change, was the 5th domain with low sustainability score 2.93. In this domain; having a strong experience of using standard IR checklists regularly to keep the change on track, and facility's experience of providing strong evidence to the stakeholders and the entire public about the change and its sustainability regularly were the identified areas for action.

The 6th domain with low sustainability score was Staff factors (2.95). This domain included adequate training of staff to sustain the change, whether the staff believe the improvements, feel empowered as part of the change process and whether their input is taken into account. In addition, having appropriate staff commitment, confidence, motivation and competence to maintain the HIS change directly, feeling of ownership/personal to sustain the observed changes are the identified areas for action.

On the other hand, the benefit, credibility and adaptability of the change was scored relatively better than the rest domains (3.04) though there remains a room for action even in this domain. Areas that are included in this domain includes; benefits of the change on data quality and information use, and the adaptability of the change to other health care facilities.
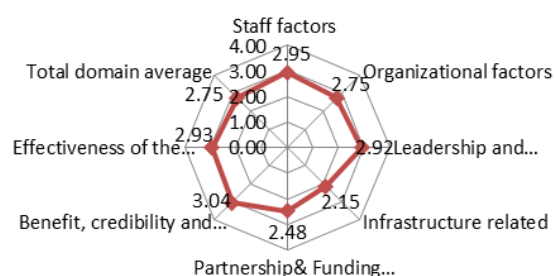


Fig 1. Specific and total average score of Sustainability of HIS change domains

Figure 2, informs trends in the change of health information system using the IR assessment tool. Accordingly, percentage change in HIS from the baseline (2018) was unstable for three consecutive data points. The IR score of baseline, 4th quarter/ 2020 and 3rd quarter/65.5 (short before the implementation), was 45.8%, 73.16%, and 65.5% respectively.



Fig.2 Total IR assessment Score, Cheha and Wonago woreda
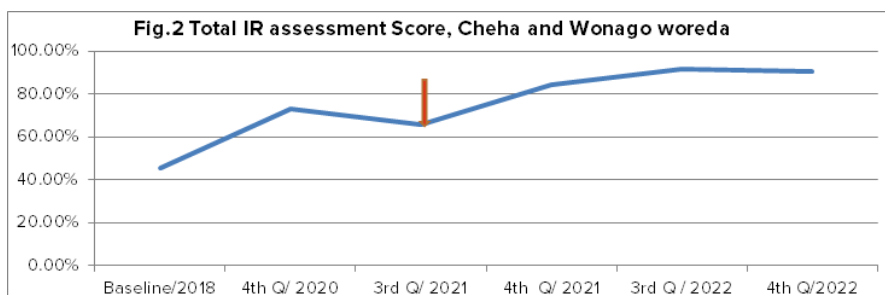
## Qualitative findings

A total of 44 Key informant interviews and 3 Focus Group Discussions were conducted from WoHo heads, HMIS focal and health centers. Following the CFIR framework, barriers and facilitators for sustainability were identified and described in Table 1.

## Interventions and post intervention results

Based on the evidence from the findings we employed an adapted DSF to help us identify **interventions** that fits to the **context** of the targeted facilities setting and the **broader system**/ecological within which practice setting operates. The **intervention** included staff training on HMIS, leadership training on HIS transformation, integrated training on change management and strengthening of monitoring and evaluation through integrated mentorship and supervision that consider sustainability into account. The facilities and WoHO's, the context in which these interventions take place included MRU structure improvement, improving facilities budget allocation and its utilization, strengthening collaborative work of the facilities with stakeholders. The broader system/ecological we considered emphasizing on MOH's HIS policy and strategy/ particularly the HSP, review meetings with regional, zonal and WoHO officials and conducting phase 2

research finding dissemination, strengthen their monitoring and evaluation of the HIS change, verifying the facilities as a model woreda based on MOH standard. Besides we set continuous communication with the facility and WoHO heads to identify specific budgets for HIS using formal letters. These intervention modalities were developed and implemented on an ongoing process and by making continuous improvements/changes to the identified interventions themselves. After 3-6 months of the intervention, the end line assessment was conducted.

Accordingly, during the first quarter of 2021, the overall IR assessment score in the woredas (Wonago and Cheha) was 65.51%, but in the final two consecutive quarter of the implementation phase (third and fourth quarter/ 2022), the change had grown to 91.41 and 90.52 respectively, indicating a sustained change (Fig. 2).

**Table 1:** Barriers and Facilitators for Sustainability, findings from qualitative Study using CFIR framework

| | Outer setting | Inner setting | Characteristics of individuals | Characteristics of process |
|---|---|---|---|---|
| **Facilitators** | • **Having supportive National Health policy**<br><br>*"…It is due to the Government led transformation agenda in the area of Data quality and use. Then the supportive supervision provided and attention given has contributed a lot".* Quality focal person from hospital. | **Structure of the facilities**<br><br>• Having good infrastructure for sustaining the change in HIS. these are<br><br>  • Organization of the health facility<br><br>  • Location and accessibility of transportation to health facilities:<br><br>  • Budget allocation and<br><br>  • Having HIS tools | • **Having staffs who can carry out the activities**<br><br>• **Provision of training Mentorship**<br><br>*" What we consider as big opportunity is that we have adequate trained staff starting from health office"* | **Presence of regular performance evaluation:**<br><br>• *"Every member of management is gathering in the presence of the HC head and discussing the reports from each department. They check everything and provide solutions in zsuch a way…" "HC Head"* |
| | **External support**<br><br>Majority of the key informant responded that the support of Hawassa University specially CBMP Project has a significant role in sustaining the change | | **Commitment and Being responsible for HIS**<br><br>*"…. It is not repetition of meetings that could bring a change. As long as there is commitment, it is enough to sustain a change".* Male CEO | |
| **Barriers** | Educational curriculum content<br><br>• As one of the key informants said *"All health professions would have been thought of HIS".* Male, HIT professional | Structure of the facility<br><br>• Lack of standard MRU, functionality of eMCS , Shortage of allocated budget,<br><br>• Lack of computer and printer; Shortage of power supply and network<br><br>Leadership commitment<br><br>• Lack of strong follow up at case team level and improper management of PMT for sustaining the change.<br><br>  *"There is a PMT, but it is not regular. There is a gap from the health center director: they didn't pressure members to attend the meeting…'* HMIS focal,<br><br>Working culture<br><br>• overload with other activities and thinking the HIS as an additional work, staff rotation without considering in to account their exposures to HIS | • Staff readiness and responsibility<br><br>• Staff dissatisfaction with the job<br><br>  o As majority of the respondents explained; HIT professionals are not satisfied with their job<br><br>• Lack of strong sense of ownership<br><br>*"……. some professionals didn't consider data related tasks as their own job description."*<br><br>Hospital quality officer*"* | Monitoring and evaluation system<br><br>• Lack of continuous monitoring and evaluation support is *"lack of effective supportive supervision is a barrier for sustaining the change".*<br><br>  HF head |

**Key lessons**

Sustainability of interventions has to be prioritized in line with any changes/improvements. Like any other program interventions, it is possible to measure the level of sustainability of changes and fill the identified gaps.

**Challenges and Solutions**

One of the major identified challenges was low infrastructure that incurred unexpected costs to provide for the intervention facilities, particularly, computer, printer and related supplies. The estimated cost for the materials during the proposal and implementation was very different due to market inflation and we were unable to supply the items though these are the highest needed domain to sustain the change. As a result, we focused on the remaining infrastructure related problems that can be solved by participation of WoHo and the facilities themselves, for example MRU shelves and having separate HMIS rooms.

The other challenge was inability to secure reasonable funds for HIS activities at facility level. We set communication with each facility and WoHO during our mentorship to identify the budget needed for HIS and put an evidence letter for confirmation. Though an official letter showing the allocated budget has been documented in most facilities, we are not sure of the extent to which it has been executed.

The third major challenge was staff turnover. This became visible especially when the facility heads were changed. We tried to orient when such an event occurred to minimize the risk. Another challenge was inability to implement the DSF because the nature of the framework demands continuous change over time, thus time limitation in line with research projects was a challenge. However, we employed partial DSF and are still trying to continue working after the project's lifetime. The current change might have also had other attributes that demand further analysis for the future, however, the current finding has laid the groundwork.

**Policy Implications**

This brief report highlights the necessity of focusing on sustaining changes, different from classical considerations of intervention for change only. The study identified priority areas/domains where the managers, planners and program coordinators can consider in evaluating sustainability status and implementing strategies. Measuring sustainability of evidence based interventions is the best practice identified from this research work.

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Gambella Health Bureau

# The role of Tailored Interventions in Improving Data Quality in Rural Districts of Oromia and Gambella Regions, Ethiopia: Findings from an Implementation Research

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## Background

Data quality is defined as the degree to which the data fulfills any intended purpose. Though access to accurate, complete, and timely data is critical in health-care systems; most healthcare facilities are suffering with poor data quality in Ethiopia.

## Objective

This implementation research (IR) aimed to examine whether the data quality improving interventions will contribute to changes in data quality at facilities in Digaluna-Tijo of Oromia region and Godere district of Gambella region, Ethiopia.

## Methods

### Study Areas

The study was conducted in Digaluna-Tijo district (from Oromia region) and Godere district (from Gambella region). The study areas were selected as part of implementation research to improve health data quality. Digaluna-Tijo district is located 200 km (southeast) of Addis Ababa, (the country capital). The district has 5 Health centers (HCs), one Hospital and 25 Health posts (HPs). The Godere district is located 628 km southwest of Addis Ababa and 205 km from Gambella town, (the region's capital). Godere district has 2 HCs, one hospital and 14 HPs.

## Study Design and Measurements

To carry out the implementation research, a research team conducted baseline assessment, intervention and end line assessment. Baseline data were collected from March 19 – 27, 2021 and end-line data were collected from July 6 – 20, 2022.

Interventions were tailored to the context and implemented for six months. We used the Consolidated Framework for Implementation Research (CFIR) and the Reach, Effectiveness, Adoption, Implementation and Maintenance (RE-AIM) models to assess implementation status and outcome of the interventions. PRISM tool was used to assess indicators and variables for this implementation research.

Availability of required recording and reporting tools were assessed. Data quality was measured within four major dimensions such as data accuracy; timeliness, completeness and consistency. Frequency, proportion, and mean scores were used to compare the findings. When appropriate, independent t-test was conducted to compare means for continuous data.

KIIs were conducted to supplement the quantitative findings and the qualitative data was analyzed thematically. The Theory of Change (ToC) for this IR is summarized in Figure 1 below.
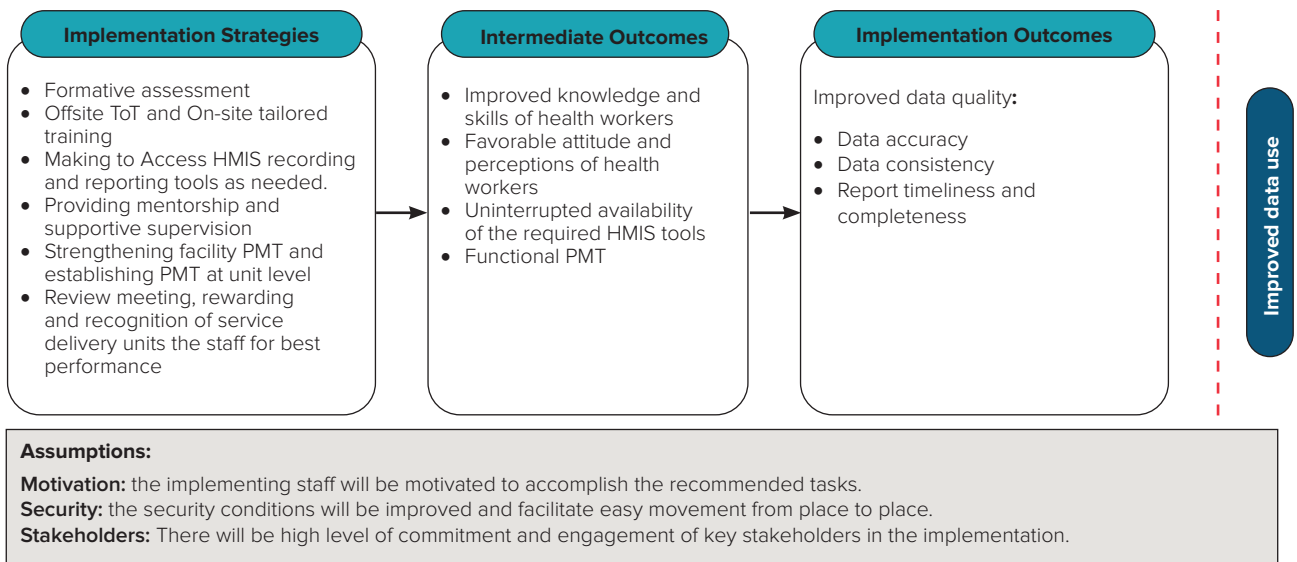
**Figure 1:** Theory of Change (ToC)

## Implementation strategies

The implementation strategies were arranged in two phases: (i) Phase one – Development of standard operating procedure (SOP), preparation of detailed action plan to tailor interventions based on the major gaps identified during the pre-intervention assessment; (ii) Phase two – Implementation of tailored interventions, which focused on building the capacity of selected internal mentors and health workers in the district to proactively request for HMIS tools, apply data quality assurance techniques, and identify best practices for sharing and recognition of best performers. These were conducted through need-based and practical off-site and on-site trainings, regular mentorship and supportive supervision (Figure 2).



**Figure 2:** Summary of implementation strategies to improve data quality

## Major Findings
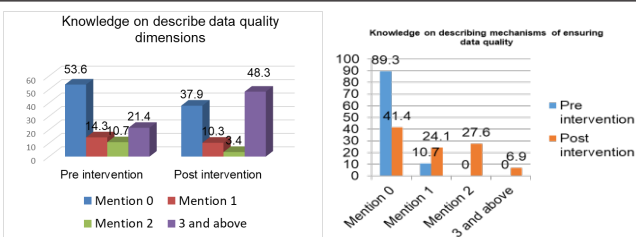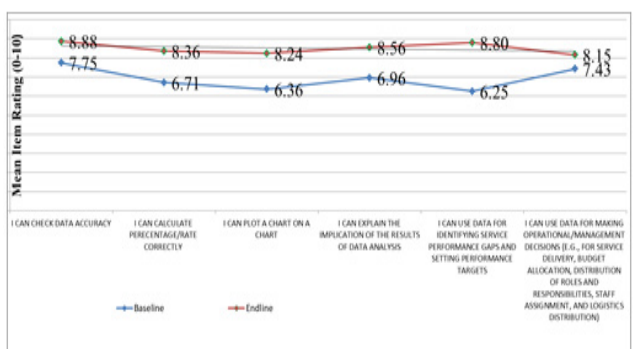
Table 1 and 2 details the coverage of the intervention's coverage, which includes training, mentorship, supportive supervision and review meetings; the effect of these strategies on health workers' knowledge and perception on data quality dimensions and quality assurance mechanisms; and data quality parameters such as data accuracy; timeliness, completeness and consistency in Digaluna-Tijo and Godere districts respectively.

**Table I:** Digaluna-Tijo District, Arsi Zone, Oromia region

| Digaluna-Tijo District, Arsi Zone, Oromia region | | |
|---|---|---|
| **Intervention coverage** | **Effect on health workers (intermediate Outcome)** | **Implementation Outcome** |
| **Training**<br><br>• Eight health workers (internal mentors) had received ToT on data quality from each health facility<br>• Over all HMIS and data quality training status of health care providers in Digaluna-Tijo improved from 26% to 83.7% at health facility level<br>• The training status of HEWs on CHIS/eCHIS data recording, folder maintenance and reporting, and data quality topics has improved from 68% to 79.6% after the intervention.<br><br>     **Mentorship**<br>• None of the health facilities received monthly mentorship during pre-intervention period and this has improved to 39.7% in the post-intervention period.<br><br>**Supportive Supervision**<br><br>• Coverage of SS to health facilities increased from 28% at baseline to 89% in the end-line<br>• Except for one, all health posts received SS during post-intervention period, out of which 60% had received written feedback from the supervisory body. This was zero at baseline.<br><br>**Review Meeting**<br><br>• Only HCs conducted quarterly review meeting during pre-intervention period. However, during the post-intervention period, all health centers and the hospital conducted quarterly review meetings – twice within six months (100%).<br>• All HPs participated in the quarterly review meetings prepared by the cluster health centers and WoHO which was 90% before the intervention. | <br><br>• There were significant changes on health workers' knowledge of data quality dimensions ($X^2$=8.67; P=0.003) and the mechanisms to assure data quality ($X^2$=30.6; P<0.0001)<br><br>• Though there was a positive mean difference in HWs perception of information use culture (MD=1.8), the change was not statistically significant (P=0.166)<br>• Self-efficacy (confidence) of HWs to perform RHIS tasks has increased by 9.2 after the intervention (P=0.001)<br>• The proportion of HWs who were competent to calculate percentage for a given indicator increased from 33.3% at baseline to 64.3% in the end-line | • Overall register completeness increased by 32.1% after the intervention (from 54% to 87%)<br>• Overall report timeliness of health facilities increased from 50% at baseline to 87% in the end-line (difference=35.7%)<br>• The mean data accuracy level (Verification factor score) improved from 0.64 at the start of the study to 0.84 in the end-line, with no statistically significant changes (p=0.06)<br>• Among the selected indicators during both period one indicator at pre-intervention (pent3) and at post intervention (ANC) have moderate outliers, when observed over a period of one year |

**Table 2:** Findings from Godere district, Gambella region

| Godere district, Gambella region | | |
|---|---|---|
| **Intervention coverage** | **Effect on health workers (intermediate Outcome)** | **Implementation Outcome** |
| **Training**<br><br>Over all HMIS and data quality training status of health care providers improved from 44.5% to 64.8% at health facility level and from 25.0% to 65.0% for woreda health office experts<br><br>• Training status of health extension workers (HEWs) on CHIS data recording, folder maintenance and reporting topic improved from 19.4% to 75.0% and on data quality topic from 22.2% to 77.8% after intervention<br><br>**Mentorship, Supportive Supervision and Review meeting**<br><br>• Two third of planned mentorship and supportive supervision at health facility and woreda health office was achieved and all planned review meetings were achieved | <br><br>• The mean knowledge score of health workers on HMIS remained the same from mean (±SD), 0.73 (0.07) to 0.73 (0.08)<br>• Perception of health workers on decision-making practice improved from mean (±SD), 3.44(0.66) to 3.83 (0.41), mean difference (MD) = 0.39, PV = 0.037 which is statistically significant<br>• Perception of health workers about characteristics of supervisors improved from mean (±SD), 3.52 (0.96) to 4.15 (0.50), MD = 0.63, PV = 0.006 which is statistically significant<br>• Perception of health workers about HMIS task performance by staff improved from mean (±SD), 3.85 (0.54) to 4.11 (0.70), MD = 0.25, PV = 0.171 but not statistically significant<br>• Personal feelings of health workers about data quality and data use improved from mean (±SD), 3.67 (0.60) to 3.89 (0.47), MD = 0.22, PV= 0.200 but not statistically significant<br><br><br><br>Analysis skill of health workers improved from 53.3% to 75% in calculating ANC coverage, while interpretation skill improved from 10.7% to 60.7% | • Overall data accuracy at Hospital for aggregated indicators improved from 93% at baseline to 101% after interventions<br>• Overall data accuracy at health centers for aggregated indicators improved from 86% at baseline to 95% after interventions<br>• Overall data accuracy at health post level decreased from 98% at baseline to 86% after interventions<br>• 100% report completeness (Pre & post intervention) in all HFs<br>• The overall register content completeness improved from 91.8% before the intervention at all three facilities to 92.6%<br>• The overall health facilities report timeliness improved from 80.9% to 89.3%<br>• Moderate outlier was observed in three selected indicators in pre-intervention, while in two selected indicators in post-intervention period. |

## Conclusion

There were improvements in the knowledge and perception of health workers on data quality, and the completeness, timeliness, and accuracy of health data after the implementation of interventions, particularly at the health centers in Digaluna-Tijo (Oromia region) and Godere districts (Gambella region).

## Challenges

- High workload and staff turn-over

## Recommendations

- Use of agreed criteria in selection of internal mentors which was embedded in the standard operating procedure helped to have accountable internal mentors who could sustain the interventions at their facilities, and thus could be considered in other similar settings.
- Regular supportive supervision and mentorship from Woreda health office, and internal mentors from facilities are recommended to be followed to bring data quality improvement
- Recognition of best performing health workers and facilities (including health posts) is promising to sustain and diffuse the observed changes which could be cascaded using limited resources but found to have high contribution in improving data quality, hence recommended to consider it in future health data quality improvement related activities.

## Promising Practices

- Existence of internal mentors helps to have up-to-date information and support (when needed) in a timely manner and thus be knowledgeable to assure data quality
- Regular mentorship and support from internal mentors helps to have a functional PMT which is a guard for quality data and information use at the health facilities
- Embedded research with in the health system contributed to building capacity of members at RHB and district level on conducting research

## Best Practices

- Availing functional PMT at all levels
- Celebrating data/HMIS day to motivate health workers on data quality
- Organizing experience sharing platforms among health facilities and recognition

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# Effectiveness of Key eCHIS Implementation Strategies in Improving Service Provision and Data Quality: A Hybrid Study

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## Background

Implementing an electronic community health information system (eCHIS) is a high-priority initiative of the Ethiopian Ministry of Health (MoH) that demonstrates its commitment to use technology and data to improve community-level provision of health promotion and preventive, basic, and curative health services.

Despite the priority given to eCHIS, after two years of implementation, health extension workers (HEWs) have yet to benefit from the system, household profiling is incomplete, and service provision through CHIS is limited. Moreover, there is a lack of consistency in implementation approaches across the regions. The success of evidence-based interventions, including eCHIS, are determined by a wide range of pragmatic factors that require thorough assessment and tailored strategic interventions. However, to date, there is sparse evidence on the determinants that influence eCHIS implementation and their implications for policy and practice in the country.

## Objectives

**General** - to evaluate the effectiveness of eCHIS implementation strategies in improving service provision and data quality

## Specific objectives

- Assess eCHIS implementation barriers and facilitators
- Implement eCHIS using key implementation strategies
- Evaluate effectiveness of eCHIS & implementation strategies
- Document lessons learned with regard to implementation challenges

## Methods

**Study Design:** A hybrid study design (evaluating the effectiveness of both intervention and strategies) was applied in a Phase-based and iterative approach. We applied mixed methods (qualitative & quantitative). The quantitative part was done 4 times in health posts - baseline and after 3 rounds of mentorship. The qualitative part assessed barriers & facilitators using the consolidated framework for implementation research (CIFIR).
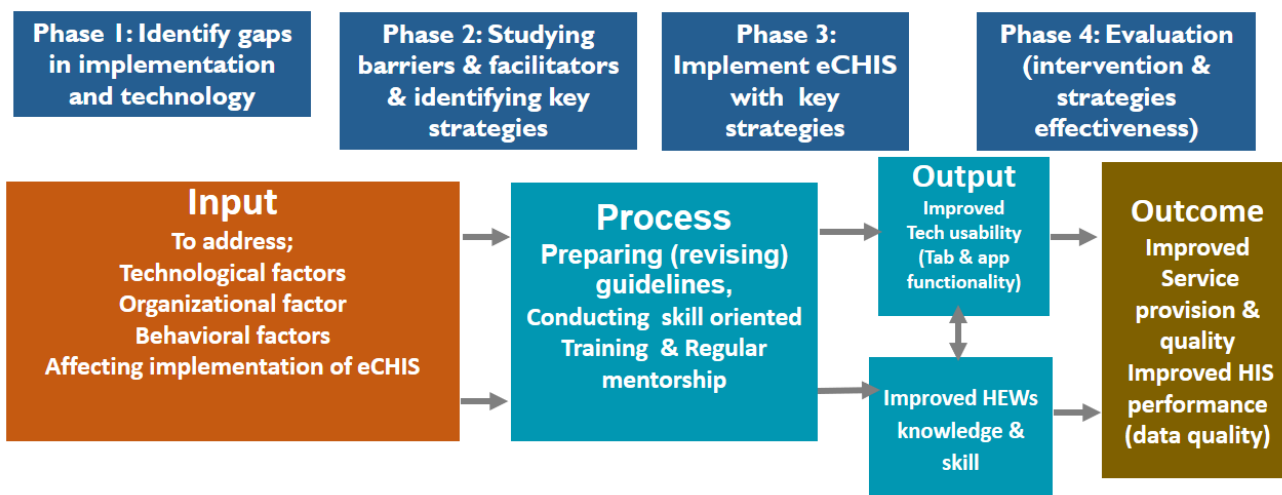
## Study Area & Setting

Two woredas from Amhara (Dangla zuria) and Oromia regions (Welmera) and 7 health posts from each were the study sites.

## Study period

The study was from January, 2021- December, 2022.

## Target population

All HEWs in the selected health posts are the target populations. Almost all have their own tablet

**Assumption:** Addressing skill and knowledge gaps as well as mentoring HEWs are key strategies for eCHIS technology usability and improve service provision and data quality.

**Fig.1:** Study and implementation framework

**Table1:** Key implementation strategies

| Skill oriented training | Quality | Reach |
|---|---|---|
| | Adjusted training days, | • All HEWs, |
| | • Assisted by public health professionals, | • HC (HEP Focal persons, MCH, HIT, & HC head trained), |
| | • Added practical scenarios to the training | • Woreda (HEP Focal, Head, MCH, Plan head, HIT) |
| | • Good quality internet connection for training | • Resolving application and user configuration issues immediately after training. |
| | • Pre and Post test | • Tablet (Android) Troubleshooting training |
| | • Cascade approach - Woreda Provide ToT to HC and HC cascade the training to HEWs | • Tablet (Smart phone) management training. |
| Mentorship | Regular mentorship (monthly for 3 months) | Areas of mentorship: |
| | • Mentorship guide prepared | • Manual CHIS, eCHIS tablet use |
| | • Used Local mentors from Health center | • eCHIS app use |
| | • Aim is to consolidate skills of HEWs in HH profiling and service delivery. | • HH profiling and service provision using eCHIS |
| | | • eCHIS data quality assurance & data use |
| | | In average about 75% of the mentorship checklists are applied by mentors |

## Data collection

Checklist adapted from Community Performance of Routine Information System Management (PRISM) assessment tools was applied for the four rounds of quantitative data collection (baseline and after the 3 mentorship visits). Qualitative data collection guide was also prepared to identify determinants using CIFIR. Both document review and 32 key informants from Health post (HEWs) to MOH level were interviewed. The five dimensions of CIFIR including intervention characteristics, outer setting, inner setting, characteristics of individuals, and process were assessed.

After preparation of the tools, five days training and pretest of programed questionnaires using tabs (with SurveyCTO apps) was provided.

## Analysis

It was done based on the changes in output and outcome indicators to evaluate effectiveness of the intervention as well as the implementation strategies. In all statistical tests, 0.05 level of significance is taken to accept/reject null hypothesis

## Ethics

Ethical clearance was obtained from EMWA IRB. In addition, support letters were received from MOH & RHBs. All the required ethical procedures were maintained (consent, confidentiality etc.)

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### Key findings and implications from the qualitative study

- Organizational structures such as technical working groups (TWGs) at all levels and an eCHIS Center of Excellence have the potential to improve and institutionalize eCHIS implementation in the country.
- Strengthening the support forum and regularity and functionality of TWG meetings at all levels is essential.
- Lack of clear eCHIS specific governing documents, such as comprehensive implementation guide lines and a roadmap, training facilitators guide, end user guide, tablet management guidelines, and incentive strategies, negatively impacted implementation.
- As a result of poor documentation and monitoring mechanisms, lack of regular meetings and formal activity reporting mechanisms, insufficient supervision, marginal mentorship, and absence of a functional feedback loop, eCHIS goals were not usually acted upon, activities were not sufficiently followed up, and progress were not checked against feedback.
- Insufficient resources and infrastructure to fully support eCHIS are major challenges that require further resource mobilization in the future.
- Strengthened and collaborative effort with all key stakeholders and active engagement of leaders are critical to improve eCHIS implementation.
- Based on the findings of this study, our team of experts outlined policy insights to guide optimization of eCHIS in Ethiopia.

## Tablet and application functionality scores

The change in the composite scores of function indicates significant improvement when we compare the before and after intervention.
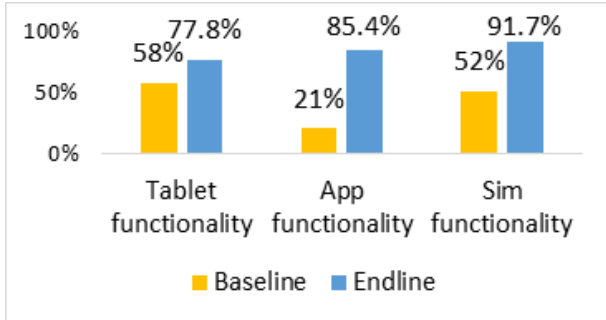


## eCHIS Software Usability (5 composite score indicators)

HEWs skill on App initialization, managing digital family folder, RMNCH module, referral & communication is significantly improved (reached 100%). In addition, eCHIS app usage is improved but didn't show change after second mentorship.
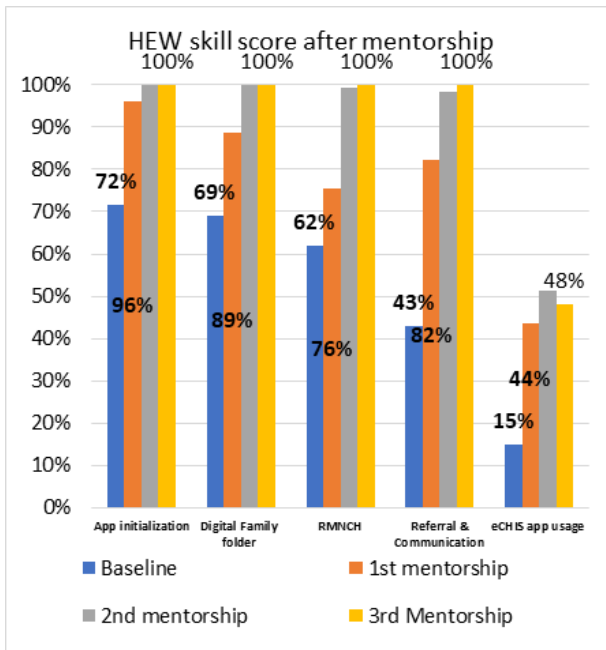


## Service Provision and quality

The five indicators of HEW's service provision and service quality showed significant improvements after the mentorship intervention (p<0.000).
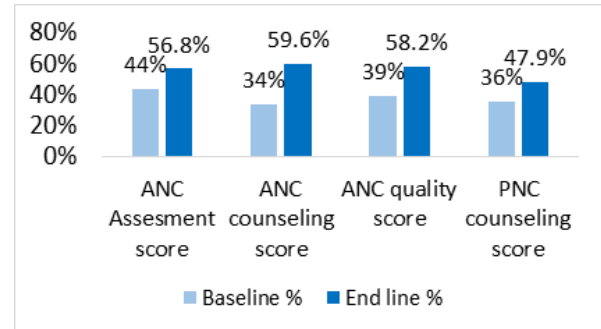


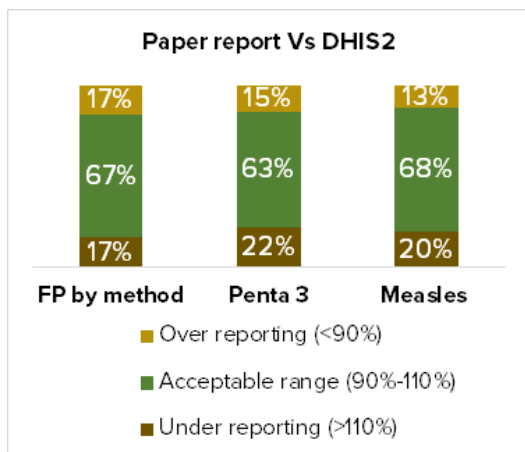## Data quality: Completeness of data elements

Completeness of data elements was measured using seven indicators (HH registration, member registration, HH properties, HEP package, ANC, PNC, and FP).

- At baseline: assessed for reporting month of Ginbot (May) 2021

- At end line: assessed for the three reporting months of Meskerem, Tikimt & Hidar, (Sept, Oct & Nov, 2022)
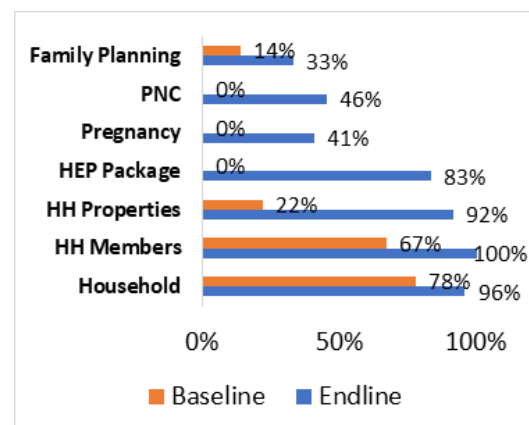
## Data quality: Reporting accuracy

The Numerical consistency between paper CHIS report and DHIS2 was assessed by three indicators (FP, Penta 3 and Measles) for the reporting months of Meskerem , Tikmt & Hidar, 2015 EC. The result indicated that both over and under reporting are major problems.

**Paper report Vs DHIS2**

| | FP by method | Penta 3 | Measles |
|---|---|---|---|
| Over reporting (<90%) | 17% | 15% | 13% |
| Acceptable range (90%-110%) | 67% | 63% | 68% |
| Under reporting (>110%) | 17% | 22% | 20% |

- Over reporting (<90%)
- Acceptable range (90%-110%)
- Under reporting (>110%)

## Lag time between form completion to submission to eCHIS server

The average lag time, for all forms, between form completion on the HEWs tablet to submission to eCHIS server has improved significantly. The reduction in lag time ensures on time data reporting as well as timely referral communication to health centers. eCHIS has a relative advantage over paper-based CHIS due to its quick communication and client referral to the higher level among other things like reducing workload, facilitating standardized service, and promoting data quality.

Baseline, 11.5
Endline, 4.1
Maximum tolerable lag, 0.5 days

0 5 10 15
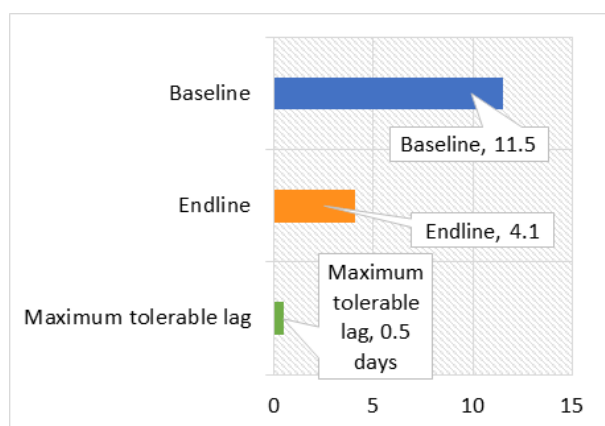
## Conclusions & key lessons

- Skill oriented training and regular mentorship (at least 75% of check lists applied) are key strategies to have 100% achievement in most HEWs skill and knowledge indicators related to eCHIS usability

- Regular mentorship is also a useful strategy in improving service provision and data quality particularly on source document completeness

- Both over and under reporting are the major issues which requires further investigation

- So far eCHIS does not include data from field book which needs further follow up

- Using eCHIS is an advantage to reduce lag time which ensures on time data reporting as well as timely referral communication to higher level

- Identified implementation barriers/ challenges requires immediate interventions

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# Building a Learning Health System

# Through Implementation Research