



Evaluation of Health Management Information System Data  
Quality in Selected Public Health Facilities of Four Zones of  
Oromia Region, Ethiopia

Evaluation Report Submitted to Jimma University, Institute of Health,  
Public Health Faculty, Department of Health Economics, Management  
and Policy, Health Monitoring and Evaluation Post Graduate Training  
Coordination Unit for Partial Fulfillment of the Degree of Masters of  
science in Health Monitoring and Evaluation

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June, 2017  
Jimma, Ethiopia

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## Abstract

**Background:** Health management information system is the primary source of information for continuous monitoring of the health service. As it uses routine facility-based collection of data on health it has the potential to show more current information about the health situation of the population. But existing evidence suggests that there is variable and often poor quality of this data in developing countries. In Ethiopia, Information quality and use remain weak within the health sector, particularly at the peripheral levels of woreda and facility.

**Objective:** To assess health management information system data quality and factors that determines quality of data in public health facilities of Oromia.

**Methods:** Facility-based cross sectional study was conducted on 53 health and health administrative facilities which are selected purposefully. Data quality assessed using completeness, timeliness and accuracy dimensions. Seven indicators selected purposefully to assess data accuracy, and monthly reports used to assess completeness and timeliness of reports. Data was collected by two MSc students and four MPH holders with supervision after tools pretested. Two day training was given for the data collectors and supervisors. Finally the data was analyzed using SPSS version 20 through descriptive statistics and binary logistic regression used to determine the factors associated with accuracy.

**Result:** The overall data quality based on the evaluation judgment matrix was 81%. In average data accuracy was 57.2% which is lower than the national target for data accuracy. From indicators low accuracy was observed on Family planning (35.6%), Antenatal care four visit (40.4%) and growth monitoring (39.8%). Over reporting was higher (32.2%) than under reporting (10.6%) in all facilities. From facilities low level of data accuracy observed at HP (40.3%). Completeness and Report timeliness were 94.9% and 85% respectively and this attains the national target for completeness and timeliness. Using M&E database (AOR=2.2, 95% CI [1.4, 3.5]) has shown a positive relationship with data accuracy. Level of priority of indicators (AOR=0.5, 95% CI [0.4, 0.9]) and supportive supervision (AOR=0.6, 95% CI [0.4, 0.9]) observed to be negatively associated with data accuracy.

**Conclusion and recommendation:** This study found that the overall data accuracy was lower than the minimum amount required for data accuracy. Completeness dimension of data quality are more than adequate at all level of the facilities and timeliness dimension attains the target for report timeliness. Recommendation based on the finding includes: standard registers should be distributed for health posts, procedure manual and M&E database should also be distributed for those who are not using, for researchers further investigate the negative relationship between accuracy and supportive supervision.

**Key words:** data quality, data accuracy, content completeness, report completeness, report timeliness

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## **Acronyms**

ANC	Antenatal Care
CSA	Central Statistics Agency
eHMIS	electronic Health Management Information System
EFY	Ethiopian Fiscal Year
FP	Family Planning
HMIS	Health Management Information System
HIS	Health Information System
HSDP	Health Sector Development Plan
HSTP	Health Sector Transformation Plan
HI	Health Informatics
ICT	Information Communication Technology
ISS	Integrated Supportive Supervision
LQAS	Lot Quality Assurance Sampling
M&E	Monitoring and Evaluation
PMT	Performance Monitoring Team
MOH	Ministry of Health
PRT	Performance Review Team
PRISM	Performance of Routine Information System Management
SNNPR	Southern Nation Nationalities and Peoples' Region
SPM	Strategic Planning and Management
SBA	Skilled Birth Attendance
SS	Supportive Supervision
VF	Verification Factor
WHO	World Health Organization

## **Operational definitions**

**Data verification:** is a quantitative comparison of the data source to reported data

**Evaluation judgment matrix:** a matrix that shows the list of indicators to be evaluated, the criteria for giving judgment and actual scores of each indicator depending on the finding of the evaluation

**Data item:** –an HMIS indicator that is selected to assess the data accuracy

**Data element:** - all necessary information that are to be filled in each cells of the HMIS data base or report form

**Accuracy:** - The data reflect consistency between what is in the source document and what is in databases/reporting forms. It was measured by calculating number from source document over the number from report submitted to the next level. Based on 10% tolerance for data accuracy classified as:

- Over reporting (<0.90 or 90%),
- Acceptable limit (0.90-1.10 or 90%-110%)
- Under reporting (>1.10 or 110%).

**Content completeness:** - That all the data elements in a database or report form are filled or data are complete. It was measured by the number of cells of report form or database which are left blank without indicating “zero”. If greater than or equal to 90% of cells of the report filled considered as complete.

**Report Completeness:** - The health administrative unit has reports from all the health facilities and/or lower level health administrative units within its administrative boundary. It was measured by the number of reports received over the number of reports expected. 90% or greater facility reporting are considered as complete.

**Report timeliness:** Timeliness reflects that data is collected, transmitted and processed according to the time table and available for making timely decisions. It was measured by the number of reports came up to deadline over the number of reports expected to come.

**Self-efficacy or confidence level:** of the health workers to perform a specific activity related to HMIS was measured in a scale of 0-100 that means from no confidence (zero) to full confidence (100) to perform HMIS tasks.

# **1. Introduction**

## **1.1 Background**

Health management information system (HMIS) is a process through which health data are recorded, stored, retrieved and processed for decision-making. It is specifically designed to help in management and planning of health programs. It also assists to improve the management and optimum use of resources and to make timely decisions to resolve problems of implementation (1, 2).

The routine HMIS is the primary source of information for continuous monitoring of the health service. The mission of HMIS is to support for the improvement of health service and for the improvement of population health through evidence based decision that is based on the quality of information gathered. As HMIS uses routine facility-based collection of data on health it has the potential to show more current information about the situation of the population rather than population based surveys which are conducted in longer time intervals (3, 4).

Globally, HMIS has been considered as an important tool for health reform. In most countries, HMIS serve as the primary data source for national health planning and evaluation. In developing countries the trends of diseases are severe and resources are limited, due to that HMIS data became more vital for better decision for the improvement of the health system. However, existing evidence suggests variable and often poor quality of this data. And the health systems in many developing countries lag behind the developed world in the use of HMIS. In 2009, the World Health Organization (WHO) shared a framework for assessing data quality of HMIS through checks of completeness, internal consistency and external consistency, offering countries a way to measure data quality and identify gaps (5).

Improvement of the quality of data coming from developing countries has been promoted since the 1990s by enhancing the routine HIS with the help of information technology. The development and maintenance of such systems are all the more important in the recent times of resource constraints necessitating good governance, transparency, accountability and evidence-based decision making (6).

In Ethiopia, the Federal Ministry of Health (MOH) puts utmost importance to strengthening the HIS of which the routine HMIS is an integral part. The government has adopted a “One plan, one

budget and one report” policy making HMIS as the core information system providing the essential information for health system monitoring (7).

FMOH described Health information as ‘the “foundation” for better health, as the “glue” that holds the health system together, and as the “oil” that keeps the health system running’. There is also a broad consensus that a strong HIS is an integral part of the health system, the operational boundaries of which include all resources, organizations and actors that are involved in the regulation, financing, and provision of actions whose primary intent is to protect, promote or improve health (3).

Health information (HI) is one critical area that has given a broad attention in the newly developed five year health sector transformation plan (HSTP). HI is an important part for the transformation of the health sector. Because decisions at different level relays on accurate and timely information, it is considered that there is a need for information revolution which involves advancement on the methods starting from data collection to the use of information for decision. The information revolution not only focuses on the method advancement but also on the changes of culture and attitude toward information use (8).

So in the context of information revolution, the new HMIS program focuses on information use, data quality, data burden, human resource, information communication technology (ICT) and financial resource. It is believed that to improve health system efficiency and effectiveness through the following guiding principles: standardizing, recording and reporting forms, integration, simplification, human resource development and ICT application (9).

## **1.2 Statement of the problem**

Health Information system is one of the six building blocks of a health system. A well-functioning health information system supports the delivery of health services by ensuring the production, analysis, dissemination and use of reliable and timely information on health determinants, health system performance and health status. Decision-makers at all levels of the health system need information that should be relevant, reliable and timely (7, 10).

HMIS data quality refers to the extent the collected data reflects the real situation. No data collection has 100% rating of data quality, but to meet the goal of HMIS it is critical to have the best possible representation of reality. Specifically, the goal should be to record the most

accurate, consistent and timely information in order to draw reasonable conclusions about the health condition of the population (4, 11).

There is a big concern for the improvement of the health care services delivery system, which is widely seen to be attributed to the shortcomings of HMIS in the developing countries. Despite the credible use of HMIS for evidence based decision making (strategic planning, improved patient care, efficient allocation of scarce resources and effective targeting of intervention to those in greatest need leading for better outcome), countries with the highest burden of ill health and the most acute needs for good data have the weakest HMIS in the vast majority world's poorest countries. In short, at most Health Institutions (HIs) the HMIS does not deliver its most important product – quality information that supports monitoring and performance improvement. As a result, M&E is also weak, since it lacks the foundation of an HMIS to supply reliable data (1, 12).

In Ethiopia, information quality and use remain weak within the health sector, particularly at the peripheral levels of woreda and facility, which have primary responsibility for operational management under the woreda decentralization process begun in 2002 GC. Institutional will and guidance to correct this situation are strong and clear: improve information use in internal management and improve the quality of information to support improved management and to enhance credibility in reporting to external agencies (1, 7).

As the annual report based on the RDQA finding shows , accuracy and consistency of HMIS data was low in public health facilities of Oromia region, specially at HP level. But no research done that can show the level of HMIS data quality and factors affecting data quality in the region (13).

All health data are imperfect in some way; data quality assessment should always be undertaken to understand how much confidence can be placed in the health data reported. Population-based surveys use standard methods to assess data quality and make adjustments as needed to address problems of bias or missing values. Such quality control mechanisms are rarely applied to routinely-collected administrative and health facility data. Yet these data are often the basis for annual monitoring; decision makers using them need assurance of their reliability and soundness (4).

So this study tried to assess problems related to the HMIS quality in public health facilities of Oromia. It tried to assess the implementation process in terms of weakness and strength in data quality, and assesses the contribution of different factors for the observed level data quality.

### **1.3 Significance of evaluation**

Understanding the quality of HMIS now could reap multiple benefits, including: helping decision makers to detect and control emerging and endemic health problems, monitor progress towards health goals, and promote equity; empowering individuals and communities with timely and understandable health-related information, and drive improvements in quality of services; strengthening the evidence base for effective health policies, permitting evaluation of scale-up efforts, and enabling innovation through research; improving governance, mobilizing new resources, and ensuring accountability in the way they are used (14).

The finding of the study would help to:

- Revise the design of the existing system used for HMIS, and the data collection and reporting tools according to the context of the problem or adapt other system,
- Take action on the factors affecting the quality of data and implementation of the system based on the pre-identified priority, and
- Strength the communication channel for timely delivery of data and routine reports

Moreover, the findings of the study would help to improve the quality of health care delivery in the country by investing a minimum cost to strength the system. The main beneficiaries of the result will be the public as a whole and other beneficiaries include; Health facilities, policy makers, and researchers.



## **2. Description of HMIS program in Oromia region**

### **2.1 Program stakeholders**

Stakeholders were providing the general information of the program, decided on the readiness of program for evaluation, identifies the areas of the program to be evaluated and participated in evaluation question development. Likewise, they have participated in providing the necessary information throughout the evaluation process. Finally, there is evaluation result dissemination plan to all stakeholders to communicate the findings and lessons learned will be included in the report.

Table 1: Stakeholder analysis matrix for evaluation of HMIS data quality in public health facilities of Oromia, 2017

Sr. no.	Stakeholder	Role in the program	Interest or perspective on evaluation	communication strategies	Role in the Evaluation	Level of importance H,M,L
1.	Oromia Regional Health Bureau	<ul style="list-style-type: none"> <li>• Financial support</li> <li>• Planning</li> <li>• Implementing</li> <li>• Evaluation</li> </ul>	<p>Program Continuity</p> <p>Ensuring quality of the program</p>	<ul style="list-style-type: none"> <li>• Face to face</li> <li>• Telephone</li> <li>• E-mail</li> </ul>	<ul style="list-style-type: none"> <li>• Select evaluation questions</li> <li>• Set criteria</li> <li>• Provide information</li> <li>• Use the finding</li> </ul>	High
2.	Zonal Health Departments	<ul style="list-style-type: none"> <li>• Financial support</li> <li>• Planning</li> <li>• Implementing</li> <li>• Evaluation</li> </ul>	<p>Program Continuity</p> <p>Ensuring quality of the program</p>	<ul style="list-style-type: none"> <li>• Telephone</li> <li>• E-mail</li> <li>• Face to face</li> </ul>	<ul style="list-style-type: none"> <li>• Select evaluation questions</li> <li>• Set criteria</li> <li>• Provide information</li> <li>• Use the finding</li> </ul>	High
3.	Woreda Health Offices	<ul style="list-style-type: none"> <li>• Financial support</li> <li>• Program planning</li> <li>• M&amp;E</li> </ul>	<p>Improved quality of HMIS</p>	<ul style="list-style-type: none"> <li>• Telephone</li> <li>• Face to face</li> </ul>	<ul style="list-style-type: none"> <li>• Provide information</li> <li>• Use the finding</li> </ul>	High
4.	JSI (Measure Evaluation)	<ul style="list-style-type: none"> <li>• Financial support</li> <li>• Planning</li> <li>• Implementing</li> <li>• Evaluation</li> </ul>	<p>Improved quality of HMIS</p>	<ul style="list-style-type: none"> <li>• Telephone</li> <li>• E-mail</li> </ul>	<ul style="list-style-type: none"> <li>• Select evaluation questions</li> <li>• Set criteria</li> <li>• Provide information</li> <li>• Use the finding</li> </ul>	High

Sr. no.	Stakeholder	Role in the program	Interest or perspective on evaluation	communication strategies	Role in the Evaluation	Level of importance H,M,L
5.	Health care providers (hospital, health center, health posts)	<ul style="list-style-type: none"> <li>• Program implementers</li> <li>• Monitoring the program</li> </ul>	Use the finding and recommendation of the evaluation for program improvement	<ul style="list-style-type: none"> <li>• Telephone</li> <li>• Face to face</li> </ul>	<ul style="list-style-type: none"> <li>• Provide information</li> <li>• Use the finding</li> </ul>	Medium

## **2.2 HMIS Program objectives**

**Goal:** To contribute for the improvement of health service delivery and health status of population through evidence-based decision making.

### ***General objective***

- The general objective is to support decentralized, action-oriented, evidence-based decision making in Oromia region.

### ***Specific objectives***

- To increase Percent of report completeness from 72% to 85% in June 2009 EC.
- To increase Percent of report timeliness from 84% to 85% in June 2009 EC.
- To increase Proportion of health facilities that met the data verification factor within 10% range from 71% to 75% in June 2009 EC.
- To increase Proportion of health facilities that conducted Lots quality assurance Sampling (LQAS) from 36% to 75% in June 2009 EC.
- To increase Proportion of health facilities that met minimum information use standards/criteria from 29% to 65% in June 2009 EC.
- To aid in setting performance targets at all levels of health service delivery (8).

## **2.3 Major strategies**

1. Capacity building: - through on job training, supportive supervision, TOT and mentorship
2. Standardized and integrated data collection and reporting: - By definition, the HMIS collects data for performance monitoring from service delivery and administrative records.
3. Linkage between information sources: - The HMIS relies on data collected from several sources: service delivery, finance, human resources, logistics, and capital assets.
4. Information use:- Action oriented performance monitoring: - All of the HMIS/M&E reforms are directed towards supporting and strengthening local action-oriented performance monitoring.
5. Appropriate technology: - Introduction of information and communications technology (ICT).

## **2.4 Program activities and resources**

### ***Capacity building***

- Establish staffing pattern and Appropriately train staffs
- Supportive supervision for ongoing skill improvement

### ***Standardized and integrated data collection and reporting***

- Cascade indicators for performance monitoring
- Standardize data collection tools for service delivery and administrative records
- Standardize reporting instruments and Integrate reporting channel

### ***Linkage between information sources***

- Agreement within public sectors HMIS subsystems
- Harmonization of reporting arrangements
- Agreement by all information suppliers

### ***Action oriented performance monitoring***

- Enhance good organizational cultures
- Resource allocation
- Feedback and externally assisted performance monitoring

### ***Appropriate technology***

- Establish customized HMIS software system at woreda, sub city zone, regional, and federal levels.
- Procure and install required hardware
- Train staff in basic computer literacy and in HMIS electronic system

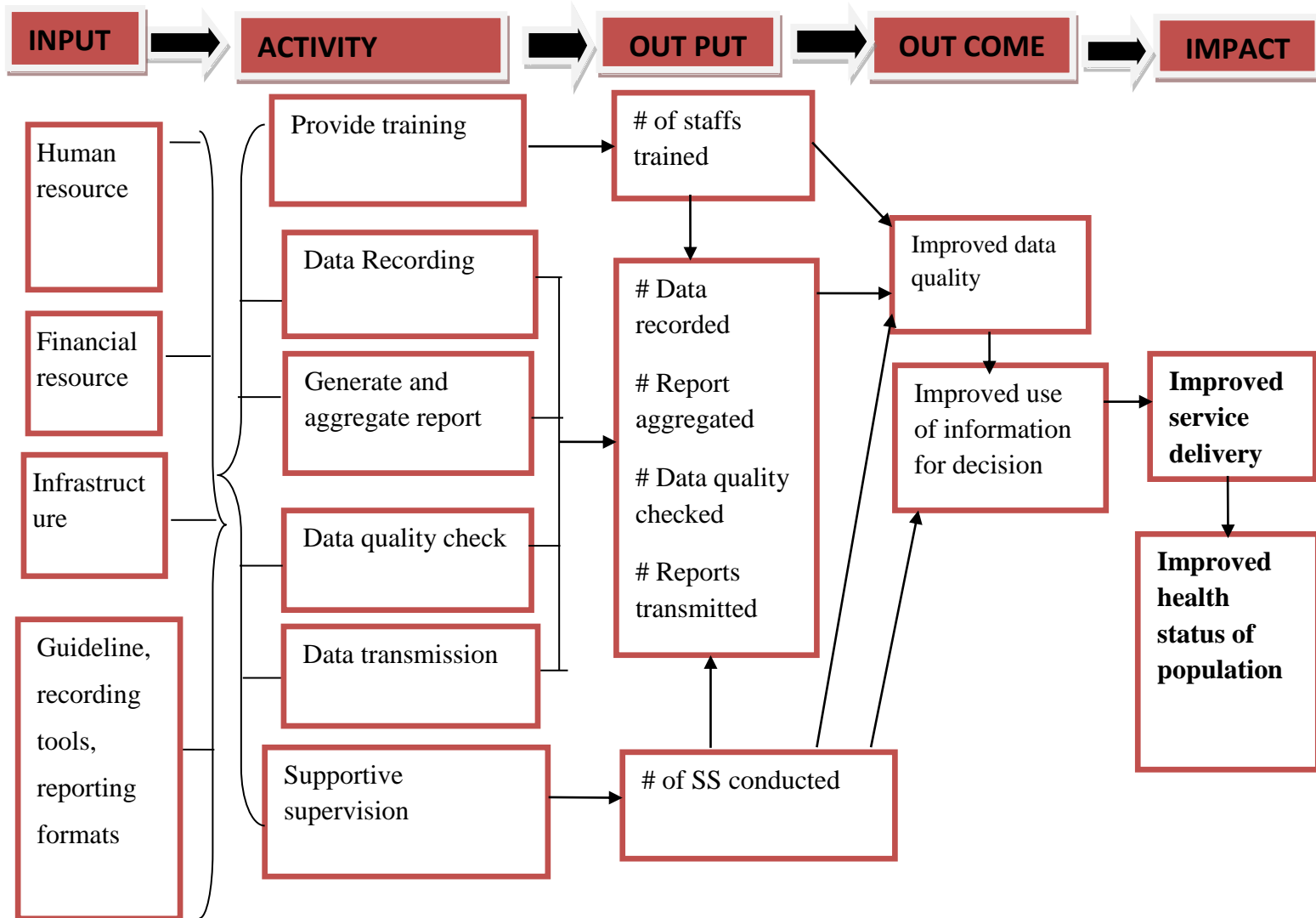
In general, for the activities mentioned above the following resources are needed

- Financial resources
- Human resources
- Guidelines, recording tools, reporting formats
- Infrastructures (electricity, computers, internet access)

## 2.5 Program logic model

**Problem statement:** Information quality and use remain weak within the health sector, particularly at the peripheral levels of Woreda and facility, which have primary responsibility for operational management under the Woreda decentralization process begun in 2002 GC (1).

**Goal:** To contribute for the improvement of health service delivery and health status of population through evidence-based decision making in Oromia region.



**Figure 1: Logic model for HMIS program, 2017**

## **2.6 Stages of program development**

Health Management Information System and Monitoring and Evaluation (HMIS/M&E) was one of seven components of the Health Sector Development Program of Ethiopia, HMIS/ M&E strategic plan and continued to be one essential part of the five year health sector transformation plan (HSTP) (15).

The health and health related indicator has been published annually since 2000G.C. And selection of the HMIS indicators began in July 2007 with a national workshop attended by federal, regional, and Woreda officials, and by development partners. Since then the indicators and their definitions have been discussed and reviewed by health professionals, program officers and administrators at all levels. Extensive consultation with managers and program officers in the last half of 2006 produced consensus on indicator definitions and disease classification required for M&E of the health sector and programs (3, 16).

To increase the quality and utility of the health information, FMOH reform and redesigned the HMIS and M&E in January, 2007 by the reform team. In the newly designed system, the mission of (monitoring and evaluation) as indicated in the HMIS and M&E strategic plan is to support continuous improvement of health services and the health status of the population through action-oriented, evidence-based decision making, based on quality information. After the redesign different activities has been done to increase the performance of the HMIS. This includes:

- Training of managers, health professionals and supportive staffs that help them to increase their knowledge and skill for data management activities. Establishment of performance review team (PRT) was one part of the training.
- Promotion has been done in the use of ICT including eHMIS, which can facilitate timeliness of health information.
- Efforts also done to improve the information use especially at the point of data collection, even though it remains challenging in the quality and use of information at data collection point (17).

As health information is important element of the HSTP, a need for information revolution become critical to facilitate decisions at different level specially to enhance local use of information which needs accurate and timely information. There was a drives for the need of

information revolution, which are an increase in the need for health information and opportunity created by the advancement of the ICT. The information revolution focuses on the advanced use of methods for data collection, analysis, dissemination and use of information; it also focuses on the culture and attitude change toward information use (8, 16).

In 2014, HMIS implementation in Ethiopia was reached 122 (98%) at public hospitals and 2,697 (87%) at health centers. On average, a fulltime HMIS focal person was assigned in 61.7% of facilities. Of them 25.7% were health information & technology (HIT) graduates. All health centers implementing HMIS started transmitting report using standardized format linked up to national level. Even though it is used less frequently, Lot Quality Assurance Sampling (LQAS), performance review team (PRT) and ISS are available for data quality assurance. Facilities check their own data quality using LQAS before using the data for their own decision making and sending to higher levels (3).



### **3. Literature review**

#### ***General overview on HMIS quality***

Despite increasing importance being laid on use of routine data for decision making, it has frequently been reported to have problems. Evidence suggests lack of quality in HMIS, however there is no robust analysis to assess the extent of its accuracy. It is well known that no data are completely accurate. The main concern with data quality is not to ensure the data are perfect, but that they are accurate enough, timely enough, and complete enough for the organization to make appropriate and reliable decisions (7).

Data quality is linked to the use of Information Systems and the health sector is an information based service. Information held in databases and other electronic repositories and delivered in a reliable and timely manner is critical to the health and well-being of patients, the wider population, and to the management of health care organizations (5). Raising the level of data quality within an organization contributes to improving the quality of decision-making enabling the reduction of uncertainty and the production of more timely and accurate decision outcomes.

#### ***Dimensions of data quality***

In the information use guide prepared by the FMOH; accuracy, completeness, timeliness, reliability, confidentiality, precision and integrity listed as the dimensions for the assessment of data quality that helps to identify major data quality problems (7).

#### ***HMIS data quality in developing and middle income countries***

To be most useful for reporting, an HMIS should include the most current information of clients served by the health institution. To ensure the data is the most up to date, it should be entered as soon as it is collected. A study done in Nigeria showed that timing of data flow was often problematic, with most reports coming in late. Therefore, a data handling and monitoring tools was developed to monitor data flow as well as feedback and data quality. Where implemented, this tool improved timely submission rates considerably. Some states were achieving over 95% submission rates, while others still languished (18).

To give meaningful information from HMIS, data should be as complete as possible or it should contain all required information of all clients served. Adequate HMIS coverage is about ensuring that the records are the representative of the served population. Assessment done in Tanzania

was revealed that, data incompleteness was from the prominent findings from those facilities included in the study, which renders the data collected of poor quality. Registers, forms and tally sheets as well as tables in report book were not complete as required. Also at districts and higher the reports were not completed at the specified time (19).

Another research conducted on quality of HMIS in Rwanda showed on contrary that there was an improvement on the completeness of HMIS data and another quality dimensions. Nationally, the average monthly district reporting completeness rate was 98% across 10 key indicators from 2008 to 2012. Completeness of indicator data increased over time: 2008, 88%; 2009, 91%; 2010, 89%; 2011, 90%; and 2012, 95%. The researchers finally recommended to maintaining these assessments to identify remaining gaps in data quality and that results are shared publicly to support increased use of HMIS data (20).

Information entered to HMIS needs to be valid. i.e. it should be accurately represent information about the serving population by the health institutions. False or inaccurate information is much worse than incomplete information. WHO conducted a research to assess Uganda's HMIS data quality in 2011. The data quality assessment shows that Accuracy of reporting was partly adequate with 18% of the district reports zero or missing, 7% of the districts having extreme outliers, and 9% of the districts having major differences between the annual total and the sum of the monthly reports. The intervention coverage estimates were often poor, and are likely to lead to incorrect rankings for at least one third of districts. Completeness of district reporting was also poor in 9% of districts and completeness of health facility reporting were problematic for one-third of the districts (4).

On the other hand, study performed in India by Dr Harikumar on selected indicators founds that only 37 percent of the institutions were within acceptable limits at a tolerance of 10 percent in all the items for the months studied. All the institutions were 26 within the set limits for antenatal registration, while only 71percent, 63 percent and 58 percent of institutions were within the set limits for pentavalent-1 vaccine, measles and DPT booster vaccinations respectively (6).

Inadequate human resources to complete their reports, which leads to high numbers of errors in the submitted reports was one factor for the observed low data quality in assessment of HMIS done in Rwanda. One-third of the health centers visited reported some anomaly in the data collection process and one-fourth of them admitted they “skip” some reports or do not send them

at all. At the same time, facility staff and others have reported that the information system needs to be updated to capture data they report. Lack of regular data quality checks, lack of feedback and lack of training on data quality and analysis were the other factors identified for the low performance by the health workers (21).

Muhammad et al, 2009 discussed in their research in a study done at Pakistan, the weaknesses they identified were includes scarcity of resources (i.e. skilled personnel and financial resources), lack of motivation and feedback among health managers. The authors suggested that there is a need to activate organizational development and institutional strengthening initiatives. These may include defining the structure of organizations; specifying the roles, responsibilities and defining a career structure; managing resources; overhauling the training activity, right from needs assessment to evaluation; creating sense of responsibility; motivating the staff; giving incentives for good work (22).

### ***HMIS in Ethiopia***

The problem seen on HMIS data quality in Ethiopia is more or less similar with other developing countries. Kidist T. et al. wrote in their paper that overall data quality was found to be below the national expectation level at Diredawa city administration health facilities in 2014. Low data quality was found at health posts compared to health centers and hospitals. The overall data quality was found to be 75.3% in health facilities assessed during the evaluation. Trained staff to fill format, decision based on supervisor directives and department heads seek feedback were significantly associated with data quality. There was also a shortage of assigned HIS personnel, separate HIS offices, and assigned budgets for HIS across all units and/or departments (23).

Similarly, Study done in Bahirdar city showed that there were no local quality control mechanisms as well as up to date quality assurance trainings. Lack of appropriate technology in the system, Lack of HIS manipulations skill human resource, lack of incentives, feedback, technical support, low attitude of health workers, management commitment and awareness, centralized decision making, absence of information culture, and non-participation of HMIS staffs in the planning process were the determinant for the low quality of the data. (24)

On the other hand, assessment of HMIS implementation conducted in Ayder referral hospital, Mekelle result shows, out of the six month data used for the study, 63.3% was accurate. More than 95% of the reviewed patient cards were complete. Out of the total respondents 93% have

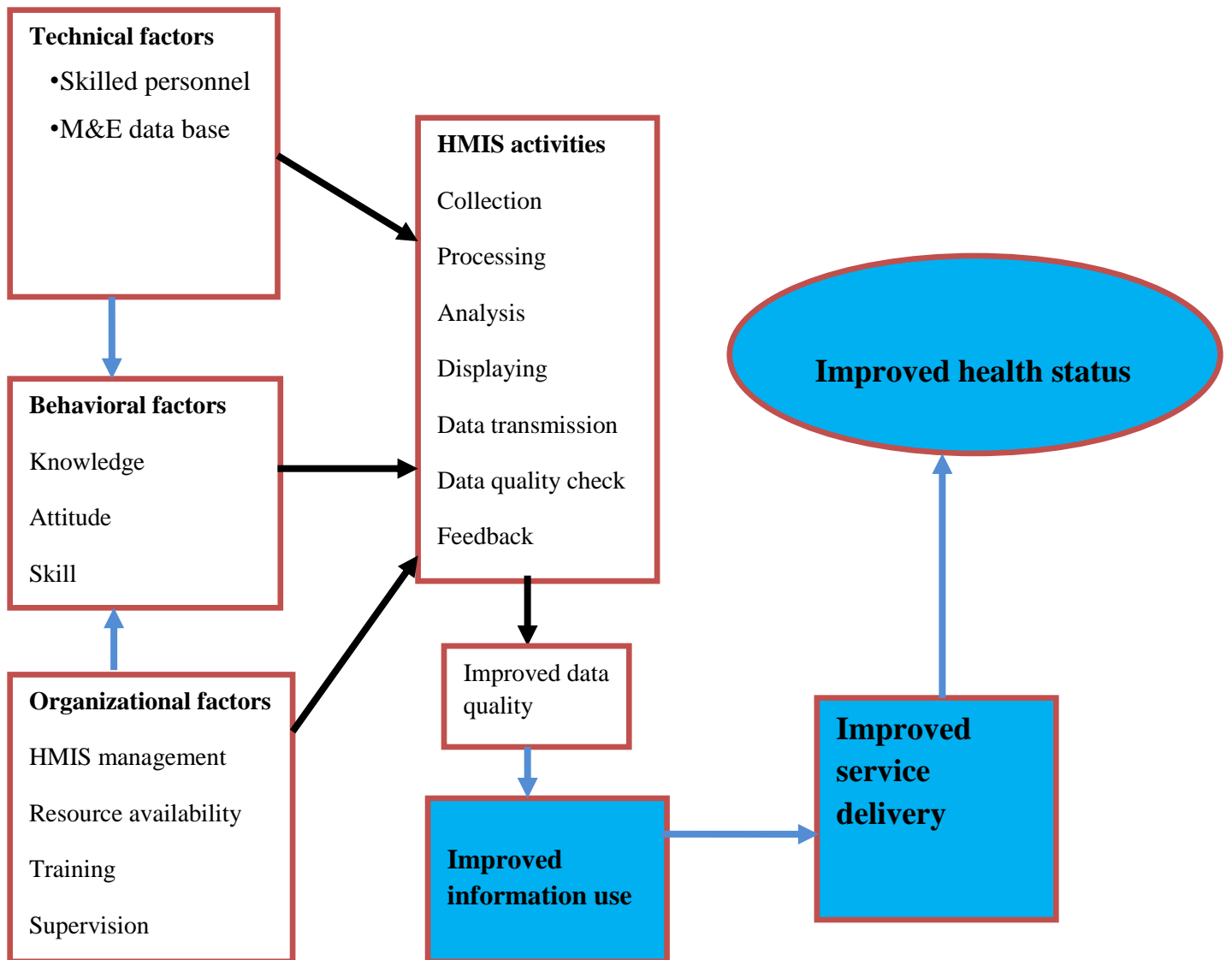
good attitude towards HMIS. There was 78.6% an average report completeness measure in the HMIS unit. The problem found was low utilization of information generated by the facility (14).

HMIS performance assessment done in SNNPR showed that the overall data quality in all studied facilities were 41%. One of the strongest motivations for ensuring the quality of information being collected is a person's interest in its local use and skill they have, and an average confidence levels of respondents observed for calculation, plotting, and use of data were above 75%, but confidence levels were around 70% for checking data quality and interpretation of data. This indicates that respondents felt more confident in collecting data than interpreting data. A similar pattern of confidence levels for various tasks observed between health extension workers, ZHD, WoHOs and hospital staff. The lowest average confidence level (66%) was observed among health workers in the health centers. Overall, respondents in all levels (mean score of 70%) believed that performing HMIS tasks bring about positive outcomes (25).

In a study done by Gebrekidan Mesfin et al in the selected facilities of Ethiopia founds that content completeness and timeliness of reports were very low which is 39% and 73% respectively at regional level. In the contrary, Accuracy of the observed data in 24 of 32 (76%) SDSs had an accuracy ratio that fell within the accepted range. Under reporting was observed on proportion of deliveries attended by skilled persons (SBA) and the accuracy was highest for antenatal care (ANC). Major factors were identified for the low performance was inadequate provision of the required resources or inputs, including lack of trained focal persons (26).

HMIS data quality assessment done at Yekatit 12 Hospital revealed a high level of report completeness (100%) and data accuracy (90%) which is a greater achievement seen. The problem found were limited use of information at senior management level and totally non-existence of information use practice at departments and case team levels. Individual assessment founds that comparatively higher staff confidence in performing HMIS related activities. Respondents were more confident in interpreting results and their implication 67.0 (63.5, 70.6) (27).

### 3.1 Conceptual framework



**Figure 2: Conceptual framework for HMIS program, 2017. Adapted from WHO PRISM framework**

## **4. Evaluation questions and objectives**

### **4.1 Evaluation questions**

1. What is the level of HMIS data quality in public health facilities of Oromia?
2. What are the major HMIS data quality problems?
3. What factors contribute for the observed level of data quality?

### **4.2 Evaluation objectives**

#### **4.2.1 General objective**

- To assess the HMIS data quality and factors that determines the quality in public health facilities of Oromia, 2017.

#### **4.2.2 Specific objectives**

- To determine the level of HMIS data quality
- To identify major HMIS data quality problems
- To identify factors that affect the HMIS data quality

## 5. Evaluation methods

### 5.1 Evaluation area

Based on 2007 (EFY) figures from the Central Statistical Agency (CSA) of Ethiopia, the Oromia Region has an estimated total population of 35,875,159 in 2017, of which 18,069,112 were males and 17,806,047 were females in 2009 (EFY). From the total population 87% is estimated to be rural inhabitants, while 13% are urban dwellers. The region covers the largest part of the country and comprises of 20 administrative zones, 334 woredas and 18 town administrations. Of the 20 zones, Bale and Borena account for 45.7% of the State's total area. By the year 2014, the region has 3000KM asphalt road that connect major cities which is low in coverage but measures taken to increase road access are not sufficient specially to enhance rural access. All major cities connected through telecommunication primarily by mobile telephone. Internet is also available in major cities; however, telecommunication in general and internet in particular is intermittent like the rest regions. Regarding electricity, most cities have 24-hour electric access but commonly there is a problem of power interruption. Regarding health facilities, Oromia region has 66 Hospitals, 1,366 Health Centers and 6,559 Health Posts. (13,28, 29, 30)

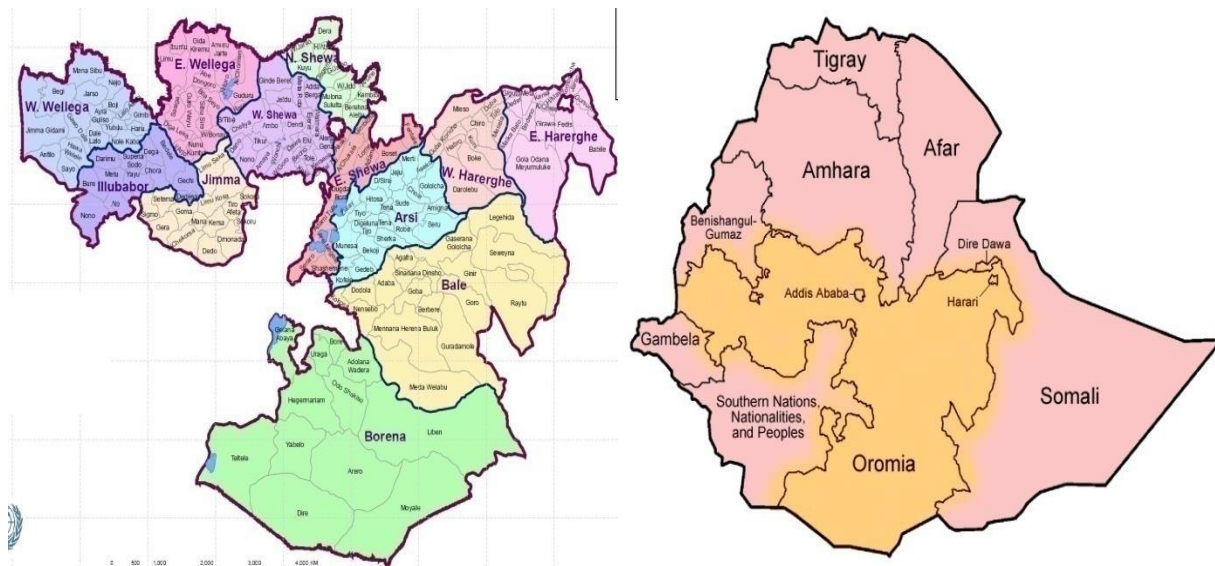


Figure 3: Map of Oromia Regional State

### 5.2 Evaluation period

The total evaluation period was from March 20 – May 1/2017. Data for evaluation was collected from March 20 – April 6/2017 after development of tools. Pretest and arrangements for data collection was done on February 27 and 28/2017. Final report prepared from May/2017 and then.

### **5.3 Evaluation approach**

Even if HMIS program implemented for a long period of time and it is ready for summative evaluation, formative approach applied. Formative evaluation provides important information on how the HMIS process is going on and how HMIS quality and use might be improved by depicting changes needed. This will help for the improvement of the program and also to empower program staffs with evaluation. Formative approach focuses on the process part of the HMIS program.

### **5.4 Evaluation design**

Facility based cross sectional study with quantitative methods was employed to assess quality of HMIS program in the study area.

### **5.5 Focus of evaluation and dimensions**

This evaluation is focused on the process part of the HMIS program. So, selected HMIS quality sub dimension which are **completeness**, **timeliness** and **accuracy** were assessed.

### **5.6 Indicators and variables**

#### **1. Completeness indicators (6)**

##### ***Content completeness indicator (3)***

- Percentage of HPs with complete data elements of a monthly report
- Percentage of HCs with complete data elements of a monthly report
- Percentage of Hospitals with complete data elements of a monthly report

##### ***Report completeness (3)***

- Percentage of WoHO with complete monthly reports
- Percentage of ZHD with complete monthly reports
- Percentage of RHB with complete monthly reports

##### ***Timeliness indicator (2)***

- Percentage of monthly reports received based on the prescribed time by WoHO
- Percentage of monthly reports received based on the prescribed time by ZHD

##### ***Accuracy indicators (6)***



- Percentage of data items within acceptable limit for data accuracy at HP
- Percentage of data items within acceptable limit for data accuracy at HC
- Percentage of data items within acceptable limit for data accuracy at Hospital
- Percentage of data items within acceptable limit for data accuracy at WoHO
- Percentage of data items within acceptable limit for data accuracy at ZHD
- Percentage of data items within acceptable limit for data accuracy at RHB

### ***Dependent Variables***

- Accuracy, Completeness and Timeliness

### ***Independent variables***

- Technical (skilled staff, M&E data base)
- Organizational (Resource availability, Training, Supervision and HMIS management)
- Individual behavior (Knowledge, Attitude, skill)

## **5.7 Population and sampling**

### **5.7.1 Target population**

All health institutions in Oromia region

### **5.7.2 Source population**

The source populations were all functional public HF (hospitals, health centers and health posts) implementing HMIS, administrative health institutions, health workers involved in HMIS activities and HMIS documents.

### **5.7.3 Study population**

Study populations were selected:

- HFs and administrative health institutions
- Health workers involved in HMIS activities
- HMIS documents

### **5.7.4 Study unit and sampling unit**

#### ***Sampling unit***

First zones selected then woredas selected from zones, facilities selected from woredas and finally individuals and documents selected from the facilities.

### *Study units*

Data were collected from HMIS documents, head of HFs, HMIS focal persons, department case team leaders, woreda health bureau HMIS core process, zonal health office HMIS unit, regional health bureau HMIS core process and administrative institution department heads.

### **5.7.5 Sample size and Sampling technique**

#### *Sample for Health institutions*

Four zones (North Shewa, West Arsi, East wolega and Illu Ababore) selected purposefully in the region (convenience sampling technique employed), due to shortage of resources. From each zones two Woredas which are high performing and low performing included in the study. In the same manner, two hospitals from each zones and two health centers from each selected woredas included using deviant sampling techniques. From each health centers, one health post selected using critical sampling technique.

Including Oromia regional health bureau and the four zonal health departments, a total of **53** HFs and health administrative facilities were selected for the evaluation (fig. 4).

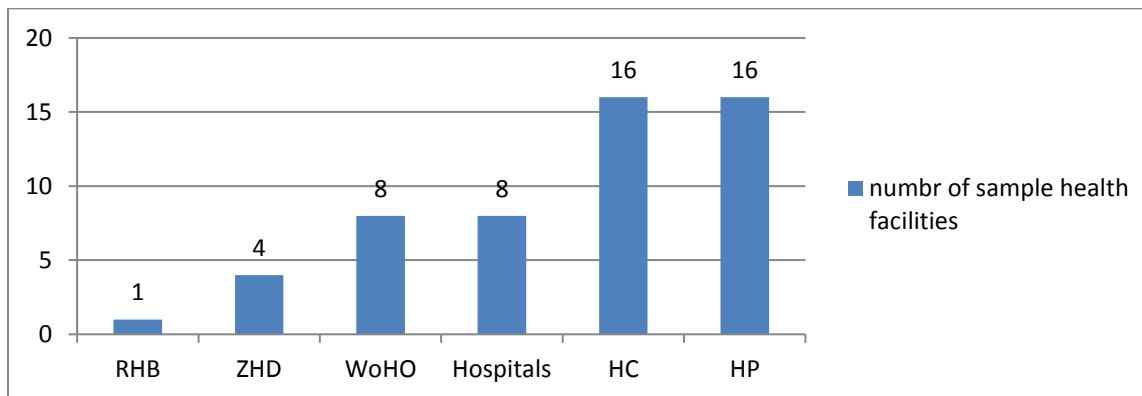


Figure 4: Sample size for facilities included in the study

#### *Sample for Document review*

To assess the accuracy of data, sample size was determined using single population proportion formula by taking P=41% of data accuracy, confidence level of 95% and 0.05 margin of error.

$$n = \frac{(z_{\alpha/2})^2 p(1 - P)}{d^2} \quad n = 3.8419 \times \frac{0.41(.59)}{0.0025} = 371$$

**Where: -**

- $n$  = the maximum possible sample size
- $Z_{\alpha/2}$  = standard score value for 95 % confidence level of two sides normal distribution
- $p$  = 41% data accuracy in a study done at SNNPR health facilities (25).
- $d$  is margin of error (5%)

Because the sampling was multistage sampling technique, it was necessary to apply design effect to ensure the power of this study and to get effective sample size. So design effect of 2 applied, that means **742** samples were needed for this study. Seven data items/indicators for the month of Sene and Tikimt selected purposively. The purpose of the months was to see if there is any difference between the months (Sene is the end of a budget year and many reports are compiled and, Tikimt is beginning of second quarter and considered as coolest month).

To assess content completeness, service delivery report of the month Tikimt was selected purposively. The purpose for selecting Service delivery report was, it contains larger number of indicators compared to other reports.

To assess report completeness and timeliness, all reports of the month Sene and Tikimt were also selected purposively.

#### ***Sample for Structured interview***

Sample size for interview was determined using single population proportion formula. By taking  $P=75\%$  which was the average confidence level of respondents to perform HMIS activities, confidence level of 95 % and 0.05 margin of error:

$$n = \frac{(z_{\alpha/2})^2 p(1-P)}{d^2}$$
$$= 3.8419 \times \frac{0.75(0.25)}{0.0025} = 288$$

**Where: -**

- $n$  = the maximum possible sample size
- $Z_{\alpha/2}$  = standard score value for 95 % confidence level of two sides normal distribution

- $p = 75\%$ , the average confidence level of individuals in a study done at SNNPR health facilities (25).
- $d$  is margin of error (5%)

Because the total populations who are involved in HMIS data compilation and reports are less than 10,000 which are 4000 (13), population correction formula used:

$$nf = \frac{n}{1 + \frac{n}{N}} \quad \frac{288}{1 + \frac{288}{4000}} = 268$$

Considering 10% non-response rate, total sample size was **295** health workers.

All available department heads from each selected facilities who are involved in compilation and reporting of HMIS data, all facility heads and all HMIS focal person were involved in the interview until the sample size reached.

## 5.8 Inclusion and exclusion criteria

### *Exclusion criteria*

- New health facilities that implements HMIS for less than two years
- Facilities who do not keep report and registers
- Study participants who works at the facility for less than three months

## 5.9 Data collection

### 5.9.1 Development of data collection tools

Data collection tools were adapted by the evaluator. It was adapted from PRISM assessment tools (31). The tool prepared to fit with local context and it contains:

- Routine data quality assessment tool
- Organizational and behavioral assessment tool

The tools pretested prior to actual study then based on the result of pretest further adjustment made. The pre test was conducted in Jimma zone on three facilities, 15 individuals, three monthly reports and 37 data items.

### ***5.9.1.1 Routine data quality assessment tool***

This tool was Semi-structured and used for document review to assess the HMIS data quality in terms of completeness, timeliness and accuracy. It mainly contains background information of institutions, questions to assess accuracy, completeness & timeliness, and free listing portion for major reason of data quality problems.

### ***5.9.1.2 Organizational and behavioral assessment tool***

This tool was interviewer administered and used to assess the determinants of HMIS data quality in those public health facilities and health administrative institutions. It mainly contains four major parts; background information of respondents, technical, organizational and behavioral determinants.

## **5.9.2 Data collectors**

The data collectors for this study were six, two MSc students in Health monitoring and evaluation and four MPH holders. Two MPH holders also recruited for supervision. All evaluation team were found in the respective study area but who do not work or have relationship in the study facilities. Training was given for all data collectors and supervisors for two days before the actual data collection period. Pretest was done by those selected data collectors to see their performance at the same time.

## **5.9.3 Data collection field work**

First, availability of all the required materials for data collection assured. After the numbers of data to be collected are limited for the data collectors, data collectors reach the study population on time. Before collection of data, the data collector gives some highlight about the purpose for the person in charge or interviewee on the selected facility.

The data collector was checking for completeness of the tools daily, whenever incomplete data found necessary actions were taken to complete it. The process of data collection was supervised. Daily performance of the way of the data collection process assessed with the group members and appropriate corrections were taken for the next day in case problem occurs. When problem encountered during data collection discussion was made and appropriate measure taken to correct it.

## **5.10 Data management and analysis**

Evaluator checked for completeness of the data and coded it before entry. Whenever incomplete or inconsistent data obtained, it was corrected or removed. The data entered to *EpiData* version 3.1, then exported to *SPSS* version 20. Data then analyzed using the *SPSS* through descriptive statistics; the assessment of HMIS presented using frequency distribution tables and figures. Also the outcome of interest accuracy of HMIS data was analyzed in harmony with responses for the selected variables in a way to identify the association and average accuracy of HMIS data. Binary logistic regression used to identify the association. First bivariate analysis conducted and then variables with  $p < 0.25$  select as candidate variables for multivariate analysis, finally variables with  $p < 0.05$  during multivariate analysis considered as significant.

For further analysis accuracy re-categorized into two, 'Over reported' and 'under reported' as not acceptable limit and acceptable limit as it is.

The overall data quality was calculated by taking the sum of completeness, timeliness and accuracy scores from the judgment matrix.

Responses of individuals for the determinants assessment were categorized into strongly disagree, disagree, neutral, agree and strongly agree. During analysis this category regrouped and recoded into two categories, 'strongly disagree' and 'disagree' as disagree and 'agree' and 'strongly agree' as agree. Neutral responses grouped with disagree when the interest is on agree and vice versa.

## **5.11 Data quality assurance**

To ensure the quality of data different activities was done which include the following: Standard tools were used; training was given for all evaluation team, pre-test done on the tools. Inconsistent and incomplete data was managed accordingly, there was supervision. Data entry and cleaning was done by the principal investigator (PI). *EpiData* was used for data entry to improve the data quality.

## **5.12 Ethical consideration**

The ethical approval and letters of support were obtained from Jimma University, institute of health, institutional review board. An official permission was sought from the Oromia regional health bureau and from each of the study facilities.

Data collection for the evaluation was done with all consideration of the norm and values of the study participants. Moreover, oral consent was obtained from interviewee at data collection time. Confidentiality was assured for the information provided.

### **5.13 Evaluation dissemination plan**

Final draft of the evaluation document was disseminated to the key stakeholders for their comments, after completion of the study before presenting the document to the responsible body. The comments given were addressed in preparing the final evaluation report. The findings of the evaluation was disseminated to Jimma University, institute of health, Department of Health Economics, Management and Policy, Health Monitoring and Evaluation Post Graduate Training Coordination Unit, Oromia regional health bureau, and to the government and non-government organizations that potentially could benefit from the study. It was also submitted for peer review and publication for the wider use.

## **6. Result**

### **6.1 Characteristics of study subjects**

#### *Characteristic of health institutions*

The total number of facilities studied was 53. Oromia regional health bureau, four ZHDs (Arsi, North Shewa, Illu Ababore and East Wolega), two WoHO from each zones, eight Hospitals, 16 HCs and 16 HP included in the study. The four zones are 175Km, 112Km, 600Km and 334Km far from their supervising institution (Oromia regional health bureau) respectively, which is found in Addis Ababa region.

#### *Characteristics of records and reports reviewed*

A total of 678 (91.4%) items (339 from Sene and 339 from Tikimt) studied from the total 742 planned. Some items were not possible to be assessed in some facilities due to unavailability of the services. Items included in the study were family planning total new & repeat, ANC 4, skilled birth attendance, Pentavalent 3, weight measured for under five, inpatient discharge and slide or RDT positive for malaria. From which FP, ANC 4, SBA and pentavalent 3 are the priority indicator for the performance monitoring of the health service delivery.

Fourty Service delivery reports of the month Tikimt reviewed to assess the content completeness of the reports at service delivering facilities. All monthly reports of Sene and Tikimt also reviewed to assess the report completeness and timeliness on 13 health administrative facilities.

#### *Characteristics of Individuals*

A total of 245 respondents where participated in the study from the total 295 planned due to unavailability of individuals at the time of the study which gives the response rate of 83%. Twenty four were from general hospitals, 40 from primary hospital, 91 from HCs, 18 individuals from HP, 43 from woreda health office, 23 from zonal health department and 6 where from regional health bureau. All respondents were department heads (case team leaders), HMIS focal persons and institution heads from each health institutions. From the respondents most of them (73.1%) found in the age group of 21- 30 years old and male (73.5%) and with the average experience year of 7.8. From total respondents 115 (46.9%) and 103 (42.0%) were Level 4/Diploma and Bachelor Degree respectively (Table 2).



Table 2: Socio-demographic characteristics of respondents, Oromia, 2017 (N=245)

Sr. No	Variables	Categories	Frequency	Percent	
1.	Age	20 or younger	1	0.4	
		21-30 years old	179	73.1	
		31 to 40 years old	43	17.6	
		41 to 50 years old	19	7.8	
		Above 50 years old	3	1.2	
2.	Sex	Male	180	73.5	
		Female	65	26.5	
3.	Highest Level of Education	Level 3/Certificate	3	1.2	
		Level 4/Diploma	115	46.9	
		Bachelor Degree	103	42.0	
		Master Degree	19	7.8	
		Other	5	2.0	
4.	Field of study	Health Extension Worker	18	7.3	
		Nurse	95	38.8	
		Midwife	20	8.2	
		Health Officer	23	9.4	
		Medical Doctor	3	1.2	
		Public Health (MPH)	18	7.3	
		Health Monitoring and Evaluation	1	0.4	
		Health Information Technology	20	8.2	
		Laboratory Technology	16	6.5	
		Other study	31	12.7	
			Mean	Median	Range
5.	Years of experience on current position		3	2.0	0.3-12

## 6.2 HMIS data quality

### 6.2.1 Data accuracy

The average proportion of data accuracy within the tolerance of 10% at all level was **57.2%** for all the items in the studied two months. There was a varied difference of accuracy between indicators and across facilities assessed. From indicators lower proportion of data accuracy was observed on FP (35.6%), ANC four (40.4%) and growth monitoring (39.8%) for all facilities. Greater proportion of data accuracy observed on SBA (83%), Inpatient discharge (76.5%) and malaria positive (83.3%) (Table 3).

Table 3: Summary of HMIS data accuracy for all indicators based on 10% tolerance, Oromia, 2017

Date item	Facility type	No of data items checked	Level of data accuracy					
			Under reported		Acceptable limit		Over reported	
			No	%	No	%	No	%
Family planning	HP	30	3	10.0	2	6.7	25	83.3
	HC /Hospital	48	4	8.3	13	27.1	31	64.6
	Administrative	26	0	0.0	22	84.6	4	15.4
	<b>Total</b>	<b>104</b>	<b>7</b>	<b>6.7</b>	<b>37</b>	<b>35.6</b>	<b>60</b>	<b>57.7</b>
ANC 4	HP	30	1	3.3	8	26.7	21	70.0
	HC /Hospital	48	9	18.8	13	27.1	26	54.2
	Administrative	26	1	3.8	21	80.8	4	15.4
	<b>Total</b>	<b>104</b>	<b>11</b>	<b>10.6</b>	<b>42</b>	<b>40.4</b>	<b>51</b>	<b>49.0</b>
SBA	HP	26	3	11.5	22	84.6	1	3.8
	HC /Hospital	48	2	4.2	38	79.2	8	16.7
	Administrative	26	0	0.0	23	88.5	3	11.5
	<b>Total</b>	<b>100</b>	<b>5</b>	<b>5.0</b>	<b>83</b>	<b>83.0</b>	<b>12</b>	<b>12.0</b>
Penta 3	HP	32	14	43.8	9	28.1	9	28.1
	HC /Hospital	44	9	20.5	18	40.9	17	38.6
	Administrative	26	1	3.8	23	88.5	2	7.7
	<b>Total</b>	<b>102</b>	<b>24</b>	<b>23.5</b>	<b>50</b>	<b>49.0</b>	<b>28</b>	<b>27.5</b>
Growth monitoring	HP	28	4	14.3	3	10.7	21	75.0
	HC /Hospital	44	5	11.4	15	34.1	24	54.5
	Administrative	26	0	0.0	21	80.8	5	19.2
	<b>Total</b>	<b>98</b>	<b>9</b>	<b>9.2</b>	<b>39</b>	<b>39.8</b>	<b>50</b>	<b>51.0</b>
Inpatient discharge	HC /Hospital	42	3	7.1	28	66.7	11	26.2
	Administrative	26	2	7.7	24	92.3	0	0.0
	<b>Total</b>	<b>68</b>	<b>5</b>	<b>7.4</b>	<b>52</b>	<b>76.5</b>	<b>11</b>	<b>16.2</b>

Malaria positive	HP	30	5	16.7	27	90.0	1	3.3
	HC /Hospital	46	6	13.0	36	78.3	4	8.7
	Administrative	26	3	11.5	22	84.6	1	3.8
	<b>Total</b>	<b>102</b>	<b>14</b>	<b>13.7</b>	<b>85</b>	<b>83.3</b>	<b>6</b>	<b>5.9</b>
<b>All items</b>	HP	176	27	15.3	71	40.3	78	44.3
	HC /Hospital	320	38	11.9	161	50.3	121	37.8
	Administrative	182	7	3.8	156	85.7	19	10.4
	<b>Total</b>	<b>678</b>	<b>72</b>	<b>10.6</b>	<b>388</b>	<b>57.2</b>	<b>218</b>	<b>32.2</b>

In average over reporting was much higher (32.2%) than under reporting which was 10.6% in all facilities. From the items over reporting were higher for all data items assessed except for malaria positive.

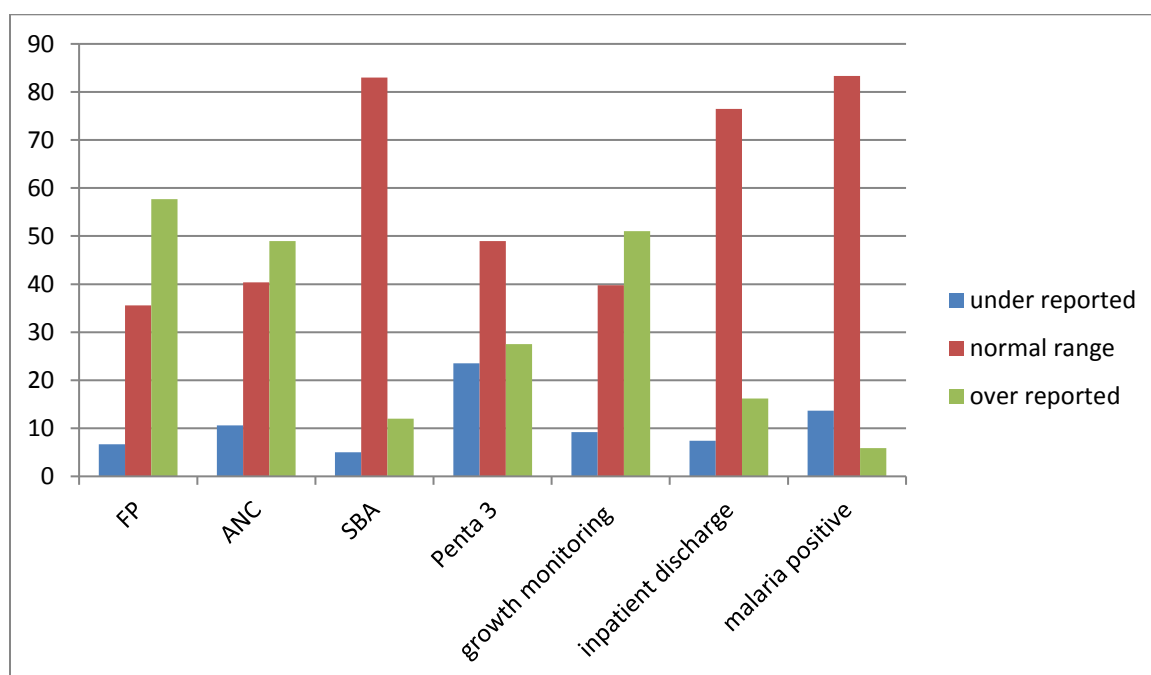


Figure 5: Percentage of data accuracy level based on 10% tolerance for data accuracy

From the facilities assessed, low level of data accuracy observed at HP (40.3%) level except for malaria positive and Birth attended by HEW (fig. 6) and in the contrary high level of data accuracy observed at administrative institutions for all data items (85.7%).

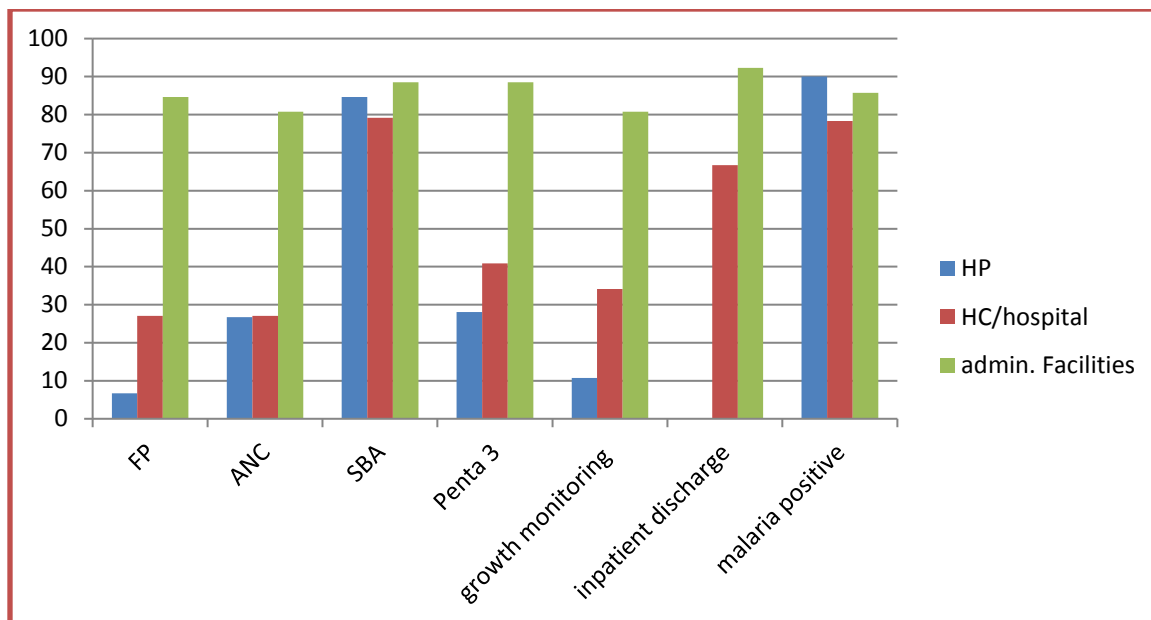


Figure 6: Percent institutions within 10% tolerance for data accuracy

### 6.2.2 Judgment for accuracy

Based on actually observed value compared to the given value before evaluation started, the overall score for accuracy became **66.3%**. Finally, this result judged as **fair** as indicated in the judgment parameter.

Table 4: Summary judgment matrix for accuracy dimension of data quality, Oromia, 2017

Evaluation Questions	Indicators	Weight given (A)	Observed Value (B)	Score (%) B/A*100	Judgment parameters
What are the major HMIS data quality problems in terms of accuracy?	Percentage of data items within acceptable limit for data accuracy at HP	6.66	2.68	40.3	[86 –100] -V. Good
					[76 – 85] -Good
					[61-75] - Fair
					<b>[&lt; = 60] - poor</b>
	Percentage of data items within acceptable limit for data accuracy at HC	6.66	3.35	50.3	[86 –100] -V. Good
					[76 – 85] -Good
					[61-75] - Fair
					<b>[&lt; = 60] - poor</b>
	Percentage of data items within acceptable limit for data	6.66	3.35	50.3	[86 –100] -V. Good
[76 – 85] –Good					

	accuracy at Hospital				[61-75] – Fair
					[< = 60] – poor
	Percentage of data items within acceptable limit for data accuracy at WoHO	6.66	5.71	85.7	[86 –100] -V. Good
					<b>[76 – 85] –Good</b>
					[61-75] – Fair
					[< = 60] – poor
	Percentage of data items within acceptable limit for data accuracy at ZHD	6.66	5.71	85.7	[86 –100] -V. Good
					<b>[76 – 85] –Good</b>
					[61-75] – Fair
					[< = 60] – poor
	Percentage of data items within acceptable limit for data accuracy at RHB	6.66	5.71	85.7	[86 –100] -V. Good
					<b>[76 – 85] -Good</b>
				[61-75] - Fair	
				[< = 60] - poor	
<b>Total accuracy</b>	<b>40</b>	<b>26.51</b>	<b>66.3</b>	<b>Fair</b>	

### 6.2.3 Completeness

**Report completeness:** was assessed by taking the proportion of facilities within 90% acceptable range for report completeness. From total administrative facilities assessed 90.9% of them were within the acceptable range for report completeness.

Table 5: Monthly report completeness of administrative facilities, Oromia, 2017

Facility	# of HF reports meeting 90% report completeness criteria	Percent
WoHO (N=6)	5	83.3%
ZHD (N=4)	4	100%
RHB (N=1)	1	100%
<b>Total (N=11)</b>	<b>10</b>	<b>90.9</b>

**Content completeness:** was assessed by taking the proportion of facilities within 90% acceptable range for content completeness. Based on that the average proportion of content completeness were **94.9%**, 37 out of 39 facilities were within 90% acceptable range for data completeness.

Table 6: Data completeness of monthly report in service delivering facilities, Oromia, 2017

Facility	# of HF reports meeting 90% content completeness criteria	Percent
HP (N=15)	15	100%
HC (N=16)	14	87.5%
Hospital (N=8)	8	100
<b>Total (39)</b>	<b>37</b>	<b>94.9</b>

#### 6.2.4 Judgment for completeness

Actually observed value for completeness indicators compared with the previously given value and the overall score for completeness became **95.7%**. Finally this result judged as **V. good** as indicated in the judgment parameter.

Table 7: Summary of Judgment matrix for completeness dimension of data quality, Oromia, 2017

Evaluation Questions	Indicators	Weight given (A)	Observed Value (B)	Score (%) B/A*100	Judgment parameters
What are the major HMIS data quality problems in terms of completeness?	Percentage of HPs with complete data elements of a monthly report	5.5	5.5	100	<b>[86 –100] -V. Good</b>
					[76 – 85] -Good
					[61-75] - Fair
					[< = 60] - poor
	Percentage of HCs with complete data elements of a monthly report	5.5	5	90.9	<b>[86 –100] -V. Good</b>
					[76 – 85] -Good
					[61-75] - Fair
					[< = 60] - poor
	Percentage of Hospitals with complete data elements of a monthly report	5.5	5.5	100	<b>[86 –100] -V. Good</b>
					[76 – 85] -Good
					[61-75] - Fair
					[< = 60] - poor
	Percentage of WoHO with complete monthly reports	5.5	4.58	83.3	[86 –100] -V. Good
					<b>[76 – 85] -Good</b>
					[61-75] - Fair
					[< = 60] - poor
Percentage of ZHD with	5.5	5.5	100	<b>[86 –100] -V. Good</b>	
				[76 – 85] -Good	

	complete monthly reports				[61-75] - Fair
					[< = 60] - poor
	Percentage of RHB complete monthly reports	5.5	5.5	100	<b>[86 –100] -V. Good</b>
					[76 – 85] -Good
					[61-75] - Fair
					[< = 60] - poor
<b>Total completeness</b>		<b>33</b>	<b>31.58</b>	<b>95.7</b>	<b>V. Good</b>

### 6.2.5 Timeliness

### 6.2.6 Judgment for timeliness

Actually observed value for timeliness indicators also compared to the previously given value and the overall score for timeliness became **85%**. Finally, this result judged as **Good** as indicated in the judgment parameter

Table 8: Summary of judgment matrix for timeliness dimension of data quality, Oromia, 2017

Evaluation Questions	Indicators	Weight given (A)	Observed Value (B)	Score % B/A*100	Judgment parameters
What are the major HMIS data quality problems in terms of timeliness?	Proportion of monthly reports received based on the prescribed time by WoHO	13.5	11.47	85	[86 –100] -V. Good
					<b>[76 – 85] -Good</b>
					[61-75] - Fair
					[< = 60] - poor
	Proportion of monthly reports received based on the prescribed time by ZHD	13.5	11.47	85	[86 –100] -V. Good
					<b>[76 – 85] -Good</b>
					[61-75] - Fair
					[< = 60] - poor
<b>Total score timeliness</b>		<b>27</b>	<b>22.95</b>	<b>85</b>	<b>Good</b>

### 6.2.7 Judgment for overall data quality

Using the dimensions of data quality which are data accuracy, completeness and timeliness the overall data quality based on the judgment criteria became **81%**. When compared to the judgment criteria set by the stakeholders before the evaluation conducted, the overall HMIS data quality fall between 74-84% which means the overall data quality was judged as **Good**.

Table 9: Summary of performance indicators for over all data quality, Oromia, 2017.

Dimension	Value given (A)	Value achieved (B)	Percentage achieved B/A*100	Judgment criteria
Completeness	33	31.58	95.7%	<b>76 – 85.9% Good</b> 61 – 75.9% fair < =60.9% poor
Timeliness	27	22.95	85%	
Accuracy	40	26.51	66.3%	
<b>Total</b>	<b>100</b>	<b>81</b>	<b>81</b>	

### 6.3 Determinants of data quality

#### 6.3.1 Individual factors

The PRISM tool assesses individual factors through individual’s perception on the usefulness of HMIS tasks and their confidence level to perform those HMIS activities.

Based on the assessment finding, most respondents (79.6%) disagreed with the idea of collecting information make them feel bored and 81.2% do not think that collecting information is forced on them. On the other hand almost all believed collecting information give them the feeling that it is needed for monitoring of the facility performance. But from the respondents, 75.5% of respondents replayed that collecting information that is not used for decision making make them discouraged to collect the information.

Table 10: Individual’s perception on information collection, Oromia, 2017 (N=245)

Individual perception	Disagree		Agree	
	No	%	No	%
Collecting information which is not used for decision making discourages me	60	24.5	185	75.5
Collecting information makes me feel bored	195	79.6	50	20.4
Collecting information is meaningful for me	17	6.9	228	93.1
Collecting information gives me the feeling that data is needed for monitoring facility performance	8	3.3	237	96.7
Collecting information give me the Feeling that it is forced on me	199	81.2	46	18.8



### Self-efficacy

The result shows that in average the confidence level of the respondents to perform HMIS tasks were 84.3%. More confidence observed on interpretation and use of the information (86.9%) than checking the data quality (83.2%) but confidence on checking data accuracy has shown no significance on the accuracy level observed. Similarly, relatively low level of confidence observed at HC (82.9%) and higher confidence observed at HP (86.5%) and administrative facilities (87.2%). (N=18, N=155, N=72).

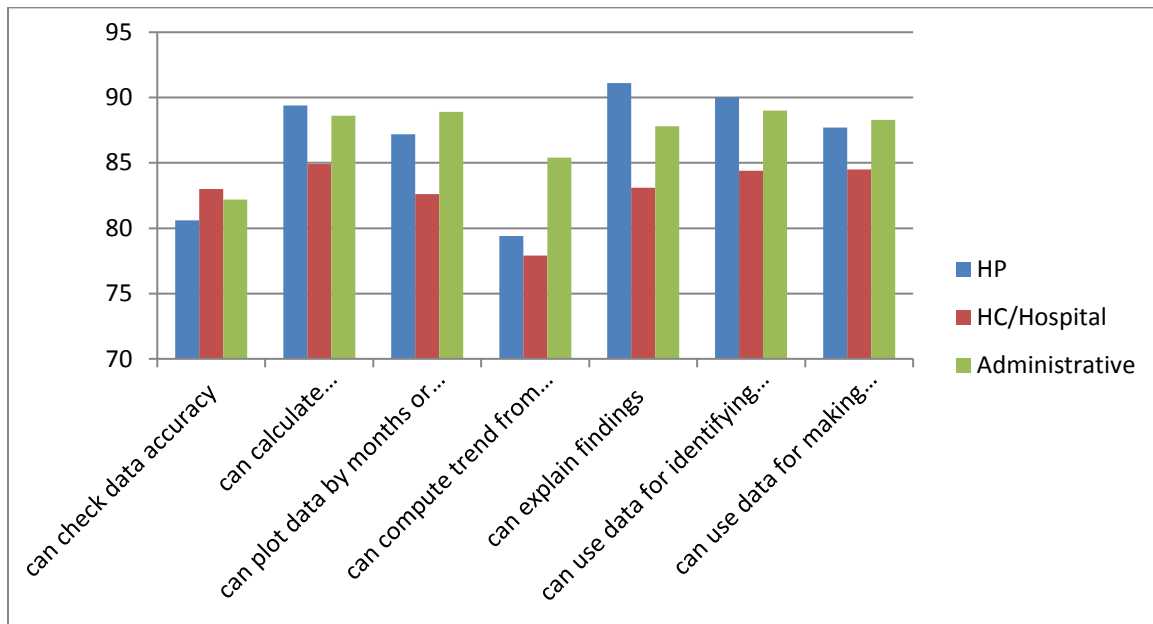


Figure 7: Self-reported level of confidence to perform specific HMIS tasks at all level

### 6.3.2 Organizational factor

As the individual's response shows, majority of them (68.6) agreed that the overall organizational processes and policies encourage reporting accurate data for underperformed activities. 82.4% agreed their supervisors give attention for data quality in the monthly reports but the number of individual's agreement decreased to (66.9%) for the supervisors did check data quality regularly. 77% respondents replied their supervisors did not encouraged them to over report their performance. Majority of respondents (89.4%) also agreed that staffs in the facility are committed to improve the health status of target population (Table 11).

Table 11: Responses given for the organizational factors assessment. Oromia, 2017 (N=245)

Organizational factors	Disagree		Agree	
	No	%	No	%
overall organizational processes and Encourage reporting accurate data for underperformed activities	77	31.4	168	68.6
Supervisors Seek feedback from concerned persons	46	18.8	199	81.2
Emphasize data quality in monthly reports	43	17.6	202	82.4
Check data quality regularly	81	33.1	164	66.9
Provide regular feedback to their staff through regular report	82	33.5	163	66.5
Report on data accuracy regularly	70	29.3	169	70.7
Encourage their supervisees to over report (false report) their performance	187	77	56	23
Staffs Feel committed in improving health status of the target population	26	10.6	219	89.4

### ***HMIS budget***

All facilities do not have separately assigned budget for M&E activities. Similarly, only 5 out of 37 facilities have human capacity development plan for M&E activities.

### ***M&E posts***

Based on the findings of the facility assessment, 14 from 37 (37.8%) facilities (excluding HPs) do not have HIT professional, the rest have ranging from 1-3. Two administrative facilities have HI professionals, 3 have HME and 3 facilities have Public health professional. Three (8%) do not have specifically assigned personnel to HMIS at all, head of institution or PMT committee was the one that performs the activities of the HMIs other than their assigned duty. In general, 27 (73%) of the facilities were assigned adequate staffs for M&E activities compared to standard for M&E posts.

### ***Training***

Overall 63.7% of the respondents from all facilities assessed stated that they had received in service training related to HMIS and the last time they took training was given in average 29 months (it ranges from 6days-84 months) back. All assigned HMIS focal persons took in-service HMIS training.

### ***Supportive Supervision***

Regarding supportive supervision, 10(62.5%) HPs, 15(62.5%) HC and hospitals and 3(23.1%) administrative facilities were visited by their immediate supervising institution during the last three month period. During supervision, the supervisors checked data quality in 8(80.0%) of HPs, in 13(86.7%) of HC & hospital, and in 1(33.3%) of administrative facilities. From total 53 facilities 16 (30%) of them were getting supervision from non-governmental organizations.

From the supervised facilities, only 4 (40.0%) HPs, all 15(100%) HC &hospitals, and all 3(100%) administrative facilities got feedback after supervision. But no significant relationship observed between the observed accuracy and feedback from supervisors.

From all service delivering facilities assessed, 36(90%) did not get any directive from their superiors to check the data quality and 39 (97.5%) did not know the consequence of not checking the data quality

### ***Record keeping***

All administrative facilities kept report copies but only soft copies are available. Also all HCs and hospitals kept both hard and soft copies of reports. The manual count for one year period shows that the monthly report kept ranges from 10-12. From the HPs one did not keep report at all, but from the rest, number of monthly report kept for one year period ranges from 8-12. In general, from all facilities assessed 98.1% kept copy of monthly reports that are sent to the next level.

### **6.3.3 Technical factors**

#### ***Skilled personnel***

From total facilities 12 (32.4%) facilities assigned professionals that do not have the skill for the HMIS activities.

### *M&E database*

Regarding M&E data base, except the HPs all facilities started using electronic M&E database. But 10 (41.7%) out of 24 facilities (HC/Hospital) were not using the database at the time of the study due to non-functionality. All facilities that are using the database are secured with password to prevent unauthorized change of the data.

On the other hand out of 40 services delivering facilities including HPs, 23 (57.5%) did not have manual with definition for HMIS data collection that can help them properly define and collect HMIS data. Having manual for data collection has a significant relationship ( $p < 0.05$ ) with accuracy during bivariate analysis.

### *Level of priority of indicator*

From the total items assessed 62.5% were priority indicators and from which 212 (50%) was not within the acceptable limit for data accuracy.

### **6.3.4 Bivariate and multivariate analysis**

Variables with  $p < 0.25$  during bivariate selected as candidate for multivariate analysis. Based on that, the following variables were the candidates for multivariate analysis: facility conduct performance review meeting, using M&E data base, data collection manual, HMIS management, Supportive supervision from Gov't facility, level of Priority of indicator and supervision from non-government facility. Then variables with  $p < 0.05$  declared as predictors of HMIS data accuracy which are: using M&E data base, supportive supervision and level of Priority of indicator.

Being visited by immediate supervisor has shown a significant relationship ( $P < 0.05$ ) with data accuracy (**AOR=0.6, 95% CI [0.4, 0.9]**) however the relationship was negative, those supervised facilities were 40% less likely to produce accurate data. In the contrary facilities supervised by NGOs were 1.8 times (**AOR=1.8, 95% CI [1.1, 2.8]**) more likely to produce more accurate data than who did not supervised by NGO. Using electronic M&E database has shown significant relationship ( $P < 0.01$ ) with accuracy (**AOR=2.2, 95% CI [1.4, 3.5]**). Being a priority indicator has also shown a significant association ( $p < 0.05$ ) with the observed data accuracy (**AOR=0.5, 95% CI {0.4, 0.9}**), i.e. indicators that are labeled as priority were by 50% less likely to be accurate than indicators which are not priority.

Table 12: Multivariate logistic regression result on data accuracy

Determinants (N=678)		Data accuracy		COR (95% CI)	AOR (95% CI)	p-value
		No (%)	Yes (%)			
Does the institution have electronic M&E database	No	161(56.7)	123(43.3)	1.0	1.0	0.000
	Yes	130(33)	264(67)	2.6 (1.9, 3.6)	2.2 (1.4, 3.5)*	
did the indicator priority indicator	No	81(33.7)	167(67.3)	1.0	1.0	0.011
	yes	210(48.8)	220(51.2)	0.5 (0.4, 0.7)	0.58 (0.4, 0.9)*	
Supportive supervision from Government facility	No	119 (36.5)	207 (63.5)	1.0	1.0	0.030
	Yes	172 (48.9)	180 (51.1)	0.6 (0.4,0.8)	0.6 (0.4,0.9)*	
Supportive Supervision from NGO	No	214 (46.1)	250 (53.9)	1.0	1.0	0.009
	Yes	77 (38.5)	123 (61.5)	1.3 (1, 1.9)	1.8 (1.1, 2.8)*	
Data collection manual available	No	163 (58.6)	115 (41.4)	1.0	1.0	0.19
	Yes	102 (46.8)	116 (53.2)	1.6 (1.1,2.3)	1.4 (0.9, 2.3)	
Performance review meeting	No	95 (49.5)	97 (50.5)	1.0	1.0	0.20
	Yes	196 (40.3)	290 (59.7)	1.4 (1, 2)	0.6 (0.3, 1.2)	
HMIS management	No	62 (53.4)	54 (46.6)	1.0	1.0	0.18
	Yes	113 (33.6)	223 (66.4)	2.2 (1.4, 3.4)	1.4 (0.8, 2.3)	

\*significant with p<0.05 at 95% CI

### 6.3.5 Qualitative finding

HMIS focal persons from each facility asked to list out and then choose the three main possible reasons for the low HMIS data quality. The main reasons given are generally divided into three groups:

- **Lack of knowledge and skill:** the respondents mentioned there is a knowledge and skill gap due to inadequate training, lack of supportive supervision and feedback

- **In adequate resource:** was also from the major reasons listed by the respondents. Lack of inadequate manpower, lack of HIT professional, lack of standardized registers (specially at HP), lack of tally sheet, lack of facilities like computer and electricity and lack of HMIS budget were the main reasons stated.
- **Not giving attention to HMIS:** staffs negligence during registration and data collection, non-functionality of the performance monitoring team and not giving proper attention from the superiors were the main reasons mentioned.

## **7. Discussion**

The overall objective of this evaluation were to assess the level HMIS data quality in Oromia region and to identify individual, organizational and technical factors that affect the observed level of HMIS data quality.

### **7.1 Data quality**

Raising the level of data quality within an organization contributes for the improvement of decision-making quality which enables the reduction of uncertainty and the production of more timely and accurate decision outcomes (5). This study found that the overall data completeness and timeliness was higher but which was low in accuracy. Completeness and timeliness of the HMIS data accomplished the national target 85% however accuracy of the HMIS data was 57.2% which is much lower than the national target. Similar finding also observed in a study done at SNNPR and India, greater proportion of completeness and timeliness observed but the level of data accuracy was lower than the expected level (6, 8, 25).

Getting information whenever it is needed would facilitate timely decision making and being complete can help to completely understand the population served, but accuracy of the information can majorly affect the reliability of the decision made even if the information is timely and complete, in other words, this complete and timely data might not correctly represent the population served. As the accurate data is need for health planning, policy change, for monitoring progress toward the health goals and other related decisions, being low in the level of data accuracy plays major role for poor quality decision making which can affect the strive to improve the health service delivery (14).

From the items assessed, low data accuracy observed for ANC, growth monitoring and FP at HP and HC/Hospitals. There was a tendency of over reporting for these items. Similar finding observed in a study done by EPHI, as the result of the data quality review showed from the items assessed over reporting observed in ANC and FP services and only 30 percent of the ANC data reported was matched with source document in government facilities (32).

Possible reasons for this could be due to the fact that these indicators are from the top priority indicators and needed to be performed well which might lead the facilities to over report. Being a priority indicator has shown a negative relation with data accuracy i.e. priority indicators were by 50% less likely to be accurate than not priority indicators. The performance of the health system

is monitored using priority indicators, so conclusions made based on these less accurate data would probably become wrong.

Based on the facility type, low level of data accuracy observed at HP. Over all at HP level there was a tendency to over report in most of the items. This result is similar with result found in Diredawa health facilities and SNNPR, low data accuracy was found at health posts compared to health centers and hospitals (23, 25).

Lack of standard registers that leads to improper registration of the service given and error during counting to report could be the possible reason for the low level of data accuracy at HP level (these was strengthened by subjective responses and observation during assessment). Since information sent to the higher level is an aggregate of data starting from the HP, low level of data accuracy at HP can in turn affect the accuracy at higher level.

Greater proportion of data accuracy observed at administrative institutions for all data items. At zone and region data accuracy was 100% because reports came from lower level are soft copies which are directly imported to the database without any editing. Higher level of concordance observed for FP, ANC, delivery and malaria positive at zone and region level in the study of EPHI data quality review (32). But high level of data accuracy at administrative facility does not completely indicate the data at that point are accurate, because report came from lower level showed some sort of inaccuracy and the aggregate of this inaccurate data are transferred to the next level. So the observed accuracy level rather indicates administrative institutions are transferring to the next level what they were received from lower level weather it is accurate or not. This might result in wrong judgment and wrong decision making at that point.

## **7.2 Determinants of data quality**

**M&E posts:** For M&E to work appropriate staffing is necessary which needs to fill personnel with appropriate knowledge and skill to perform the activities. Even if no significance relation observed in multivariate analysis, the result of this evaluation identified that according to the standard the staffing pattern for M&E activities was not adequate in 27% of the facilities assessed. There were facilities that do not have assigned M&E personnel at all. In the HMIS data quality assessment done at selected facilities of Ethiopian regions, major factors identified for the low performance was inadequate provision of the required resources or inputs, including lack of trained focal persons (26). Similarly, inadequate and not trained human resources to complete



their reports, which leads to high numbers of errors in the submitted reports was one factor for the observed low data quality in assessment of HMIS done in Rwanda (21). Subjective responses of the individuals also strengthen this, in which respondents mentioned that they believe lack of adequate manpower generally and lack of trained man power specifically could be from the main reason for low data quality.

**M&E data base:** According to the new HMIS system, all HFs are supposed to use electronic M&E database, but 27% facilities (excluding HP) were not using the database and significant relationship observed between using M&E database and data accuracy, accuracy was two times more likely to be higher in those facilities that are using electronic data base than who do not use. Lack of appropriate technology identified as one factor in a study done at Bahirdar city (24). Subjective responses also supported this, lack of computer and the software may result in low data quality. The main reason mentioned for not using the data base was due to non-functionality of the computers

**Supportive supervision:** is one of the important inputs for good quality HMIS data. Close follow up with feedback could contribute to improve overall performance, particularly for better data quality. The result of this study shows around half of the facilities were not visited by any supervising institutions in the last three months from the study period. Similarly, inadequate and irregular supervisions were reported by the health facilities in the study done at SNNP region. (25). But the findings of this study shows negative relationship between supervision and data accuracy, facilities that was visited by the immediate supervising institution were by 40% less likely to produce accurate data. In the contrary, getting supportive supervision from NGO has shown a positive relationship with data accuracy, i.e. facilities supervised by NGOs were nearly two times more likely to produce more accurate data than who did not supervised by NGOs. Negative relationship between accuracy and supervision from immediate supervises could be the effect of the way supervision conducted, if not performed correctly as planned it might not lead to the intended positive outcome.

Supervisors checking data quality during supervision and not getting feedback after supervision have shown no relation with the data accuracy which is against from the finding obtained in a study done in Rwanda (21). Also against from subjective finding which shows lack of supportive

supervision, lack of feedback and not well functioning performance monitoring team (PMT) were from the main reasons for low data quality mentioned by the respondents.

**Individual perception:** most individuals within the facilities believed that their facilities are favorable for HMIS data quality. They believed even under performed activities are reported accurately without any addition most of them believed their supervisors give attention for data quality in monthly basis. On the other hand for most individuals, their perception on the collection of information is positive; they feel information is needed for performance monitoring and for the improvement of population health. This positive attitude might come from their interest on the positive assessment of their facility. Similar finding also observed in a study done in Mekelle and SNNPR, in which majority of individuals have positive attitude toward HMIS. (15, 25)

**Procedure manual:** For appropriate collection of HMIS data all service delivering facilities needed to have a manual with the definition of the indicators that help to properly define and collect the data. But the result of this study revealed that more than half of the facilities do not have the manual. Subjective response suggest those do not have the manual are collecting the data as they think what is correct. Having procedure manual has shown significant association with data accuracy during bivariate analysis. But this finding did not supported by other literatures.

In general, those mentioned and other unidentified factors would affect the accuracy of HMIS data gathered. So, only understanding of the data quality level might not be efficient for future improvement of the HMIS data quality.

### **7.3 Strength and limitation of the evaluation**

#### **Strength:**

- The study used the PRISM framework that have been tested and used in many developing countries including Ethiopia.

#### **Limitation:**

- Samples of facilities were small due to resource constraints which can affect the representativeness of the sample.

- Due to unavailability, the expected number of individuals to be included was lower than expected (i.e. low response rate resulted small sample size)
- Information bias from service providers because of their interests on positive assessment of the program was another limitation.

## **8. Conclusion and recommendation**

### **8.1 Conclusion**

Completeness dimension of data quality are more than adequate at all level of the facilities and timeliness dimension attains the national target for report timeliness. But the overall data accuracy was lower than the minimum amount required nationally for data accuracy. Decisions made using this complete and timely but inaccurate data can majorly affect the reliability of the decisions made which will have negative effect on the improvement of the health system. FP, ANC and weight measured for under-five are observed to be less accurate from data items. Over reporting of indicators are observed in all facilities than under reporting. From the facilities HPs were the one that have less accurate data than others and in the contrary administrative facilities were transferring data more accurately than service delivering facilities.

Using electronic M&E database has shown a positive relationship with data accuracy. Level of priority of indicator and supportive supervision on the other hand observed to be negatively affecting HMIS data accuracy. Unlike supportive supervision from immediate supervisors, getting supportive supervision from NGOs has shown a positive relationship with data accuracy.

### **8.2 Recommendation**

From the assessment finding the recommendations are given for better performance of HMIS in the future, which includes:

For ORHB, ZHDs:

- No standard registers are available for most services given at HP, so Standardized Registers should be prepared and distributed for the HPs. Inclusion of HEWs and other lower level administrative personnel would be helpful during preparation of the registers.
- M&E data base should be distributed for those who are not using; as it will help to improve data accuracy and timeliness of report.

For WoHO

- Adequate HMIS focal person should be assigned at all level.
- Distribute a procedure manual with definition of indicators for HMIS data collection.
- Should investigate why supportive supervision from immediate supervisors has negative effect on data accuracy.

For Researchers: Further investigate the negative association between accuracy and SS

## **9. Meta evaluation**

### **9.1 Utility**

Mainly Stakeholders of the evaluation was identified and be communicated starting from the planning of the evaluation. The main questions of the stakeholders were addressed. The final result will be reported timely; and it will precisely describe purpose, procedures, findings

### **9.2 Propriety**

Ethical issue was addressed before the start of evaluation to meet the standard. The interaction of the evaluators was in a manner that can preserve the participant's good feeling for participation during evaluation. The evaluation also designed to help the organization to effectively serve the need of the population.

### **9.3 Feasibility**

With the agreement of the stakeholders, the methods for the evaluation designed in realistic way to make the whole evaluation process is practical in order to keep disruption to a minimum while relevant and needed information is obtained, and producing sufficient information with a minimum cost. Different groups of people with different power and need that can affect the evaluation were considered to increase the feasibility of the evaluation.

### **9.4 Accuracy**

Started by accurately describing the program being implemented the context in which the program exists. The purpose and procedures of the evaluation clearly described so that it can be identified. As the evaluation is all about getting technically adequate information to determine the programs worth and merit, the source of the information was described in detail, and the method for the information gathering chosen in a way to produce valid and reliable information in a systematic way. Data analysis was done in appropriate and systematic manner that are able to answer the evaluation questions and that can lead to justified conclusion.

### **9.5 Overall score for Meta evaluation**

Checklist was used to assess the evaluation based on the four standards of evaluation. It was evaluated by external evaluator. Overall score was **81%** which is judged as Good by the evaluator.

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## Annex I

### Matrix of analysis and judgment

The matrix of judgment contains indicators of all listed dimensions with their given weight that is compared later with the actually observed value of those indicators after analysis done. Each indicator was calculated using its numerator and denominator then changed into the weighted value. The observed values for each indicators of the dimension some up and put as percent to see in which judgment parameter fall that specific dimension.

**Table 13: Information matrix**

<b>Evaluation question</b>	<b>Indicators</b>	<b>Sources of data</b>	<b>Data collection method</b>	<b>Data collection tools</b>
1. What is the level of HMIS data quality in public health facilities of Ethiopia? 2. What are the major HMIS data quality problems?	<ul style="list-style-type: none"> <li>• Percentage of service delivering facilities with complete data elements of a monthly report</li> <li>• Percentage of administrative facilities with complete monthly reports</li> </ul>	<ul style="list-style-type: none"> <li>• Medical records</li> <li>• Registration books</li> <li>• Reports</li> <li>• HMIS staffs</li> </ul>	<ul style="list-style-type: none"> <li>• Interview</li> <li>• Document review</li> </ul>	<ul style="list-style-type: none"> <li>• Interview guide</li> <li>• Structured checklist</li> </ul>
1. What is the level of HMIS data quality in public health	<ul style="list-style-type: none"> <li>• Percentage of monthly reports received based on the prescribed time by administrative facilities</li> </ul>	<ul style="list-style-type: none"> <li>• Medical records</li> <li>• Registration books</li> </ul>	<ul style="list-style-type: none"> <li>• Interview</li> <li>• Document review</li> </ul>	<ul style="list-style-type: none"> <li>• Interview guide</li> <li>• Structured checklist</li> </ul>



<p>facilities of Ethiopia?</p> <p>2. What are the major HMIS data quality problems?</p>		<ul style="list-style-type: none"> <li>• Reports</li> <li>• HMIS staffs</li> </ul>		
<p>1. What is the level of HMIS data quality in public health facilities of Ethiopia?</p> <p>2. What are the major HMIS data quality problems?</p>	<ul style="list-style-type: none"> <li>• Percentage of data items within acceptable limit for data accuracy</li> </ul>	<ul style="list-style-type: none"> <li>• Medical records</li> <li>• Registration books</li> <li>• Reports</li> <li>• HMIS staffs</li> </ul>	<ul style="list-style-type: none"> <li>• Interview</li> <li>• Document review</li> </ul>	<ul style="list-style-type: none"> <li>• Interview guide</li> <li>• Structured checklist</li> </ul>

**Table 14: Judgment matrix for completeness**

Evaluation Questions	Dimensions	Indicators	Weight given	Observed Value	Judgment parameters
What are the major HMIS data quality problems in terms of completeness?	<b>Completeness (27%)</b>	Percentage of HPs with complete data elements of a monthly report	5.5		[86 –100] -V. Good [76 – 85] -Good [61-75] - Fair [< = 60] - poor
		Percentage of HCs with complete data elements of a monthly report	5.5		
		Percentage of Hospitals with complete data elements of a monthly report	5.5		
		Percentage of WoHO with complete monthly reports	5.5		
		Percentage of ZHD with complete monthly reports	5.5		
		Percentage of RHB with complete monthly reports	5.5		

<b>Total</b>	<b>33</b>		
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**Table 15: Judgment matrix for timeliness**

Evaluation Questions	Dimensions	Indicators	Weight given	Observed Value	Judgment parameters
What are the major HMIS data quality problems in terms of timeliness?	<b>Timeliness (27%)</b>	Percentage of monthly reports received based on the prescribed time by WoHO	13.5		[86 –100] -V. Good
		Percentage of monthly reports received based on the prescribed time by ZHD	13.5		[76 – 85] -Good [61-75] - Fair [< = 60] - poor
<b>Total</b>			<b>27</b>		

**Table 16: Judgment matrix for accuracy**

Evaluation Questions	Dimensions	Indicators	Weight given	Observed Value	Judgment parameters
What are the major		Percentage of data items within	6.66		[86 –100] -V.

HMIS data quality problems in terms of accuracy?	<b>Accuracy (40%)</b>	acceptable limit for data accuracy at HP			Good [76 – 85] -Good [61-75] - Fair [< = 60] - poor
		Percentage of data items within acceptable limit for data accuracy at HC	6.66		
		Percentage of data items within acceptable limit for data accuracy at Hospital	6.66		
		Percentage of data items within acceptable limit for data accuracy at WoHO	6.66		
		Percentage of data items within acceptable limit for data accuracy at ZHD	6.66		
		Percentage of data items within acceptable limit for data accuracy at RHB	6.66		
<b>Total</b>			<b>40</b>		

**Table 17: Overall judgment matrix**

Dimension	Value given	Value achieved	Percentage achieved	Judgment criteria
Completeness	33			[86 –100] -V. Good
Timeliness	27			[76 – 85] -Good
Accuracy	40			[61-75] - Fair
<b>Total</b>	<b>100</b>			[< = 60] - poor

## Annex II

# The Status of M&E in the Ethiopian Health Sector

## Routine Data Quality Assessment Tool

*RHB, ZHD, WoHO*

<b>NOTE TO THE INTERVIEWER:</b> EXPLAIN THE TOOL TO THE M&E/HMIS FOCAL PERSON WHO WILL SERVE AS KEY INFORMANT AS WELL AS FACILITATOR OF RECORD REVIEW. YOU WILL HAVE TO VISIT DIFFERENT DEPARTMENTS WITHIN THE HEALTH INSTITUTION.	
01	Date (GC)  ____/____/____ DD / MM / YYYY
<b>HEALTH INSTITUTION IDENTIFICATION</b>	
Name of Health Institution	_____
Institution Type (circle category):	<ol style="list-style-type: none"><li>1. Woreda Health Office</li><li>2. Zonal Health Department</li><li>3. Regional Health Bureau</li></ol>
Zone	
Woreda	
Telephone Number (Office)	
Distance from supervisory health institution in KM	
Name of person interviewed/facilitated DQA	
Position of person interviewed	

General Information		
#	Question	Response
G1	Does the institution have an organogram describing the organization of M&E/HMIS unit in relation to the overall organizational structure?	1) Yes 2) No
G2	If yes to G1, where is the unit located within the institution?	
G3	Do M&E/HMIS staff have written job descriptions?	1) Yes 2) No
	What is the number of M&E posts (required & filled) for the following professional categories that are primarily responsible for the functioning of the M&E system?	
	<b>Professional category</b>	<b># Required per standard</b>
	a) Health Information Technicians (HIT)	
	b) Health Informatics (HI)	
	c) Health M&E (HME)	
	d) Epidemiology/Public Health	
	e) Data clerk	
	f) Other, specify: _____	
	g) Other, specify: _____	
	h) Other, specify: _____	
G4	Does the institution have electronic M&E database? (If no, skip to G8)	1) Yes (Name _____) 2) No
G5	Is the electronic M&E database currently functional?	1) Yes 2) No
G6	Is there any system in place to prevent unauthorized changes to data?	1) Yes 2) No
G7	If yes to G6, please, describe the system:	

G8	Does the institution have a human capacity development plan for M&E system (including for sub-reporting entities under the supervision of this institution)? <i>[Note: It could be part of the M&amp;E Plan of specific programs, or exist as a stand-alone document.]</i>	1) Yes 2) No
G9	If yes to G9, what key human capacity development strategies are planned?	
G10	Are there standard curricula for M&E/HMIS capacity building?	1) Yes 2) No
G11	If yes to G10, please, describe (duration, content, certification, etc..)	
G12	What was the total budget allocated for the HMIS/M&E unit for EFY 2009 _____ birr	
G12	What was the total budget allocated for the institution for EFY 2009 _____ birr	

<b>Data Recording and Transmission</b>					
DQ 1	Does the Region/Zone/Woreda office keep copies of HMIS reports sent by reporting health institutions? (verify)			0. No	1. Yes
DQ 2	What is the number of health facilities in the Region/Zone/Woreda that are supposed to be reporting to your institution?				
DQ 3	What is the number of facilities/institutions in the Region/Zone/Woreda that are actually reporting to the institution (Enrolled to the HMIS) by paper, electronically and total?				
			<b>DQ3</b>		
	<b>Ownership</b>	<b>DQ2</b>	<b>Reporting by paper</b>	<b>Reporting electronically</b>	<b>Total reporting</b>
	Public				
	Private for profit				



	Other government				
	Private not-for profit				

DQ 6	Does the Zone/Woreda office record receipt dates of the HMIS monthly report?	0. No	1. Yes
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DQ 7: Completeness and timeliness of report receiving

Type of facility	Sene 2008			Tikimt 2009		
	1. Before deadline	2. After deadline	3. Not at all	1. Before deadline	2. After deadline	3. Not at all
Public						
Private for profit						
Other government						
Private not-for profit						

DQ 8 Does the institution check timeliness and completeness of the received report before data entry?	0. No	1. Yes
DQ 9 Does the institution have a record of submitting data on time to next levels?	0. No	1. Yes

DQ 10: Manually compile the number of following data items from the HMIS monthly reports (received from reporting facilities) for the selected two months. Compare the figures with the reports from the computer or paper database (submitted to the next level).				
Item(If one or more of the following services are not provided in the institution, please include a replacement data element)	Sene 2008		Tikimt 2009	
	# from reports received	# from report submitted	# from reports received	# from report submitted
DQ 10 A. Family Planning (Total new and repeat acceptors)				

DQ 10 B. Number of pregnant women that received antenatal care: at least four visits				
DQ 10 C. Number of births attended by skilled health personnel				
DQ 10 D. Number of children under one year of age who have received third dose of pentavalent vaccine				
DQ 10 E.				
DQ 10 F.				
DQ 10 G. Number of weights measured for children under 5yrs				
DQ 10 H. Number of inpatient discharges				
DQ 10 I. Number of slides or RDT positive for malaria				
DQ 10 J				
DQ 10 K.				
DQ 10 L.				

<b>Data Processing/Analysis</b>				
DQ11	Does an electronic database (DB) (eg. eHMIS, DHIS) exist to enter and process data?	0.No	1. Yes _____	If No skip
DQ12	Have staff ever used the DB to produce the following? (Check with all responsible for the DB)			
DQ12a	Calculate indicators for each facility catchment area	1.Yes	0.No	
DQ12b	Data summary report for the catchment	1.Yes	0.No	
DQ12c	Comparisons among reporting health institutions	1.Yes	0.No	
DQ12d	Comparisons with district/national targets	1.Yes	0.No	
DQ12e	Comparisons among types of services coverage	1.Yes	0.No	
DQ12f	Comparisons of data overtime (monitoring over time)	1.Yes	0.No	

DQ12g: If no to anyone of the questions on DQ12, what are the reasons for not using the DB?  
(circle all that apply)

1. Staff do not know how to use the database

2. There are better solutions (eg. Ms Excel, other software)
3. There was no intention to produce those summaries
4. Other (specify \_\_\_\_\_)

**DQ13. Free listing**

- Data quality is a problem in some institutions in Oromia and other regions. What do you think are the main reasons for low data quality in these institutions?

DQ13A. \_\_\_\_\_

DQ13B. \_\_\_\_\_

DQ13C. \_\_\_\_\_

DQ13D. \_\_\_\_\_

DQ13E. \_\_\_\_\_

DQ13F. \_\_\_\_\_

DQ13G. \_\_\_\_\_

DQ13H. \_\_\_\_\_

DQ13I. \_\_\_\_\_

DQ13J. \_\_\_\_\_

- Which three of the above listed factors are major determinants of data quality in your health institution? (Circle the identified three factors)

# The Status of M&E in the Ethiopian Health Sector

## Routine Data Quality Assessment Tool

### *Health Center and Hospitals*

**NOTE TO THE INTERVIEWER:** EXPLAIN THE TOOL TO THE M&E/HMIS FOCAL PERSON WHO WILL SERVE AS KEY INFORMANT AS WELL AS FACILITATOR OF RECORD REVIEW. YOU WILL HAVE TO VISIT DIFFERENT DEPARTMENTS WITHIN THE HEALTH INSTITUTION.

01	Date (GC)	____/____/____ DD / MM / YYYY
<b>HEALTH INSTITUTION IDENTIFICATION</b>		
Name of Health Institution	_____	
Institution Type (circle category):	4. Health Center 5. Hospital	
Zone		
Woreda		
Telephone Number (Office)		
Distance from supervisory health institution in KM		
Name of person interviewed/facilitated DQA		
Position of person interviewed		

General Information		
#	Question	Response
G1	Does the institution have an organogram describing the organization of M&E/HMIS unit in relation to the overall organizational structure?	3) Yes 4) No
G2	If yes to G1, where is the unit located within the institution?	
G3	Do M&E/HMIS staff have written job descriptions?	3) Yes 4) No
	What is the number of M&E posts (required & filled) for the following professional categories that are primarily responsible for the functioning of the M&E system?	
	<b>Professional category</b>	<b># Required per standard</b>
	i) Health Information Technicians (HIT)	
	j) Health Informatics (HI)	
	k) Health M&E (HME)	
	l) Epidemiology/Public Health	
	m) Data clerk	
	n) Other, specify: _____	
	o) Other, specify: _____	
	p) Other, specify: _____	
G4	Does the institution have electronic M&E database? (If no, skip to G8)	3) Yes (Name _____) 4) No
G5	Is the electronic M&E database currently functional?	3) Yes 4) No
G6	Is there any system in place to prevent unauthorized changes to data?	3) Yes 4) No
G7	If yes to G6, please, describe the system:	

G8	Does the institution have a human capacity development plan for M&E system (including for sub-reporting entities under the supervision of this institution)? <i>[Note: It could be part of the M&amp;E Plan of specific programs, or exist as a stand-alone document.]</i>	3) Yes 4) No
G9	If yes to G8, what key human capacity development strategies are planned?	
G10	Are there standard curricula for M&E/HMIS capacity building?	3) Yes 4) No
G11	If yes to G10, please, describe (duration, content, certification, etc..)	

Data Recording				
FQ1	Does this facility keep copies of the HMIS monthly reports which are sent to the district office?	1.Yes	0.No	If no, got oQ5
FQ2	Count the number of HMIS monthly reports that have been kept at the facility for the twelve months (Tir 2008 to Tahiras 2009EC)			
FQ3m	Does this facility keep outpatient and inpatient registers? (Electronic or paper-based)	1.Yes	0.No	If no, got oQ5

Q 10: Manually compile the number of following data items from the health facility registers for the selected two months. Compare the figures with the reports from the computer or paper database (submitted to the next level).				
Item (If one or more of the following services are not provided in the institution, please include a replacement data element)	Sene 2008		Tikimt 2009	
	# from registers	# from report submitted	# from registers	# from report submitted
FQ4 A. Family Planning (Total new and repeat acceptors)				
FQ4 B. Number of pregnant women that received antenatal care: at least four visits <i>(Check records of pregnant mothers registered for ANC during the nine months preceding the reporting month)</i>				
FQ4 C. Number of births attended by skilled health personnel				
FQ4 D. Number of children under one year of age who have received third dose of pentavalent vaccine <i>(Check records of children registered for EPI during the nine months preceding the reporting month)</i>				
FQ4 E.				
FQ4 F.				
FQ4 G. Number of weights measured for children under 5yrs, by age				
FQ4 H. Number of inpatient discharges				
FQ4 I. Number of slides or RDT positive for malaria				

FQ4 J.				
FQ4 K.				

FQ5	Did you receive a directive in the last three months from the senior management or the institution to:		
5A	Check the accuracy of data at least once in three months?	1.Yes,Observed	0.No
5B	Fill the monthly report form completely	1.Yes,Observed	0.No
5C	Submit the report by the specified deadline	1.Yes,Observed	0.No
FQ6	During the last three months, did you receive a directive from the senior management or the institution that there will be consequences for not adhering to the following directives:		
6A	if you do not check the accuracy of data	1.Yes,Observed	0.No
6B	If you do not fill in the monthly reporting form completely	1.Yes,Observed	0.No
6C	If you do not submit the monthly report by the specified deadline	1.Yes,Observed	0.No
<b>Data Completeness</b>			
FQ7m	How many data items does the facility need to report on in the HMIS service delivery monthly report for Tikimt 2009EC?This number does not include data items for services not provided by this health facility.		
FQ8	Count the number of data items that are supposed to be filled in by this facility but left blank without indicating "0" in the selected month's report.		
<b>Data Transmission/Data Processing/Analysis</b>			
FQ9	Do data processing procedures or a tally sheet exist?	1.Yes,Observed	0.No
FQ10	Does the facility produce the following?		
FQA	Calculate indicators for facility catchment	1.Yes,Observed	0.No
FQB	Comparisons with district or national targets	1.Yes,Observed	0.No
FQC	Comparisons among types of services coverage	1.Yes,Observed	0.No
FQD	Comparisons of data overtime (monitoring over time)	1.Yes,Observed	0.No

FQ10g: If no to anyone of the questions on FQ10, what are the reasons for not doing so? (circle all that apply)

5. Staff do not know how to use the database
6. There are better solutions (eg. Ms Excel, other software)
7. There was no intention to produce those summaries



8. Other (specify)

\_\_\_\_\_

FQ11	Does a procedure manual for data collection (with definitions) exist?	1.Yes,Observed	0.No	
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**FQ12. Free listing**

- Data quality is a problem in some institutions in Oromia and other regions. What do you think are the main reasons for low data quality in these institutions?

DQ13K. \_\_\_\_\_

DQ13L. \_\_\_\_\_

DQ13M. \_\_\_\_\_

DQ13N. \_\_\_\_\_

DQ13O. \_\_\_\_\_

DQ13P. \_\_\_\_\_

DQ13Q. \_\_\_\_\_

DQ13R. \_\_\_\_\_

DQ13S. \_\_\_\_\_

DQ13T. \_\_\_\_\_

- Which three of the above listed factors are major determinants of data quality in your health institution? (Circle the identified three factors)

# The Status of M&E in the Ethiopian Health Sector

## Routine Data Quality Assessment Tool

### *Health Post*

**NOTE TO THE INTERVIEWER:** EXPLAIN THE TOOL TO THE HEW WHO WILL SERVE AS KEY INFORMANT AS WELL AS FACILITATOR OF RECORD REVIEW.

01	Date (GC)	____/____/____ DD / MM / YYYY
<b>HEALTH INSTITUTION IDENTIFICATION</b>		
Name of Health Post	_____	
Zone		
Woreda		
Kebele		
Telephone Number		
Distance from supervisor health center in KM		
Name of person interviewed/facilitated DQA		
Position of person interviewed		

General Information		
#	Question	Response
G4	Does the institution have electronic M&E database? (If no, skip to G8)	5) Yes (Name _____) 6) No
G5	Is the electronic M&E database currently functional?	5) Yes 6) No
G6	Is there any system in place to prevent unauthorized changes to data?	5) Yes 6) No
G7	If yes to G6, please, describe the system:	

DataRecording				
FQ1	Does this facility keep copies of the HMIS monthly reports which are sent to the supervising health center?	1.Yes	0.No	Ifno, got oQ5
FQ2	Count the number of HMIS monthly reports that have been kept at the health post for the twelve months (Tir 2008 to Tahisas 2009EC)			
FQ3m	Doesthisfacilitykeepregisters?	1.Yes	0.No	Ifno, got oQ5

Q 10: Manually compile the number of following data items from the health post registers for the selected two months. Compare the figures with reports submitted to the next level.				
Item(If one or more of the following services are not provided in the institution, please include a replacement data element)	Sene 2008		Tikimt 2009	
	# from registers	# from report submitted	# from registers	# from report submitted
FQ4 A. Family Planning (Total new and repeat acceptors)				
FQ4 B. Number of pregnant women that received antenatal care: at least four visits <i>(Check records of pregnant mothers registered for ANC during the nine months preceding the reporting</i>				

<i>month)</i>				
FQ4 D. Number of children under one year of age who have received third dose of pentavalent vaccine <i>(Check records of children registered for EPI during the nine months preceding the reporting month)</i>				
FQ4 E. Number of births attended by HEW				
FQ4 F.				
FQ4 G. Number of weights measured for children under 5yrs				
FQ4 I. Number of RDT positive for malaria				
FQ4 J.				
FQ4 K.				
FQ4 L.				

FQ5	Did you receive a directive in the last three months from the senior management or the institution to:		
5A	Check the accuracy of data at least once in three months?	1.Yes,Observed	0.No
5B	Fill the monthly report form completely	1.Yes,Observed	0.No
5C	Submit the report by the specified deadline	1.Yes,Observed	0.No
FQ6	During the last three months, did you receive a directive from the senior management or the institution that there will be consequences for not adhering to the following directives:		
6A	if you do not check the accuracy of data	1.Yes,Observed	0.No
6B	If you do not fill in the monthly reporting form completely	1.Yes,Observed	0.No
6C	If you do not fill in the monthly reporting form timely	1.Yes,Observed	0.No
	<b>Data Completeness</b>		

FQ7m	How many data items does the facility need to report on in the HMIS service delivery monthly report for Tikimt 2009EC? This number does not include data items for services not provided by this health facility.			
FQ8	Count the number of data items that are supposed to be filled in by this facility but left blank without indicating "0" in the selected month's report.			
<b>Data Transmission/Data Processing/Analysis</b>				
FQ9	Do data processing procedures or a tally sheet exist?	1.Yes,Observed	0.No	
FQ10	Does the facility produce the following?			
FQA	Calculate indicators for facility catchment area	1.Yes,Observed	0.No	
FQB	Comparisons with district or national targets	1.Yes,Observed	0.No	
FQC	Comparisons among types of services coverage	1.Yes,Observed	0.No	
FQD	Comparisons of data overtime (monitoring overtime)	1.Yes,Observed	0.No	

FQ10g: If no to anyone of the questions on FQ10, what are the reasons for not doing so? (circle all that apply)

- 9. Staff do not know how to use the database
- 10. There are better solutions
- 11. There was no intention to produce those summaries
- 12. Other (specify

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FQ11	Does a procedure manual for data collection (with definitions) exist?	1.Yes,Observed	0.No	
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**FQ12. Free listing**

- Data quality is a problem in some institutions in Oromia and other regions. What do you think are the main reasons for low data quality in these institutions?

DQ13U. \_\_\_\_\_

DQ13V. \_\_\_\_\_

DQ13W. \_\_\_\_\_

DQ13X. \_\_\_\_\_

DQ13Y. \_\_\_\_\_

DQ13Z. \_\_\_\_\_

DQ13AA. \_\_\_\_\_

DQ13BB. \_\_\_\_\_

DQ13CC. \_\_\_\_\_

DQ13DD. \_\_\_\_\_

- Which three of the above listed factors are major determinants of data quality in your health institution? (Circle the identified three factors)

# The Status of M&E in the Ethiopian Health Sector

## Organizational and Behavioral Assessment Tool

To be filled by management and staff at all levels

**NOTE TO THE INTERVIEWER:** PROVIDE INFORMATION ABOUT THE SURVEY AND ASK FOR CONSENT TO PARTICIPATE USING THE INFORMATION SHEET.

01	Date (GC)	_____ / _____ / _____ DD / MM / YYYY
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### HEALTH INSTITUTION IDENTIFICATION

Name of Health Institution	
Department	
Institution Type (circle category):	<ol style="list-style-type: none"> <li>1. Specialized Hospital</li> <li>2. General Hospital</li> <li>3. Primary Hospital</li> <li>4. Health Center</li> <li>5. Health Post</li> <li>6. Woreda Health Office</li> <li>7. Zonal Health Department</li> <li>8. Regional Health Bureau</li> </ol>
Zone	
Woreda	
Town	
Kebele	





DD5. Total years of experience in years \_\_\_\_\_

DD5\_A. Total years of experience on current position in years \_\_\_\_\_

DD7. Have you ever received in-service training on HMIS/M&E? 0. No 1.Yes

DD7\_1. Did you receive pre-service training on HMIS/M&E? 0. No 1.Yes

DD6. If yes to DD7, when was the last time you received training? \_\_\_\_\_ months back

## INSTRUCTIONS

We would like to know your opinion about how strongly you agree with certain activities carried out by \_\_\_\_\_. There are no right or wrong answers, but only expression of your opinion on a scale.

1. The scale is about assessing the intensity of your belief and ranges from strongly disagree (1) to strongly agree (5).
2. You have to determine first whether you agree or disagree with the statement. Second decide about the intensity of agreement or disagreement.
3. If you **disagree** with statement then use left side of the scale and determine how much disagreement that is strongly disagree (1) or disagree (2) and circle the appropriate answer.
4. If you are not sure of your belief or think that you neither disagree nor agree, then circle 3.
5. If you **agree** with the statement, then use right side of the scale and determine how much agreement that is agree (4) or strongly agree (5) and circle the appropriate answer.
6. Please note that you might agree or disagree with all the statements and similarly you might not have the same intensity of agreement or disagreement and thus variations are expected in expressing your agreement or disagreement. We encourage you to express those variations.

This information will remain confidential and would not be shared with anyone, except presented as an aggregated data report. Please be frank and choose your answer honestly.

**To what extent, do you agree with the following on a scale of 1-5?**

<b>In your health institution, decisions are based on:</b>	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
D1. Personal liking					
D2. Superiors' directives					
D3. Evidence/facts					
D4. Political interest					
D5. Comparing data with strategic health objectives					
D6. Health needs					
D7. Considering costs					

<b>In your health institution, overall organizational processes and policies:</b>	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
O1. Support the use of data for decision making					
O2. Encourage reporting accurate data for well performed activities					
O3. Encourage reporting accurate data for underperformed activities					

<b>In your health institution, supervisors</b>	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
S1. Seek feedback from concerned persons					
S2. Emphasize data quality in monthly reports					

S3. Discuss conflicts openly to resolve them					
S4. Seek feedback from concerned community					
S5. Use HMIS data for setting targets and monitoring					
S6m. Check data quality regularly					
S7. Provide regular feedback to their staff through regular report based on evidence					
S8. Report on data accuracy regularly					
S9. Encourage their supervisees to over report (false report) their performance					

<b>In your health institution, staff</b>	<b>Strongly disagree (1)</b>	<b>Disagree (2)</b>	<b>Neutral (3)</b>	<b>Agree (4)</b>	<b>Strongly Agree (5)</b>
P1. Are punctual					
P2. Document their activities and keep records					
P3. Feel committed in improving health status of the target population					
P4. Set appropriate and doable target of their performance					
P5. Feel guilty for not accomplishing the set target/performance					
P6. Are rewarded for good work					

<b>In your health institution, staff</b>	<b>Strongly disagree (1)</b>	<b>Disagree (2)</b>	<b>Neutral (3)</b>	<b>Agree (4)</b>	<b>Strongly Agree (5)</b>

P7. Use HMIS data for day to day management of the facility and Health Institution					
P8. Display data for monitoring their set target					
P9. Can gather data to find the root cause(s) of the problem					
P10. Can develop appropriate criteria for selecting interventions for a given problem					
P11. Can develop appropriate outcomes for a particular intervention					
P12. Can evaluate whether the targets or outcomes have been achieved					
P13. Are empowered to make decisions]					
P14. Able to say no to supervisors and colleagues for demands/decisions not supported by evidence					
P15. Are made accountable for poor performance					
P16. Use HMIS data for community education and mobilization					
P17. Admit mistakes for taking corrective actions					
P18. Are encouraged to over report (false reporting) their performance					

	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
<b>Personal</b>					
BC1. Collecting information which is not used for decision making discourages me					
BC2. Collecting information makes me feel bored					

BC3. Collecting information is meaningful for me					
BC4. Collecting information gives me the feeling that data is needed for monitoring facility performance					
BC5. Collecting information give me the Feeling that it is forced on me					
BC6. Collecting information is appreciated by Co-workers and supervisors					

## SELF-EFFICACY

This part of the questionnaire is about your perceived confidence in performing tasks related to health information systems. High Confidence indicates that person could perform the task, while low confidence means room for improvement. We are interested in knowing how confident you feel in performing HMIS-related tasks. Please be frank and rate your confidence honestly.

Please rate your confidence in percentages that you can accomplish the HMIS activities.

Rate your confidence for each situation with a percentage from the following scale

0      10      20      30      40      50      60      70      80      90      100

Self-Efficacy	No						Yes				
	0	10	20	30	40	50	60	70	80	90	100
SE1. I can check data accuracy											
SE2. I can calculate percentages/rates correctly											
SE3. I can plot data by months or years											
SE4. I can compute trend from bar charts											
SE5. I can explain findings & their implications											

SE6. I can use data for identifying gaps and setting targets											
SE7. I can use data for making various types of decisions and providing feedback											

***Thank you for your responses and time!***