

**ASSESSMENT OF DATA QUALITY AND INFORMATION USE OF THE COMMUNITY
HEALTH INFORMATION SYSTEM: A CASE STUDY OF KARURUMO COMMUNITY
HEALTH UNIT- EMBU COUNTY, KENYA**

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DECLARATION

This project is my original work and has not been presented for a degree in any other
University.

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DR WANJIRU GICHUHI

DEDICATION

This project is dedicated to my husband Duncan Ndegwa.

Your support was invaluable.

And to my children: Darryl Maina, Hope Muthoni and Daniel Ndang'a

May you follow and overtake your mother's footsteps.

ABSTRACT

This study focused on assessing data quality and information use of Karurumo Community Health Unit (CHU) data collected through the Community Health Information System (CHIS), for the period September to November 2014. The assessment focused on three dimensions of data quality: completeness accuracy; and timeliness. Use of information was assessed based on: dialogue, action, feedback, referral, sharing and advocacy. Data was obtained from the CHIS data collection tools as well as from the District Health Information Software (DHIS2).

Completeness as the degree to which the Community Health Information System's data covers all services and is filled out in full on data collection forms was assessed at three levels: Completeness of Community Health Volunteers reporting, assessed the total number of reports received from Community Health Volunteers in relation to the total number of reports expected from the Community Health Volunteers. Data element completeness assessed the total number of reports from the Community Health Volunteers with no missing values. While Completeness of Community Health Extension Workers reporting assessed the total number of data elements filled by the Community Health Extension Worker for the month in relation to the total number of data elements expected to be filled for that month.

The results of the assessment show that Completeness of reporting for the three months being assessed was excellent, with an average score of 95.4 percent. Community Health Volunteers reporting was very good, with a score of 90 percent. The Community Health Volunteers data element completeness was excellent with a score of 100 percent. The completeness of Community Health Extension Workers reporting was also excellent with a score of 96.4 percent.

Accuracy as the matching of data transmitted from one level to another in the Community Health Information System was assessed at three levels by selecting four data elements to be assessed. At the Community Health Volunteers reporting, the data elements were aggregated and compared with the Community Health Extension Workers summary. The next level of assessment was to compare the data elements in the Community Health

Extension Workers summary against the same data elements in DHIS2. The third level of assessment for accuracy was to compare the Community Health Extension Workers summary report with the chalkboard report.

The results show that the accuracy of aggregated data from the Community Health Volunteers service delivery log book compared to the way it was reported in the Community Health Extension Workers summary reports was excellent, at 98.8 percent, while that of the Community Health Extension Workers summary report compared to the DHIS2 report was not calculated, since none of the Community Health Extension Workers summary reports for the three months were entered into DHIS2. The same applied to data transmission from the Community Health Extension Workers summary to the chalk board, since the chalk board was last updated in June 2014

Timeliness can be defined as the extent to which data are sufficiently up-to-date for a task. Information is timely if information is available when needed. For this study, keeping deadlines for the submission of reports was used as a proxy measure of the timeliness of the data. This was to be measured by checking the date of receipt of reports from Community Health Volunteers by Community Health Extension Workers for the three months and recording those that were received before and after the deadline. From the study, it was realized that the Community Health Extension Workers does not record the date of receipt of reports from the Community Health Volunteers, since the reporting form does not have such a provision. Therefore, it could not be determined whether reports were received before or after the submission deadline. This means that timeliness could not be established for the Community Health Unit.

Use of information was assessed by allocating two points to every answer that was YES and zero points to every NO answer. There were thirteen questions, and the highest possible score was twenty six points. Scores between 2 and 8 indicate that use of information overall is very weak. Scores between 10 and 14 indicate weakness but some signs of use of information. Scores 16 through 20 indicate beginning of active use of information, and 22 to 26 indicate an advanced level of use of information.

For the study, Use of Information scored 20 out of 26 points (76.9 percent), indicating the beginning of active use of information. Dialogue scored 2 points out of a total score of 4. Action scored 2 out of 4 points; feedback scored 4 out of 6 points; referrals scored 6 out of 6; sharing scored 4 out of 4; while advocacy scored 2 out of 2.

The recommendations of the study for Policy and Programmes are as follows: policy makers should come up with a system to ensure all the Community Health Units conduct routine data quality assessments, and develop action plans to improve the quality of data to inform decision making.

A second recommendation is that data collection tools need to be reviewed to ensure that they capture the timeliness of the data collection and transmission processes. This can be done by including a place for indicating the date of receipt of reports at the higher levels.

The transmission of data from the manual CHIS forms (MOH 515) into the electronic form in DHIS should be a practice that is inculcated in all the CHUs, since it is a requirement for reporting.

Programmes that are using the CHIS can also conduct assessments of the CHIS to establish a baseline of CHIS performance for improvement. The findings will serve as a basis of comparison with information collected in later assessments. Assessment of the CHIS will thus be a quality improvement strategy for the CHIS.

Financial and technical support for dialogue and action days should be provided, to ensure that all the Community Health Units are functioning as required and also accomplish their set mandates.

For the referral system, the clinicians in the health facilities that attend to the clients that have been referred from the Community Health Units need to be sensitized on the need to complete the referral forms, so that the referrals are completed.

Recommendations of the study for future research are as follows: there is need for further research to identify the factors that influence the quality of data of the Community Health

Information System, to enable the users of the system to identify the areas that need improvement and to come up with action plans for data quality improvement.

Future studies can also focus on other dimensions of data quality including: validity, periodicity, relevance, reliability, precision, integrity, confidentiality, comparability, consistency, concordance, granularity, repeatability, usability, objectivity, accessibility, transparency and representativeness.

Since Karurumo is considered a model CHU, the data quality and information use practice observed in the CHU are not the norm. future studies can therefore compare a model CHU and one that is not enjoying donor support to establish whether the data quality and information use practice of such a CHU are similar to those of a model CHU.

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ABBREVIATIONS AND ACRONYMS

CBHIS	Community Based Health Information System
CHC	Community Health Committee
CHEWs	Community Health Extension Workers
CHIS	Community Health Information System
CHS	Community Health Services
CHU	Community Health Unit
CHVs	Community Health Volunteers
CHWs	Community Health Workers
DHIS	District Health Information System
DHIS2	District Health Information Software version 2
DHMIS	District Health Management Information System
DQA	Data Quality Assessment
DQRC	Data Quality Report Card
HISs	Health Information Systems
HMIS	Health Management Information Systems
HMN	Health Metrics Network
ICT	Information and Communications Technology
KEPH	Kenya Essential Package for Health
MOH	Ministry of Health
NHSSP	National Health Sector Strategic Plan
PRISM	Performance of Routine Health Information System Management
RHINO	Routine Health Information Network
RHIS	Routine Health Information System
WHO	World Health Organization

TABLE OF CONTENTS

DECLARATION	ii
DEDICATION	iii
ABSTRACT	iv
ACKNOWLEDGEMENT	viii
ABBREVIATIONS AND ACRONYMS.....	ix
LIST OF TABLES.....	ix
LIST OF FIGURES.....	x
CHAPTER ONE.....	1
INTRODUCTION.....	1
1.1 BACKGROUND OF THE STUDY	1
1.2 PROBLEM STATEMENT	3
1.3 RESEARCH QUESTIONS	6
1.4 STUDY OBJECTIVES.....	6
1.4.1 GENERAL OBJECTIVE	6
1.4.2 SPECIFIC OBJECTIVES	7
1.5 JUSTIFICATION OF THE STUDY.....	7
1.6 SCOPE AND LIMITATIONS OF THE STUDY	7
CHAPTER TWO	9
LITERATURE REVIEW	9
2.1 INTRODUCTION.....	9
2.2 PERSPECTIVES TO DEVELOPMENT OF HEALTH INFORMATION SYSTEMS.....	9
2.3 COMMUNITY HEALTH INFORMATION SYSTEM.....	12
2.4 EMPIRICAL REVIEW OF ASSESSMENT	15
2.5 CONCEPTUAL FRAMEWORK.....	21
2.6 OPERATIONAL FRAMEWORK.....	23
CHAPTER THREE	25
METHODOLOGY	25
3.1 INTRODUCTION	25
3.2 SOURCES OF DATA	25

3.3 STUDY AREA	27
3.4 SAMPLING	29
3.5 VARIABLE DESCRIPTION	29
3.6 DATA ANALYSIS.....	32
CHAPTER FOUR.....	33
RESULTS, INTERPRETATION AND DISCUSSION	33
4.1 INTRODUCTION.....	33
4.2 RESULTS OF DATA QUALITY ASSESSMENT	33
4.2.1 ASSESSMENT OF COMPLETENESS.....	34
4.2.2 ASSESSMENT OF ACCURACY	37
4.3 RESULTS OF ASSESSMENT OF INFORMATION USE.....	40
4.4 JOINT CLASSIFICATION OF DATA QUALITY AND INFORMATION USE.....	42
4.5 DISCUSSION.....	43
CHAPTER FIVE	46
SUMMARY, RECOMMENDATIONS AND CONCLUSION.....	46
5.1 SUMMARY	46
5.2 RECOMMENDATIONS.....	47
5.2.1 POLICY AND PROGRAMMES.....	47
5.2.2 FUTURE RESEARCH	48
5.3 CONCLUSION.....	48
REFERENCES.....	50
APPENDIXES.....	57
APPENDIX 1: DATA COLLECTION FORM	57

LIST OF TABLES

Table 3.1: Summary of the Study Data Sources and Collection Process.....	28
Table 3.2: Grading Criteria for Data Quality.....	30
Table 3.3: Grading Criteria for Use of Information.....	31
Table 3.4: Joint Classification of Data Quality and Use of Information.....	31
Table 4.1: Accuracy of Reporting.....	38
Table 4.2: Selected Data Elements for Assessment of Accuracy	37
Table 4.3: Use of Information Scores.....	40

LIST OF FIGURES

Figure 2.1: Functional Health Information System	22
Figure 2.2: Operational Framework	24
Figure 4.1: Data Quality Assessment Scores	34
Figure 4.2: Completeness of Reporting	35

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

The World Health Organization (WHO) defines a Health Information System (HIS) as a system that integrates data collection, processing, reporting, and use of the information and knowledge to influence policy-making, programme action and research (WHO, 2000). The main aim of having an information system is to improve efficiency and effectiveness of services by ensuring the managers, service providers and users of the information generated use the information to make decisions (evidence based decision making). This in turn improves the quality of services offered (WHO, 2005). A health information system should exist for two main purposes which are data collection and enabling decision making

Six key attributes, or building blocks, of a health system have been identified by the World Health Organization, with Health Information Systems among these. The others are: health workforce, leadership and governance, health service delivery, health systems financing, and access to essential medicines (WHO, 2007). While each of the six building blocks are essential, Health Information Systems are critical for decision-making within each of the other five building blocks, hence forming the foundation of health systems (AbouZahr and Boerma, 2005).

In Kenya, the electronic District Health Information Software version 2 (DHIS 2) is the national health information system in use for data management and analysis purposes and health program monitoring and evaluation. Routine health Data at community and facility levels are collected manually using registers and other paper based tools. Other data are collected through mobile technologies (m-Health) and Electronic health records (EHRs)/Electronic Medical Records (EMRs). These data are then entered into the DHIS2, where they are captured, validated, analysed and managed.

A Community Health Information System (CHIS) is a system for collecting, processing, analyzing, disseminating and using information about Community Health Services and the community health needs of the population it serves (WHO, 2000).

A CHIS generates information through sources at the community level. Such a source is more comprehensive since it covers all those who need particular health care or all who suffer from a given condition in a population. At the community level, this source of information is complete in coverage and is planning and action oriented. This is different from the information originating from health facilities such as hospitals, health centers and dispensaries, which is limited in scope since it only covers those who seek healthcare from the facilities (Odhiambo-Otieno, 2005).

The objective of a CHIS is to produce relevant and quality information to support decision making (WHO, 2000). The CHIS should hence strive to complement the functions of a health system which include: Improving decision-making, improving service delivery to the population and subsequently Impacting positively on the health outcomes of the target population at different levels of the health system. Health systems performance would be enhanced not only by bridging the interface between the community and the health system but also encouraging timely decision making and action based on available information (Routine Health Information Network, 2003).

Community Health Information is important for various reasons: it helps in detecting problems, monitoring progress towards health goals and decision making; empowering individuals and communities with timely and understandable health related information; provides evidence for informing policies; documents success stories for scale up and replication; provides information that can be used for research; and provides information for improving governance, mobilizing new resources, and ensuring accountability. (MOH 2012).

In recent years, data quality has become an important issue, not only because of its importance in promoting high standards of patient care, but also because of its impact on government budgets for the maintenance of health services (WHO, 2003). Authorities at all levels of health care, including hospitals, community health centers, outlying clinics and aid posts, as well as ministries or departments of health, should be concerned about poor data quality and the impact it has on the quality of health care.

A high premium is placed on the CHIS, since it is the one that provides all the information needed to inform decision making at the community level. It is therefore imperative that the CHIS produces good quality information and that the information produced is used by the producers and managers to inform decision making.

1.2 PROBLEM STATEMENT

A study by Herbst (1999) observed that Health Information Systems are rarely assessed, in developed and developing countries, despite the large resources allocated to them. Assessment of these systems would give valuable information for improving the effectiveness and efficiency of health services. This notion is further supported by Garrib et al., (2008) in a study to evaluate the District Health Information System in rural South Africa. They describe the Health Information System in the country as not been systematically evaluated to assess its impact on health service delivery (Garrib et al., 2008).

A health information system is expected to produce quality information in support of health system performance, and more particularly of health service delivery. HIS is the backbone for planning and management of the health services, and can potentially play an important role in program improvement and reporting at all levels. Unfortunately, HIS in many developing countries are unable to provide the information support needed. The data produced are of low quality and the information generated is poorly used to inform decision making (Belay and Lippeveld, 2013).

Although reliable and timely health information is the foundation of public health action, it is often unavailable due to under-investment in systems for data collection, analysis, dissemination and use. Consequently, decision-makers cannot identify problems and needs, track progress, evaluate the impact of interventions and make evidence-based decisions on health policy, programme design and resource allocation. (WHO, 2008).

Ireland's Health Information and Quality Authority (2011) describes health as being information-intensive, generating huge volumes of data every day and spending an estimated 30 percent of the total health budget in one way or another on handling information, collecting it, looking for it, storing it (Health Information and Quality

Authority, 2011). The authority further states that safe, reliable, healthcare depends on access to, and the use of, information that is accurate, valid, reliable, timely, relevant, legible and complete).

The Canadian Institute for Health Information (CIHI) (2009) describes data and information quality as intrinsic in informing public policy, support health care management and build public awareness about the factors that affect health (CIHI, 2009). Assessment of data and information quality is key in ensuring that the data collected and provided is of the highest standard.

According to Measure Evaluation (2010), significant human and financial resources have been invested worldwide in the collection of data on populations, facilities and communities. Unfortunately, this information is often not used by key stakeholders to effectively inform policy and programmatic decision making. Further, it argues that the failure to consider all the empirical evidence before making decisions hinders the health system's ability to respond to priority needs throughout its many levels. Traditional approaches to monitoring and evaluation (M&E) usually focus on the coverage and quality of M&E data and tend to overlook information use for decision making, either by implicitly assuming that once data are collected and analyzed they will be used or by addressing only mid-course corrections that arise when desired outcomes are not achieved. The failure to address information-based decision making in M&E is exacerbated because the people who collect and analyze the data are typically not the people who make decisions (Measure Evaluation, 2010).

According to Kimaro and Twaakyondo, (2005), the lack of adequate knowledge, skills and resources by health workers to make sense of information and an understanding of the general role of the HMIS in their work of providing direct health (curative) services has affected the use of information. When information is not used and there is no routine feedback or regular training, it can lead to a perception that reporting is done for the sake of the system, and secondary to the provision of direct health services. A consequence of this is little emphasis on collecting accurate data, as well as late or missing reports (Kimaro and Twaakyondo, 2005).

The link between data quality and information use is that in one scenario, both data quality and use of information are weak. In another, there may be availability of good quality data, but does not result in use of information. In this scenario, there is a divorce between data production and use. Another situation is that the information system may be producing limited quality of data, but managers are using the data as best they can. This scenario suggests that managers are already motivated to use information (that demand is present), but the decisions they make may be jeopardized by the quality of the information they are using. The ideal status is when both data quality and use of information are strong and improving (Measure Evaluation, 2005).

Since high quality data are the prerequisite for better information, better decision-making and better population health (WHO, 2008), effective data quality and information use assessments are required for accurately evaluating the impact of public health interventions and measuring public health outcomes (Chen, et al; 2014).

A CHIS exists that generates information about the health status of household members, which helps communities identify their needs and set priorities for action. This goes a long way in building the capacity of communities to take charge of their own health and improving the health status of the people of Kenya. For implementers, beneficiaries and funders of Community Health Services to make informed decisions, the CHIS is key in providing the relevant information. It is therefore very important to ensure that the CHIS is providing quality information needed to inform decision making and to improve the health status of the people. This can only be realized by assessing the quality of data that the CHIS produces, as well as the information use practice. An assessment of the CHIS is fundamental to ensure that the information system is efficient, collects high-quality relevant information, and is used by care givers, managers, and policy makers (Hanmer, 1999).

This study sought to assess the Community Health Information System in Karurumo Community Health Unit in the county of Embu, to determine the quality of data the system produces, and the practice of using information generated by the system. The choice of Karurumo CHU was because it is considered a model community health unit due to a

number of reasons including: the workforce for the CHU are very cooperative and dedicated to their work; the CHU has many success stories since it was established, that are well documented; the community members are receptive and the reporting for the CHU is good.

This is as a result of donor support to the CHU. The CHU was a study site for an operational research conducted by Japan International Cooperation Agency (JICA). Being the case site, the CHU was provided with financial resources such as stipends for the CHVs, as well as material resources such as motor bikes, bicycles and reporting tools. All the workforce in the CHU were also trained in the basic package of training according to the community health curriculum. In addition, the CHU was also supported by APHIA plus KAMILI in the area of training, and incentives for CHVs, as well as supervision.

Data quality was to be measured on the following dimensions: completeness, accuracy; and timeliness of the information process. The reason for focusing on the three dimensions of data quality as opposed to all the others is because the study adopted the Performance of Routine Information System Management (PRISM) Framework's Routine Health Information System (RHIS) Performance Diagnostic Tool that assesses the level of data quality in relation to completeness, timeliness, and accuracy. Information use was assessed on the following criteria: dialogue, action, referral, sharing, feedback and advocacy.

1.3 RESEARCH QUESTIONS

1. What is the quality of Karurumo Community Health Unit's CHIS data in terms of completeness; accuracy; and timeliness?
2. What is the Information use practice of the CHIS in Karurumo Community Health Unit?

1.4 STUDY OBJECTIVES

1.4.1 General Objective

The general objective of the study was to assess the Community Health Information System in Karurumo Community Health Unit, Embu County.

1.4.2 Specific Objectives

1. To assess the quality of the CHIS data in terms of completeness; accuracy; and timeliness.
2. To determine the level of Information use of the CHIS.
3. To diagnose the status of the CHIS by using the Joint Classification of Quality of Data and Use of Information.

1.5 JUSTIFICATION OF THE STUDY

Community Health Services have been implemented through the community strategy, since it was launched in 2006 (MOH, 2007). A Community Health Information System exists to monitor and evaluate the community health services and is expected to provide the Community Health Services with timely and accurate information towards the successful implementation and achievement of objectives, as well as to inform decision making (MOH, 2013).

An assessment on data quality and information use is important to determine the status of the information system in providing good quality data and use of information for decision making. The CHIS has not been assessed to establish whether it produces quality information to inform decision making, and to establish how information generated by the system is used. The study therefore sought to address this gap by assessing the quality of data and information use practice of the system. Further to this, the recommendations generated from the assessment can be used to strengthen and improve the quality of CHIS data and use of information. This research study will also contribute to the existing body of knowledge.

1.6 SCOPE AND LIMITATIONS OF THE STUDY

This study covered the Community Health Information System used in Karurumo Community Health Unit, as well as the data for the Community Health Unit updated in the District Health Information Software (DHIS 2)

The sources of data for the study were mainly information that had already been collected, and therefore it was difficult to determine whether or not the data contained in the

registers represents what is taking place in the CHU, since direct observation of data collection procedures was not possible for this study.

The study was an assessment of data quality and information use of the Community Health information System. It did not take into account factors outside of that domain such as the organizational structures, resources and rules governing the operation of the CHIS.

Whereas data quality dimensions are varied, including: Completeness, accuracy, timeliness, validity, periodicity, relevance, reliability, precision, integrity, confidentiality, comparability, consistency, concordance, granularity, repeatability, usability, objectivity, accessibility, transparency and representativeness (Chen, et al, 2014), this study focused on only three dimensions of data quality: completeness, accuracy and timeliness, but the dimension of timeliness could not be assessed due to unavailability of data on the same.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter focused on related literature on the study. The chapter is presented under the following sections: Perspectives to development of Health Information System focuses on the need for health information systems as well as the evolution of health information systems. The Community Health Information System is then examined, followed by assessment review, which focuses on the relevant literature relating to the assessment. The conceptual framework and operational framework of the study are also addressed in this chapter.

2.2 PERSPECTIVES TO DEVELOPMENT OF HEALTH INFORMATION SYSTEMS

Reliable and timely health information is an essential foundation of public health action and health systems strengthening, both nationally and internationally (Abouzahr and Boerma, 2005). This is particularly so when resources are limited and funding-allocation decisions can mean the difference between life and death. The need for sound information is especially urgent in the case of emergent diseases and other acute health threats, where rapid awareness, investigation and response can save lives and prevent broader national outbreaks and even global pandemics (WHO, 2008).

The demand for good-quality health information is growing, driven in part by the move towards performance-based resource allocation and by significant increases in the resources for health mobilized in recent years, for example through the Global Fund for HIV/AIDS, TB and Malaria (GFATM). In the context of such global initiatives, reporting requirements for countries are being stepped up, while the frequent monitoring of short term programme outputs (such as improvements in service provision and the number of people using such services) is now required as part of performance-based disbursement systems. At the same time, enhanced reporting of health outcomes (such as improvements in the quality and length of life) is required to monitor progress towards major international goals such as the Millennium Development Goals (MDGs) (WHO, 2007).

Some of the benefits of investing in the development of effective Health Information Systems include: enabling decision-makers at all levels to detect and control health problems; monitor progress towards health goals and promote equity; Empower individuals and communities with timely and understandable health information; Strengthen the evidence base for effective health policies; permit evaluation of scale-up efforts and enable innovation through research; Improve governance, mobilize new resources, and ensure accountability in their use (WHO, 2007).

In 1978, the Alma-Ata conference declared that primary health care is essential health care and called for urgent and effective national and international action to develop and implement primary health care throughout the world and particularly in developing countries (WHO, 1978). This set a course leading to the development of the health information systems most commonly seen in developing countries today. Concern for monitoring the performance of the health care system gave rise to paper-based data collection systems intended to provide comprehensive data on the performance of the country's public health system and its disease burden (Vital Wave Consulting, 2009).

In the past decade, there has been tremendous activity and innovation in the development of health information systems, spurred in large part by technological advances, and the interest these advances have generated in the health sector. Progress has been made in designing systems that meet the needs of patients and health workers (Vital Wave Consulting 2009).

A landscape analysis on Health information systems in developing countries conducted by Vital Wave Consulting in 2009 categorized Health information systems in five stages, as countries move toward systems of greater scope, scale, and sophistication. The categorization captures in a general way the characteristic features of national-level programs to collect health information. HIS stages are based on five dimensions: data flow and collection, data utilization and integration, resources and capacity, scope, and scale. The categorization depicts the evolving sophistication of these systems, the quality of decision making that these systems can support, and the capabilities required to sustain them.

Stage 1 represents countries that still rely on unreformed district health information systems. These are paper-based systems that are highly fragmented and burdensome to health workers tasked with data collection. The majority of low-income, developing countries as well as lower-middle income countries belong in this category.

Stage 2 represents countries that still employ paper-based systems yet have undertaken an initiative to address data quality, accuracy and timeliness by optimizing the type and amount of data collected and reforming data collection processes. These initiatives explicitly focus on optimizing the existing paper based district health information system without any advance commitment to electronic technology. Though technology is not involved at this stage of development, the opportunities to optimize an existing paper-based system are quite significant.

Stage 3 represents the start of the electronic collection and storage of health data, to further address the issue of data collection quality, accuracy and timeliness. Initiatives in this category may start off in a few districts or states but proceed with the eventual goal of a nationwide rollout. Many initiatives result in a hybrid system where paper forms are completed at the facility level and which are subsequently entered into a computer at the district level. Depending on the number of indicators as well as the software used for data entry, migration from a paper-based to an electronic system does not necessarily reduce the burden on local health workers, but it does reduce errors associated with manual aggregation of the data at higher administrative levels. Electronic systems also make reporting potentially much more flexible and efficient, because information can be analyzed at the district level as well as above.

Stage 4 represents a fundamental shift in HIS strategy, and a significant escalation of required capability and resource demands. Initiatives in this category attempt to eliminate conventional data collection conducted as a separate activity independent of the actual delivery of health services. Instead, the initiative is to derive indicators from data captured as part of routine business operations. These systems include Electronic Medical Records, but also pharmacy, laboratory, supply chain, human resources, finance, and other applications that support many of the activities on which health care services are

dependent. These systems manage health care at the point of service as well as satisfying the reporting needs for higher level policy makers and donors.

Stage 5 represents a final step in the evolution of a comprehensive national HIS where all critical data sources are available and fully integrated into a system that is adaptable and sustainable over time (Vital Wave Consulting 2009).

2.3 COMMUNITY HEALTH INFORMATION SYSTEM

Kenya's first health policy was based on the country's landmark post-colonial nation-building and socio-economic development blueprint, the Sessional Paper No. 10 on African Socialism and its Application to Kenya of 1965, which emphasized the elimination of disease, poverty, and illiteracy (Wamai, 2009). Since 1994, the health sector development agenda was guided by the Kenya Health Policy Framework Paper (KHPFP). The Kenya Health Policy Framework Paper of 1994-2010 explicitly stated the underlying vision for health development and reform to provide quality health care that is acceptable, affordable and accessible to all (Ministry of Health, 1999). The government also identified decentralization as the key management strategy. (MOH, 2000). The implementation strategy for the health policy was devised in a series of five-year documents called the National Health Sector Strategic Plan (NHSSP).

The first National Health Sector Strategic Plan which covered the period 1999 to 2004 had four objectives, aimed at improving health services delivery to Kenyans. These were: Strengthening governance; Improving resource allocation; Decentralizing health services and management; and shifting resources from curative to preventive and Primary Health Care (PHC) (MOH, 1999). However, an evaluation carried out in 2004 on the health status in Kenya brought out the fact that rather than the expected improvement in health indices in Kenya following the formulation of the National Health Policy Framework of 1994, the health indices were worse (MOH, 2005). Such was the case for infant, child and maternal mortality rates (KNBS, 2003).

Kenya's second National Health Sector Strategic Plan (NHSSP II – 2005–2010) had a goal of reducing health inequalities and reversing the downward trend in health related outcome

and impact indicators (MOH, 2005). The NHSSP II defined a new approach to the way the sector would deliver health care services to Kenyans – the Kenya Essential Package for Health (KEPH). KEPH is the integration of all health programs into a single package that focuses towards improvement of health at different phases of human development. KEPH introduced six life-cycle cohorts and six service delivery levels. One of the key innovations of KEPH was the recognition and introduction of level 1 services, which were aimed at empowering Kenyan households and communities to take charge of improving their own health (MOH, 2005).

Realizing the importance of empowering households and communities in the delivery of the KEPH at level 1, the Ministry of Health and sector partners developed and launched a Community Strategy in 2006 (Ministry of Health, 2006). The Community Strategy is defined as a community based approach which sets out the mechanism through which households and communities take an active role in health related development issues by increasing their knowledge, skills and participation.

The overall goal of the Community Strategy is to enhance community access to health care in order to improve individual productivity and thus reduce poverty, hunger, and child and maternal deaths, as well as improve education performance. Eight key elements of the Community strategy are: Linkage mechanisms and Governance structure; Management structure; Mobilizing and organizing of communities into Community Unit (CU); Work force; Supportive supervision; Service delivery; Referral mechanisms; and a Community health information system (CHIS) (MOH, 2006).

The current health policy covers the period 2013-2030. The goal of the Health Policy is ‘attaining the highest possible standard of health in a manner responsive to the needs of the population’ (MOH, 2012). The Policy aims to achieve this goal through supporting provision of equitable, affordable and quality health and related services at the highest attainable standards to all Kenyans. It is designed to take the country beyond the current health services approach towards a focus on health, using a primary health care approach which remains the most efficient and cost-effective way to organize a health system (WHO,

2000). The policy recognizes the community health services as the foundation of the health care system.

One of the key elements of the Community Health Strategy is a Community Health Information System (CHIS) (MOH, 2006). The CHIS is an information system designed specifically to collect, analyze and use data that is obtained from the level one of the health care system (the community). It collects information on health (Morbidity and mortality statistics, Service statistics) and on management (human resources, financial, assets and infrastructure, drugs and supplies logistics) relating to the community health units. The CHIS has potential to be comprehensive because it has the possibility of covering everyone in a health unit under the responsibility of a Community Health Committee (CHC), according to their need for care. This type of system is able to collect information even about illnesses that are stigmatized like disability and various chronic conditions because the people who do the collecting are from within the community. More importantly, the system captures information from both those who visit and those who do not visit health facilities (MOH, 2006).

The goal of establishing the CHIS was to collect information to help the CHC plan and manage health activities at the community level. Within parameters set by the Ministry of Health, each CHC was to decide on the scope of their CHIS, guided by the CHEW. The CHC would prioritize the problems that determined the indicators to be included. After prioritization and agreement on possible courses of action, the CHC with the support of the CHEW were to plan specific actions to improve the community health situation.

To monitor and evaluate the actions and the level of improvement achieved, the CHC were to identify the type of information to be collected, who collects it and what tools are necessary. In addition, the committee was to describe how the information would be collected, analyzed, disseminated, utilized and stored for future use.

The information was collected through simple formats that the CHC, CHWs and CHEWs agreed on, such as tally sheets or simple questionnaires. This meant that there were no standardized formats for data collection, analysis and display of information in the different community units across the country. To address this challenge, the Division of

Community Health Services with the involvement of stakeholders developed standardized tools for collection, summarizing and display of information for the CHIS in 2009.

The information collated through the CHIS is used to: Contribute to dialogue , planning, action and assessment processes to fuel continuous health improvement; informing the participating community about their health situation and progress being made towards improvement; as well as comparing efforts by different communities in terms of health improvement (MOH, 2006).

2.4 EMPIRICAL REVIEW OF ASSESSMENT

High quality data and effective data quality assessment are required for accurately evaluating the impact of public health interventions and measuring public health outcomes (Chaulagai, et al; 2005). In many developing countries, lack of reliable data and grossly inadequate appreciation and use of available information in planning and management of health services are two main weaknesses of health information systems (Kimaro and Twaakyondo, 2005). The key performance metrics for the HIS are the availability and quality of the data it generates.

Chen, et al. 2014 state that the quality of data in public health information systems can be ensured by effective data quality assessments, and in order to conduct effective data quality assessments, measurable data attributes/ dimensions have to be precisely defined (Chen, et al; 2014).

In a study to review the data quality assessment methods for public health information systems, Chen, et al (2014) identify the following dimensions of data quality from different studies: completeness; accuracy; timeliness; validity; periodicity; relevance; reliability; precision; integrity; confidentiality; comparability; consistency; concordance; granularity; repeatability; usability; objectivity; accessibility; transparency and representativeness (Chen, et al; 2014). WHO (2003) also identifies the following as dimensions or components of data quality: accuracy and validity; reliability; completeness; legibility; currency and

timeliness; accessibility; meaning or usefulness; and confidentiality or security (WHO, 2003).

The HIS should undertake regular assessments of these dimensions for core indicators. The aim is to make a judgment whether the level and trend for each indicator adequately reflects reality, or whether the level and trend is likely to be a data artefact and does not reflect reality due to poor data quality. In the latter case, adjustment of the data may be necessary to avoid misleading conclusions, or omission of that indicator may be required until the data quality is improved in future collection (AbouZahr, 2013).

This study focused on three dimensions of data quality: completeness; accuracy; and timeliness. It also assessed the use of information. The empirical review therefore focused on the four components: accuracy; completeness; and timeliness of data and information use.

Completeness

In a study on the Design and implementation of a health management information system in Malawi. Chaulagai et al. (2005) observed that completeness of facility-based routine data was a big problem in Malawi. Data were incomplete in several ways: A number of facilities were not sending reports at all. Some other facilities were not sending reports regularly. The facilities that were regularly sending reports were not reporting data on each element every month, and those sending reports regularly on each data element were still failing to capture all the records. Thus, an indicator value generated from routine data was always lower than actual and therefore each report needed adjustment for under-reporting (Chaulagai et al; 2005).

Mphatswe et al. (2011) also conducted a study that assessed the completeness of the data reported between January 2007 and March 2009 to the DHIS for all 222 facilities providing PMTCT services in the study districts. Completeness was quantified by determining whether a value for a given data element from a specific facility was or was not present in the information system. It was analyzed by data element and facility, as well as over time (Mphatswe et al; 2011).

Hahn et al. (2013) in a study on information systems and data quality in three urban Kenyan Ante Natal clinics, observed that all examined reports were of limited completeness and accuracy. This was in both the Information Communication and Technology (ICT) supported facilities, as well as the facility using manual forms. In the study, data quality was limited by many different factors including technical, individual, and organizational aspects. A systematic intervention that incorporates all these aspects was needed to transform the one-way systems into an integrated health system with higher data quality and to promote a culture of information usage (Hahn et al; 2013).

Garrib et al. (2008) in their study on evaluation of the District Health Information System in rural South Africa conducted the evaluation around the information cycle framework that comprised the following components: Data collection; Data processing; Information presentation and Information use and feedback. The evaluation was structured to assess how well each step within this cycle was working. The results showed that in each clinic, data validation was limited to ensuring that the data submitted were complete, and occasionally checking that they were correct. Clinic staff and supervisors reported that even if the data did not look correct, checking it was rarely done due to lack of time (Garrib et al; 2008).

Accuracy

In determining data accuracy, Mphatswe et al. (2011) compared the data recorded in the DHIS with the data obtained from individual facility registers during data audits. An individual data element value was defined as accurate if the value recorded in the information system lay within 10 percent of the corresponding value “reconstructed” by the study team from the original source data during the data audit. The study observed that training of healthcare workers on the importance of public health information, monthly data reviews and feedback, and regular data audits was effective in significantly increasing the completeness and accuracy of the data used to monitor Prevention of Mother to Child Transmission of HIV/AIDS (PMTCT) services in South Africa (Mphatswe et al; 2011).

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Timeliness

In assessing the timeliness of compilation, analysis and dissemination of information, Chaulagai et al. (2005) noted that most routine data were collected for immediate actions. The routine information system requires daily compilation of data on key elements and immediate reporting of notifiable cases. Health facilities are required to update their monthly wall chart and constantly review disease and service coverage trends. However, despite consistent follow-ups and reminders, such practice had been established as a discipline in barely 50 percent of the health facilities (Chaulagai et al; 2005).

Kimaro and Twaakyondo (2005) in their study on Analyzing the hindrance to the use of information and technology for improving efficiency of health care delivery system in Tanzania noted that timeliness of data was affected by: limited resources, lack of skills and motivation, heavy workload, large datasets and missing data. The findings of the study suggested that the lower the level in the health system, the lower the understanding of the meaning of data collected (Kimaro and Twaakyondo, 2005).

Due to lack of data, this aspect was not be tested in this study.

Use of information

In assessing the use of information in support of health service management, Chaulagai et al. (2005) observed that the HMIS as designed to support individual patient care, health unit management and health system management functions had resulted in improvements in knowledge about the current health and management situation and use of such knowledge in routine management decisions. Some good examples of use were: Preparation of the district implementation plan; allocation of financial resources and for

priority supervision. Some reasons identified for inadequate use or non-use of information were: Those responsible for holding public servants accountable did not have the skills to access information systems and interpret results; Health facilities- where problems are encountered on a daily basis and immediate actions are required, did not have the resources needed to address the problems; Advocacy and leadership were needed to put a problem on the agenda and to influence and lobby for decisions; The environment in the Malawi government system was a punitive, not an encouraging one (Chaulagai et al; 2005).

Kimaro and Twaakyondo (2005) observe that the health workers at health facilities were the least capable in understanding of the use of information though they are the producers of that very information. The health workers had inadequate knowledge, skills and resources to make sense of information and they lacked an understanding of the general role of the HMIS in their work of providing direct health (curative) services. At the health facility which is the source of all routine data there was no evidence of use of data, routine feedback or regular training. This led to a perception that reporting was done for the sake of the system, and secondary to the provision of direct health services. A consequence of this was little emphasis on collecting accurate data, as well as late or missing reports (Kimaro and Twaakyondo, 2005).

Garrib et al. (2008) in their study on evaluation of the District Health Information System in rural South Africa noted that data were occasionally used to inform health education sessions run at the clinics and as a reflection of their work burden. There was, however, little understanding of the usefulness of the data, or its applicability with respect to facility or programme management. Several clinics had developed operational plans; however, clinic data were not used to inform targets or monitor plans. Several factors affect the lack of data utilization, including poor skills transfer within clinics due to high staff turnover, and poor communication of new knowledge within facilities; lack of understanding of indicators, lack of feedback to clinics; lack of access to the denominator data needed for calculating indicators; and poor numeracy skills among health care workers and managers (Garrib et al; 2008).

In assessing the use of HIV/AIDS information in Kenya, Salentine, Gichuhi and Hyslop (2007)) observed that HIV/AIDS information was used to make decisions pertaining to: policy and advocacy, Program Design and Improvement; and Program Operations and Management. The sources of information on HIV/AIDS that respondents of the study were using to assist them to understand their programs' outcomes and impacts included the Kenya Service Provision Assessment, Kenya Demographic Health Survey, Behavioral Sentinel Surveillance, national morbidity and mortality information, HIV surveillance system information, client exit interviews, and organizational performance data. Some reasons identified as constraints to information use for decision making were: inadequate information because of poor data collection; inadequate information because of weak reporting systems; and lack of capacity to use information (Salentine, Gichuhi and Hyslop 2007).

WHO has developed the Health Facility Data Quality Report Card (DQRC), which is a methodology that examines certain dimensions of data quality through a desk review of available data and a data verification component. The aim of DQRC is to ensure systematic assessment of completeness and internal and external consistency of the reported data or computed statistics and determine whether there are any data quality problems that need to be addressed. The desk review component of the DQRC is conducted through the use of the WHO Data Quality Assessment (DQA) Tool, an Excel-based tool that reviews the quality of data generated by a health facility-based information system (WHO, 2010).

Sapirie (2000) describes the assessment of a health information system as essentially a measurement of the performance of selected components or subsystems of the information system to support health care delivery and management of the health services system at various levels. Specifically, these components are assessed in terms of: data generation; data management (storing, processing, communicating, and sharing); data analysis and reporting; and data use. Data input can be assessed for: **validity** and **completeness** of data recording and collection. Data analysis, transmission, and reporting can be assessed for: **efficiency** and **completeness**. While Use of information can be assessed based on **decisions** and **actions taken** (Sapirie, 2000).

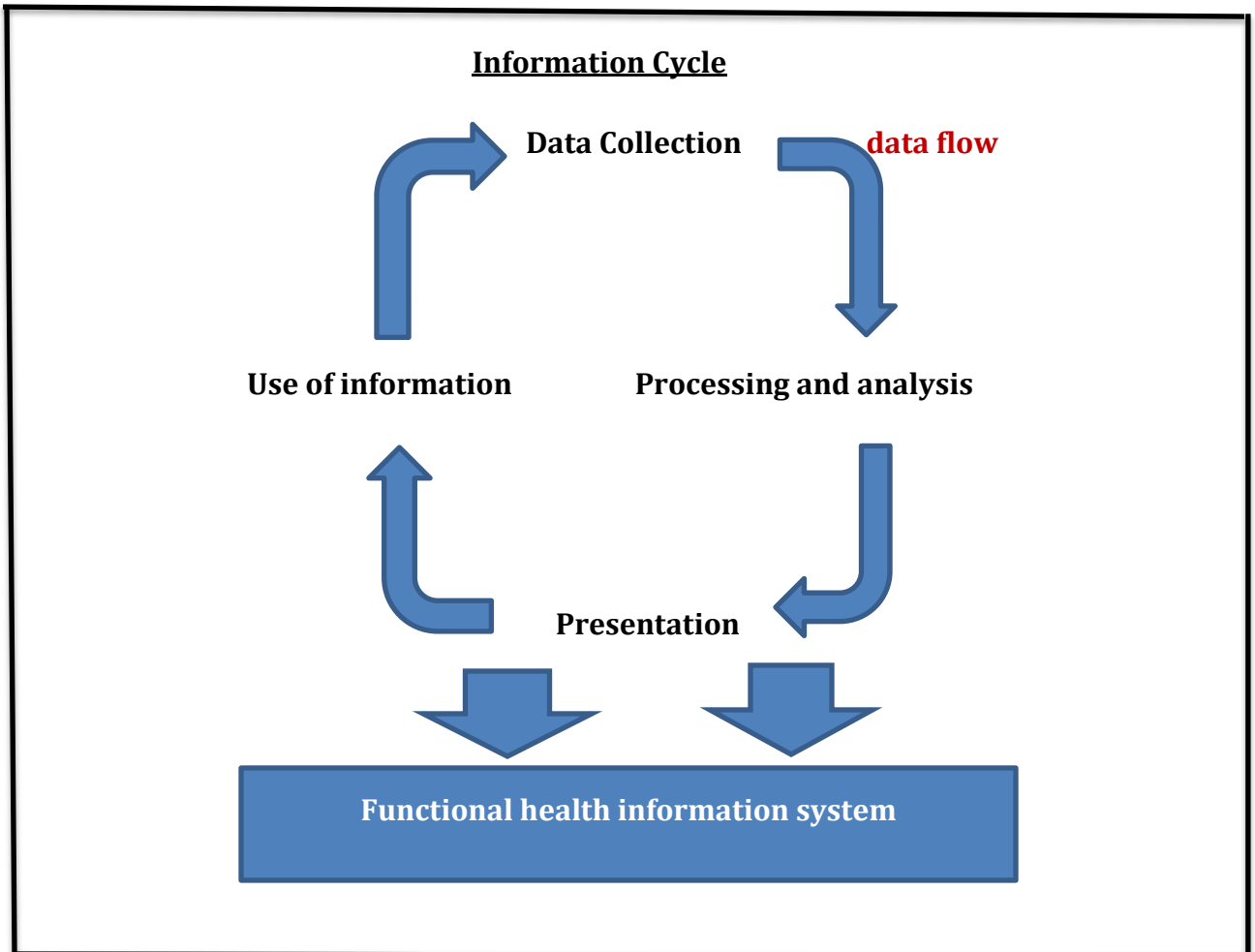
(Aqil, Lippeveld and Hozumi, 2009) describe the PRISM (Performance of Routine Information Systems Management) framework as one that considers Routine Health Information System to be a system with a defined performance (Deming, 1993), and by describing the organizational, technical and behavioural determinants and processes that influence its performance. Specifically, Routine Health Information System performance (RHIS) is defined as improved data quality and continuous use of information. Data quality is further described in four dimensions: relevance, completeness, timeliness and accuracy (Lippeveld et al; 2000). Information use is described based on: reports produced, discussion, decision, referral for action at higher level, and advocacy.

2.5 CONCEPTUAL FRAMEWORK

Odhiambo- Otieno et al. (2005) observed that evaluation criteria are important for undertaking assessment of any health information system. The assessment criteria for this study was adopted from the RHIS performance diagnostic tool of the PRISM framework to assess the information cycle (Lippeveld et al; 2000). The RHIS performance diagnostic tool assesses the data quality of a HIS in terms of completeness, accuracy and timeliness, as well as the use of information in terms of: dialogue and actions, referral to higher levels, sharing, feedback and advocacy.

The information cycle comprises of: data collection; data flow; data processing and analysis; presentation; and use of information. Figure 1 shows the conceptual framework of a functional health information system.

Figure 2.1: Functional Health Information System



Source: Heywood, A. and Rohde, J. (2001)

The information cycle is described as follows:

Data collection: This is the process of gathering data (WHO, 2005). It is the first step of the information process, so Health Information Systems are often classified according to data collection method. Data collection methods are classified into routine and non-routine data collection methods (Lippeveld, 2001).

Data transmission/ flow: This refers to the transfer of raw data from the lowest level to higher levels of the health information system for the purpose of data processing (Shrestha and Bodart, 2000).

Data processing and analysis: This is the movement of data from the point where it was collected to a point where it can be collated and prepared for analysis (Heywood and Rohde, 2001). Analysis is the examination, study and transformation of data with the goal of discovering useful information, suggesting conclusions, and supporting decision-making. Analyzing information involves examining it in ways that reveal the relationships, patterns, trends, etc. that can be found within it. That may mean subjecting it to statistical operations that can tell you not only what kinds of relationships seem to exist among variables, but also to what level you can trust the answers you're getting. It may mean comparing your information to that from other groups to help draw some conclusions from the data (Rabinowitz and Stephen, 2014).

Presentation: This is the display of the results of the analysis. Presentation is a visual way to look at the data and see what happened and make interpretations. Information can be displayed in the form of tables, charts, maps or graphs that can be readily seen and understood and discussed at all health service gatherings and community meetings (Heywood and Rohde, 2001).

Use of information: This is the application of the information to improve service delivery, planning, development and evaluation. Information is at the core of the planning cycle and should provide the answers to planning questions (Heywood and Rhode, 2001).

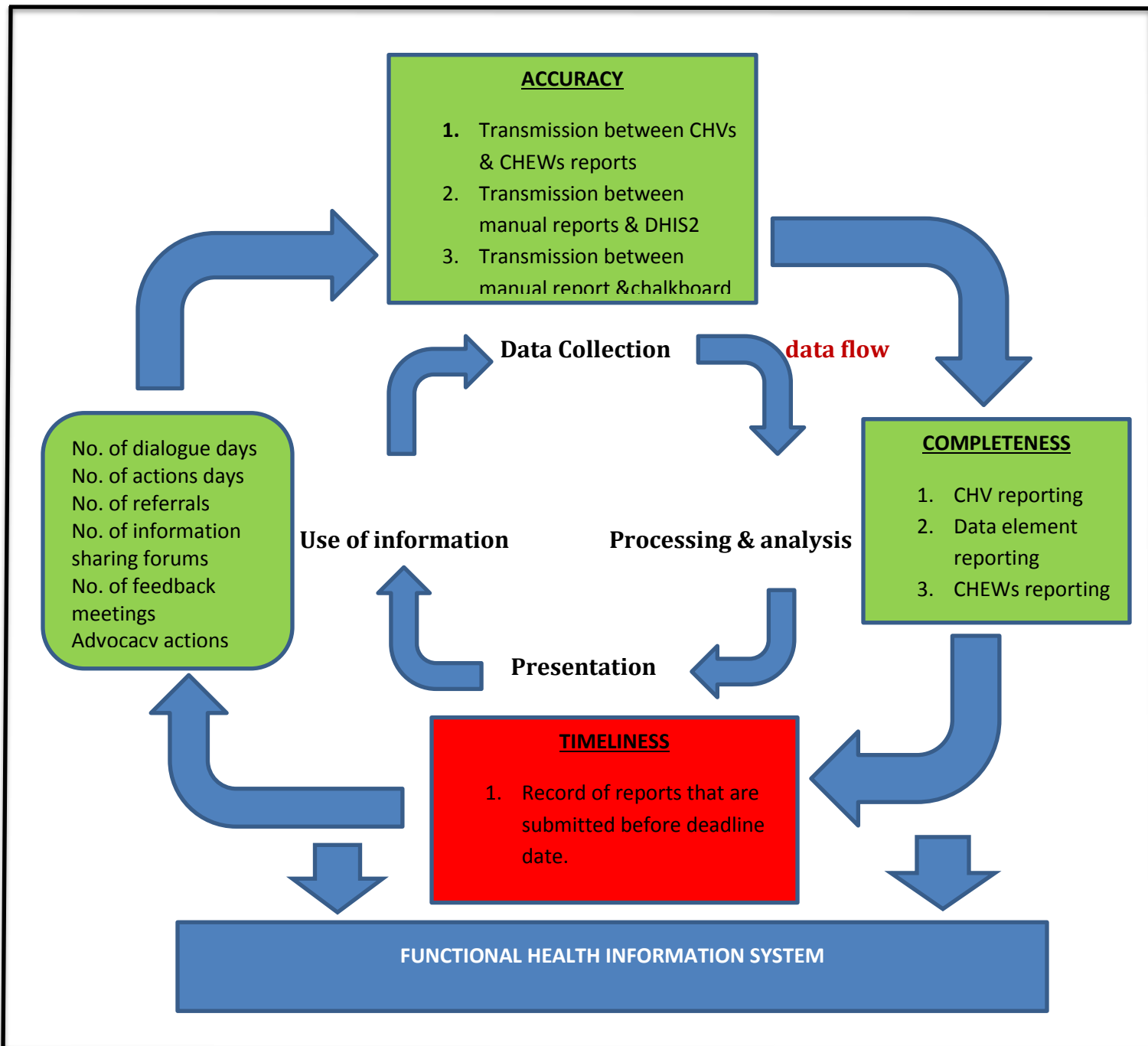
2.6 OPERATIONAL FRAMEWORK

The study operationalized Heywood and Rohde's information cycle framework using the PRISM RHIS Performance Diagnostic Tool that determines the overall level of RHIS performance, looking at quality of data and use of information, to identify weak areas (Lippeveld et al; 2000).

The data collection, processing, analysis and presentation stages of the information cycle were assessed for accuracy and completeness. Timeliness was also meant to be assessed, but it was not possible due to lack of data. The use of information stage of the information cycle was assessed on: dialogue, actions, referral to higher levels, sharing, feedback and advocacy.

As illustrated in figure 2, the assessment of the information cycle involved establishing the: accuracy; completeness; and timeliness; of the data and information. It also assessed the use of Information based on dialogue, actions, referral to higher levels, sharing, feedback and advocacy.

Figure 2.2: Operational Framework



CHAPTER THREE

METHODOLOGY

3.1 INTRODUCTION

This chapter presents a description of the sources of data that were used for the study, which includes a description of the CHIS tools; a description of the study area; the sampling procedure, and the process of analysing data used in the study so as to yield the necessary conclusions of assessment of the CHIS.

3.2 SOURCES OF DATA

Sources of data for the study were the CHIS manual tools: Household register (MOH 513), CHVs service delivery logbook (MOH 514), CHEWs summary (MOH 515) and Chalkboard (MOH 516) as well as the MOH 515 uploaded in DHIS2. These were used to collect primary data by manual counting and recording results of previously collected data, using a data quality assessment form. A structured questionnaire was used to collect data from the Sub County Community Health Focal Person on the use of information practice. This was also corroborated by reviewing necessary documents.

3.2.1 Description of the CHIS tools

The CHIS was designed based on a standard list of indicators reflecting the main services provided by the CHVs. The data collection system consists of 2 registers: MOH 513 and 514 for recording household registration and CHVs services respectively. At the end of the month data from MOH 514 from all the CHVs in a CHU is collated and summarized by the CHEW in the MOH 515. The CHEW then transfers the analyzed data onto the chalkboard, which is supposed to be the tool for informing the use of information at the community level. Onward reporting by CHEWs varies between sub counties. In some, the CHEWs report to the Sub County Community Health Services Focal Person, who is supposed to verify the data, and liaise with the Sub County Health Records and Information Officer to enter the data into DHIS2. While in others, the CHEW who has been given rights to enter data into DHIS2 enters the data directly, without going through the sub county. At the county and national levels, the information now available in DHIS2 is supposed to be used to inform decision making on improving the CHUs.

The CHIS collects data on: demographic characteristics of household members (age, sex, education levels, etc.); health Status (e.g. pregnancy, Ante Natal Clinic attendance, Chronic illness, Disability status, nutrition status, HIV testing, Immunization status of children under 5 years old); household health promotion practices; household births and deaths records; as well as health services and activities carried out by the CHVs and community. The following are the CHIS tools:

Referral form (MOH 100): This is a form used to refer patients from community who require further management at a health facility. Upon being attended to by a clinician at the facility, the form is received at the facility by the officer attending the patient/client. The form is then filled and given back to the client with instructions regarding further management, if any, to be undertaken at the community by the CHV. It acts as a feedback to the referring CHV.

The Household Register (MOH 513): This is a register used to collect and record data on households when a community health unit is established. It is used to determine the overall health status in the community health unit. The first reports serve as base line data for community strategy activities at the community. It is updated every six months and submitted to the CHEWs. It contains basic information on members of a household such as health status, health promotion practices and education. It should also have records of the births and deaths. A household register summary also exists for collating and summarizing the total number of households served by a community health worker.

Community Health Volunteers Service Delivery Log Book (MOH 514): This is a diary used by CHVs to collect and record information from the households during their visits as they give messages and services. It records factual information on what was done or identified in the household served. The logbook should be submitted to the CHEW for summary at the end of every month.

Community Health Extension Worker (CHEW) Summary (MOH 515): This is a summary of the work of the CHVs. It is filled monthly by CHEWs using the information from the CHVs Service Delivery Log at the end of the month and after six months, using the updated Household Register. A copy of MOH 515 is uploaded in DHIS2, making it possible

for community interventions to be reported in the national HIS. This is the point where the CHIS links to the national HIS.

Chalk Board (MOH516): This is a chalk board which displays the general health status of the CHU, the demographic characteristics of the population served by the CHU that are updated every six months, and services that are reported monthly by CHEWs. It is a replication of the CHEWs summary. The information displayed outlines the action areas for the community. It is usually displayed in the link facility on ordinary days, and carried to the dialogue venue during community dialogue days to trigger the community members to action to improve poorly performing indicators.

Table 3.1 shows the data sources and collection process for the study.

3.3 STUDY AREA

The study was conducted in Karurumo Community Health Unit in Embu County. Embu County has an area of 2,818Sq Km and a population of over half a Million and a population density of 183 people per Sq Km (KNBS, 2009 National Census). The county has 39 Community Health Units. Karurumo CHU is located in Runyenjes Sub County. The link facility for the CHU is Karurumo Rural Health Training Center. The CHU has 10 CHVs and 2 CHEWs, a population of 5,070 and a total of 555 households. The CHU meets the criteria of being fully functional as guided by the Master Community Health Unit List criteria, meaning that: It has all the reporting tools; conducts quarterly dialogue days and monthly action days (Master Community Health Unit List).

Table3.1: Summary of the study data sources and collection process

OBJECTIVE	METHODS	SOURCES	MEASURE
To assess the quality of the CHIS data in terms of completeness; accuracy; and timeliness.	Data quality assessment form	MOH 514 MOH 515 MOH 515 MOH 514 MOH515 MOH516 MOH 515	<u>Completeness</u> Completion rate of report submission from CHV to CHEW; Completion rate of the data elements from submitted CHV reports; and Completion rate of data elements by CHEWs <u>Accuracy</u> Data transmission between CHV and CHEWs reports. Data transmission between CHEWs manual reports and computer data entry into DHIS 2. Data transmission between CHEWs summary and CHU chalk board <u>Timeliness</u> Record of reports that are submitted before the deadline date.
To determine the Information use practice of the CHIS	Information use questionnaire Documents review	MOH 516 MOH 516 MOH 100 Minutes of meetings Reports Minutes of meetings Reports Proposal documents	Dialogue days held Action days conducted Referral cases Information sharing at various levels. There are forums for disseminating CHU data. Feedback meetings held CHU receives feedback from sub county on monthly reports Data is used to develop proposals for funding and for advocacy

3.4 SAMPLING

Purposive sampling was used to select Karurumo Community Health Unit, based on the fact that the CHU has been implementing CHS for more than two years, and has been enjoying support from development partners. It has been supported by JICA and APHIAPlusKAMILI, has received adequate training on CHS implementation and is using the 2014 revised reporting tools.

3.5 VARIABLE DESCRIPTION

This section describes the variables used for the study.

Completeness

Completeness as the degree to which HIS data covers all services and is filled out in full on data collection forms was assessed at three levels: completeness of CHV reporting, computed by getting the number of reports received from CHVs divided by the number of expected reports and multiplying by 100 to get a percentage of the completeness. Data element completeness was computed by getting the number of complete reports (those with no missing values) divided by the number of received reports and multiplying by 100. Completeness of CHEW reporting was computed by getting the number of data elements filled for the month divided by the number of data elements expected to be filled for that month and multiplying by 100.

Accuracy

Accuracy is the match of data transmitted from one level to another in the HIS, e.g. from CHV records to the monthly CHEW summary report, to the DHIS2. In checking data accuracy, four data elements were selected to be assessed. At the CHV reporting, the data elements were aggregated and compared with the CHEW summary. The aggregated totals were the denominator and the CHEW summary count the numerator. The other level of assessment was to compare the data elements in the CHEW summary against the same data elements in DHIS2. The manual count was the denominator for the four indicators, while the DHIS 2 count the numerator for the data elements to calculate the level of data accuracy for the selected data elements. The CHEW summary report was also compared

with the chalkboard report. The CHEW summary report was the denominator for the four indicators, while the chalkboard count the numerator for the data elements to calculate the level of data accuracy for the selected data elements.

As shown in table 3.2, the quality of data was classified as excellent (rates of 91 percent and above), very good (rates of 81-90 percent), good (rates of 71 -80 percent), fair (rates of 61- 70 percent), poor (rates less than 60%) and not reported (if there were no reports). This grading criteria was based on a scoring system adopted from a similar study on assessing the ability of health information systems in hospitals to support evidence-informed decisions in Kenya by Kihuba, Et al (2014).

Table 3.1: Grading Criteria for Data Quality

SCORE	CRITERIA
91 percent and above	EXCELLENT
81 percent-90 percent	VERY GOOD
71 percent-80 percent	GOOD
61 percent-70 percent	FAIR
Less than 60 percent	POOR
Not reported	Not reported

Use of Information

Use of information occurs when the decision-maker is explicitly aware of a decision and its alternatives; and considers relevant information in the process of making the decision. Use of information was assessed by allocating two points to every answer that was YES and zero points to every NO answer. There were thirteen questions, and the highest possible score was twenty six points. The points were then graded into four criterion as shown in table 3.3.

Scores between 2 and 8 indicate that use of information overall is very weak. Scores between 10 and 14 indicate weakness but some signs of use of information. Scores 16

through 20 indicate beginning of active use of information, and 22 to 26 indicate an advanced level of use of information.

Table 3.2: Grading Criteria for Use of Information

Criteria	Weak use of information	Some attempts at use of information	Beginning of active use of information	Advanced level of use of information
Scores	2-8	10-14	16-20	22-26

Source: Measure Evaluation (2005)

Joint Classification of Data Quality and Information Use

Once the levels of data quality and use of information were ascertained, the results were used to diagnose the status of the CHIS performance (Table 3.4) by using the Joint Classification of Quality of Data and Use of Information (Measure Evaluation, 2005). The joint classification is a guide in strategizing interventions to improve CHIS performance.

Table 3.3: Joint Classification of Data Quality and Use of Information

		DATA QUALITY	
		WEAK	IMPROVING
USE OF INFORMATION	WEAK	System does not produce quality data and managers make little use of the CHIS	CHIS produces good quality data but they are not used by managers
	IMPROVING	System does not produce good quality data but information is being used by managers. Data quality reduces the quality of decisions made	CHIS produces good quality data and information is being used by managers. This contributes to better management of health services

Source: Measure Evaluation (2005)

In this table, CHIS performance status is classified into four groups: One is that both data quality and use of information are weak. The next level is that the CHIS has relatively strong data production capacity, i.e., availability of good quality data, but that does not result in use of information. In this scenario, there is a divorce between data production and use. Another situation is that while CHIS produces weak data (or limited quality of data), managers are using the data as best they can. This scenario suggests that managers are already motivated to use information (that demand is present), but the decisions they make may be jeopardized by the quality of the information they are using. The ideal status is when both data quality and use of information are strong and improving. The word improving is used instead of strong as both quality and use can always be improved and the status is not static (Measure Evaluation, 2005).

3.6 DATA ANALYSIS

Quantitative data from the data quality assessment form and information use questionnaire were entered into a MS Excel 2013 (Microsoft Corporation, Redmond, USA) spreadsheet, where analysis was carried out. Data were summarized to obtain percentages of completeness and accuracy scores and then graded according to the set criteria. The information use scores were also calculated and scored as per the set criteria. Graphs and tables were then generated to display the results of the analysis.

CHAPTER FOUR

RESULTS, INTERPRETATION AND DISCUSSION

4.1 INTRODUCTION

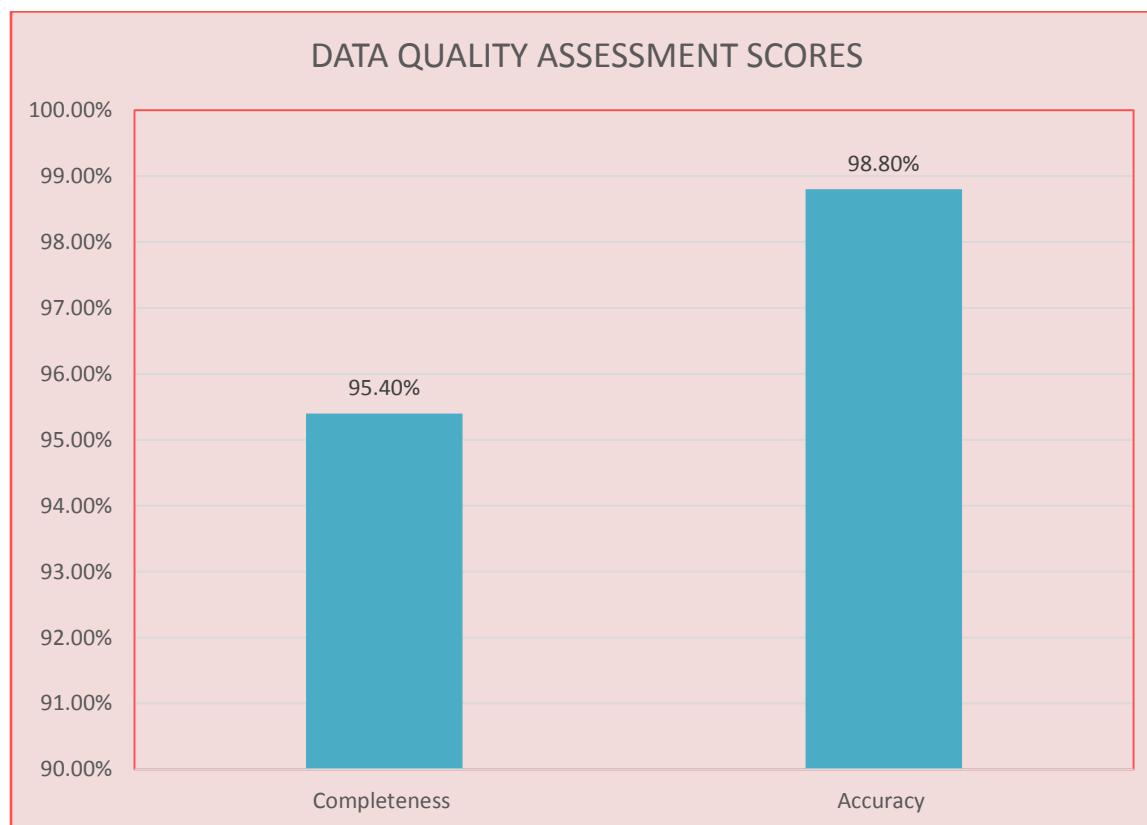
This chapter presents the results of the assessment on completeness and accuracy of the Community Health Information System as used in Karurumo Community Health Unit, as well as discussions on the results. Results of information use of the Community Health Information System and discussion on use of information are also presented.

4.2 RESULTS OF DATA QUALITY ASSESSMENT

Data quality was assessed on two dimensions: completeness and accuracy. Completeness was assessed at three levels: Completion rate of report submission from CHV to CHEW; Completion rate of the data elements from submitted CHV reports; and Completion rate of data elements by CHEWs. The overall score on completeness was 95.4 percent, which was graded as excellent.

To assess accuracy, four data elements were selected and assessed on how they were transmitted from CHV reports to CHEWs manual reports, and from the CHEWs manual reports to the DHIS2 and chalkboard. The transmission from CHV reports to CHEWs manual reports was excellent, with a score of 98.8 percent. The transmission from the CHEWs manual reports to the DHIS2 and chalkboard was not reported, and therefore accuracy could not be established for these two levels of transmission. Figure 4.1 gives a summary of the quality assessment scores.

Figure 4.1: Data Quality Assessment Scores



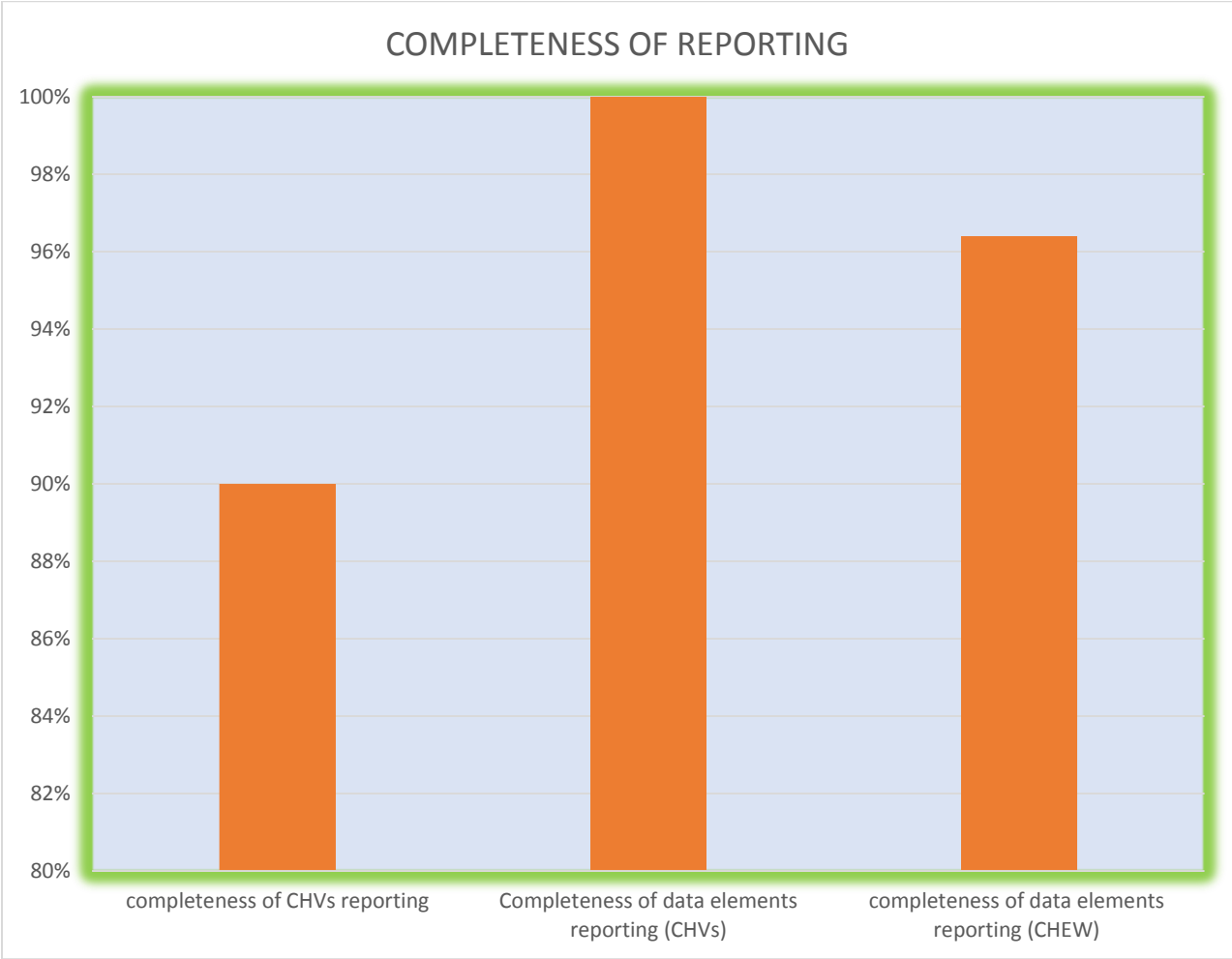
4.2.1 ASSESSMENT OF COMPLETENESS

Completeness of reporting for the three months being assessed was excellent, with an average score of 95.4 percent. Completion rate of report submission from CHV to CHEW was very good, with a score of 90 percent. Completion rate of the data elements from submitted CHV reports was excellent with a score of 100 percent. Completion rate of data elements by CHEWs was also excellent with a score of 96.4 percent. Figure 4 shows the completion rates at the three levels.

These findings contrast with those of Chaulagai et al. (2015) in a study on Design and implementation of a health management information system in Malawi, who observed that completeness of facility-based routine data was a big problem. Data were incomplete in several ways: a number of facilities were not sending reports at all. Some other facilities

were not sending reports regularly. The facilities regularly sending reports were nevertheless not reporting data on each element every month. The facilities that were sending reports regularly on each data element were still failing to capture all the records. Thus, an indicator value generated from routine data was always lower than actual and therefore each report needed adjustment for under-reporting.

Figure 3.2: Completeness of Reporting



Indicator 1a: Completeness of CHVs Reporting

All the ten CHVs are expected to submit their monthly reports to the CHEWs by the 5th of every month. The CHVs reporting completeness is defined as the total number of monthly CHVs reports received divided by the total expected number of monthly CHVs reports and

expressed as a percentage. The CHVs reporting completeness for the months of September to November 2014 in Karurumo Community Health Unit was very good, at 90 percent. There were 2 CHVs who did not submit their reports for October, and 1 CHV did not submit their report for November 2014. The reason given for the lack of reporting by the CHVs was that they did not feel obligated to bring in their reports, since they were no longer being given incentives (transport refund). These CHVs therefore opted to pursue other economically gainful activities other than taking their reports to the Health facility. These reasons are supported by another study on the review of the implementation of the Community Health Strategy in Kenya, which shows that retention of CHVs is largely dependent on motivation or a reward system (Opiyo and Njoroge, 2009).

Crigler and Hill (2010) in assessing Community Health Workers program functionality suggest that a fully functional program is one that provides incentives for the CHWs, both financial and non-financial and are in line with expectations placed on CHW, e.g. number and duration of visits to clients, workload, and services provided (Crigler and Hill, 2010).

Indicator 1b: Completeness of CHVs Data element Reporting

Completeness of data element reporting refers to the extent to which CHVs and CHEW reports include all reportable events. Missing data should be clearly differentiated from zero values in the reports. A true zero value indicates that no reportable events occurred that month; a missing value indicates that reportable events occurred but were not actually reported. In many HMIS reports, missing entries are assigned a value of 0, making it impossible to distinguish between a true zero value (no events occurred) from a missing value (events occurred but were not reported) (WHO, 2012).

From the study, CHVs data element reporting completeness is defined as the total number of complete CHVs reports divided by the total received CHVs reports and expressed as a percentage. Total complete reports are those that do not have any missing values in the data elements. The Community Health Unit had an excellent completeness of CHVs data element reporting for the three months, with a score of 100 percent. This means that all the

reports submitted by the CHVs for the three months were complete and did not have any missing values.

The findings on data element completeness rates can be attributed to a number of reasons, including: training and support supervision. As suggested by Crigler and Hill (2010), initial training provided to the CHVs as well as continued training contribute to better performance of the CHV in delivering services. In addition, Regular supervision visit every 1-3 months that includes reviewing reports and monitoring of data collected also improves performance (Crigler and Hill, 2010).

Indicator 1c: Completeness of CHEW Data element Reporting

Completeness of CHEW data element reporting is defined as the total number of data elements filled for the period divided by the total number of data elements expected to be filled for the period and expressed as a percentage. The Community Health Unit had an excellent completeness of CHEW data element reporting for the three months, with a score of 96.4 percent. Of the 56 data element values that could have been completed for each of the three months, 56 were completed in September, 50 in October and 56 in November. Only 3.6 percent of the data elements expected to be reported by the CHEW were not reported.

4.2.2 ASSESSMENT OF ACCURACY

The accuracy of the process by which data were collated at the Community Health Unit, transmitted to the CHEW and entered into the DHIS2 and chalkboard was assessed by examining the degree of agreement between four selected data elements aggregated from the CHVs service delivery log book with the CHEW summary reports for the same data elements, and the CHEW summary report against the DHIS2, and the chalkboard for the same data elements. No assessment of the accuracy of a data element value was made if that value was missing from either the CHVs or CHEW report, the DHIS2 or the chalkboard. Table 4.1 shows the selected data elements and their aggregated values in the different reporting tools, while Table 4.2 summarizes the accuracy of reporting. From the table, it can be noted that there is no average score for accuracy of reporting.

Table 4.1: Selected data elements for assessment of accuracy

	Data elements	MOH514	MOH515	DHIS2	MOH 516 (Chalk board)
1	Number of mothers with newborns counseled on exclusive breast feeding	56	56	Not reported	Not reported
2	Number of Newborns visited at home within 48 hours	10	10	Not reported	Not reported
3	Number of Deliveries by skilled attendants	18	19	Not reported	Not reported
4	Number of maternal deaths	0	0	Not reported	Not reported
	TOTAL	84	85	*N/A	*N/A
	PERCENTAGE	98.8 percent		*N/A	*N/A

*N/A: not calculated because no reports were entered in the DHIS2, or the chalkboard for the months being assessed.

Table 4.2: Accuracy of Reporting

	Indicator	Comparison (aggregated Data elements count)		Score	Criteria
2. Accuracy of reporting					
2a	Between MOH 514 and MOH 515	MOH 514	MOH 515	98.8 percent	EXCELLENT
		84	85		
2b	Between MOH 515 and DHIS2	MOH 515	DHIS2		Not reported
		85	Not reported		
2c	Between MOH 515 and MOH 516 (Chalk board)	MOH 515	MOH 516		Not reported
		85	Not reported		

Indicator 2a: Accuracy between MOH 514 and MOH 515

The aggregated data for the four selected data elements for the three months being assessed in the CHVs service delivery log book was 84, while from the CHEWs summary, it was 85. This means that the accuracy of aggregated data from the CHVs service delivery log book compared to the way it was reported in the CHEW summary reports was excellent, at 98.8 percent.

Indicator 2b: Accuracy between MOH 515 and DHIS2

The accuracy of the CHEW summary report compared to the DHIS2 report was not analyzed. This was because none of the CHEW summary reports for the three months were entered into DHIS2. The reason given for not updating the information on DHIS2 at the time was that the responsibility of entering the data into DHIS2 was that of the health records and information officer, and he had not uploaded the information due to too much work.

These findings are supported by Kihuba, et al. (2014), in a study to assess the ability of health information systems in hospitals to support evidence-informed decisions in Kenya. They observe that task shifting seemed to be the main strategy used by hospitals in a bid to address the deficits in records officers with nurses taking a leading role in data collection and compilation and employment of temporary records staff on short-term contracts. The same study also notes the reason for hospitals lacking in capacity to produce health related reports in a format that is prescribed by the government was because most of the hospital managers were likely unaware of wider health information needs, they were not trained on how to use DHIS2, and had not even opened a user account (Kihuba, et al; 2014).

Indicator 2c: Accuracy between MOH 515 and MOH 516 (chalkboard)

The accuracy of the CHEW report compared to the chalkboard was also not analyzed, since the chalkboard was not updated. The last update on the chalkboard was in June 2014. The reason given for not entering the data in the chalkboard was that the CHEWs were not motivated to continue with the reporting, since they were no longer supported to conduct dialogue days where the chalkboard is usually used, and the information was already

available in the MOH 515. The lack of motivation affects the quality and frequency of reporting, and this is supported by other studies which suggest that motivation and value placed on the quality of routine data collection (Ledikwe et al; 2014), as well as health worker numeracy and training (Bradshaw, et al; 2013)], may be significant determinants of poor HIS data quality.

4.3 RESULTS OF ASSESSMENT OF INFORMATION USE

There were six assessment areas for use of information (dialogue, action, feedback, referrals, sharing and advocacy), and a total of thirteen data elements that were to be assessed to grade use of information. The highest possible score was 26. Karurumo Community Health Unit attained an overall score of 20 out of 26 (76.9 percent). This score is graded in the criteria of beginning of active use of information. Dialogue scored 2 points out of a total score of 4. Action scored 2 out of 4 points; feedback scored 4 out of 6 points; referrals scored 6 out of 6; sharing scored 4 out of 4; while advocacy scored 2 out of 2. Table 4.3 shows the scores in the assessment of use of information.

Dialogue scored 2 points out of a total score of 4. Whereas the Community Health Unit was supposed to conduct dialogue meetings every three months, the study established that dialogue days were no longer being held on a quarterly basis due to lack of support from developing partners to conduct the dialogue days. The CHVs were conducting dialogue in their respective villages whenever they were given an opportunity to speak by other government sectors when they visited the villages. Worth noting is that whenever these opportunities arose, the CHVs would speak based on data produced by the CHIS.

Action scored 2 out of 4 points. Action days were also supposed to be conducted once every month, but this was not happening due to lack of support. Action days were only conducted when there was need (e.g. outbreak of disease). Data was also used to determine whether there was need for action by the community.

Table 4.3: Use of Information Scores

Assessment area	Data element	Score	Highest possible score
Dialogue	One Quarterly Dialogue meeting conducted in the last quarter	2	4
	Last dialogue day conducted was informed by data		
Action	Three Monthly Action days conducted in the last quarter	2	4
	Last action day conducted was informed by data		
Feedback	Three Monthly Feedback meetings conducted in the last quarter	6	6
	In the feedback meeting, data was discussed		
	CHU receives feedback from sub county on monthly reports		
Referral	A system exists for referring clients to the next level	4	6
	There are formalized referral forms used by CHVs to refer clients		
	There is a system for the health facility to provide the CHV with information about the client once the referral has been made		
Sharing	Data shared at sub county forums	4	4
	There are forums for disseminating CHU data		
Advocacy	Data is used to develop proposals for funding and for advocacy	2	2
TOTAL		20	26
PERCENTAGE		76.9 percent	

Feedback scored 6 out of 6 points. Feedback meetings for the CHVs and CHEWs were held every last Monday of the month. This was mostly to conduct their table banking business, but they also took this opportunity to discuss data. The topic to be discussed during the meeting was derived from the reports produced by the CHVs. This was expected to bring change in the health situation of the CHU once it was discussed. The CHU also received feedback from the Sub County on their reports, although this was not on a monthly basis.

Referrals scored 4 out of 6. There is a formal system for referring clients to the health facility during household visits. The CHVs have been trained on how to identify cases that require referral to health facilities. Formalized referral forms provided by the Ministry of Health (MOH 100) are available to every CHVs, and this is what they use to refer clients. The referral forms have a referral back to the community section, where the health worker that attends to the referred client is supposed to indicate the clinical care given to the client, and indicate any care that the client needs to receive from the CHVs back in the community. However, the CHVs are not able to track the referrals in the health facilities, because the client sometimes chooses to visit a health facility that is not the link facility of the CHU. In other cases, the clinicians do not fill the counter referral form, and therefore the referral cycle is not completed,

Sharing scored 4 out of 4. The CHU data is usually shared in the Sub County and County forums, and data produced by the CHU is disseminated at different levels, during different forums, including national forums for Community Health Strategy.

Advocacy scored 2 out of 2. The Sub County CHS Focal Person has developed several proposals, based on information generated from the CHU, although they have not been funded. The CHC has also written several proposals for funding to the Constituency AIDS Control Committee based on CHU data, but they have also not been successful in receiving funding. The Sub County Health Team has also allocated funding to support further training of CHVs, based on the results of improved skilled deliveries in the catchment facility attributed to the efforts of the CHVs. The CHU data has also been used, together with other CHUs data, to support the development of the County Integrated Development Plans (health sector).

4.4 JOINT CLASSIFICATION OF DATA QUALITY AND INFORMATION USE

According to the joint classification of data quality and information use, if the CHIS produces good quality data and information is being used by managers, contributing to better management of health services, then the CHIS is classified in the ideal status. Therefore, the joint classification of data quality and information use of the Community

Health Information System in Karurumo Community Health Unit was classified as the ideal status, since the quality of data and the use of information were strong and improving.

4.5 DISCUSSION

The following section presents the discussion on the findings

Data Quality

Overall, the study findings show that the quality of data of the CHIS in Karurumo CHU was very good. This is not consistent with other studies in developing countries (Garrib et al, 2008; Hahn et al, 2013; Kihuba, et al, 2014) that suggest that routinely reported data were of poor quality.

Some of the reasons that could have contributed to the good quality of data in the CHIS include: training of the community health unit workforce on the CHIS tools, and support supervision to the community health unit after the training, to check on utilization of the same. This is supported by Mphatswe et al (2011), who observed that training of healthcare workers on the importance of public health information, monthly data reviews and feedback, and regular data audits was effective in significantly increasing the completeness and accuracy of the data used to monitor PMTCT services in South Africa. Wagenaar et al. (2015) also found that an intervention consisting of data audits, equipment/supply purchase and maintenance, supportive supervision to low-performing clinics and feedback from district/provincial levels, data trainings, and district performance enhancement meetings focused on improving data use for decision-making can result in rapid improvements in data concordance in public-sector health facilities.

Another reason for the good quality of data could be the availability of standardized data collection and reporting tool, which ease the process of data collection and reporting. As observed by Lafond and Field (2003), a technically well-designed set of data management tools (for records and reports) forms the base of every information system. Hahn, et al. (2013) observe that in their study, they found well-designed standardized Health Booklets for clinical use in Ante Natal Clinics and also the report forms were designed in an easy to use way, which made reporting easier.

Use of Information

The use of information in the community health unit was good, since the CHU was in the stage of beginning of active use of information. This finding is also different from many other studies in Africa countries, which have found information use levels to be low. Garrib et al. (2008) noted that effective use of information was limited in rural South Africa, due to the poor quality of the information. Kimaro and Twaakyondo (2005) also observed that there was no evidence of use of data in the health facility, which led to a perception that reporting was done for the sake of the system, and secondary to the provision of direct health services. A consequence of this was little emphasis on collecting accurate data, as well as late or missing reports. Chaulagai et al. (2015), also observed that in Malawi, despite emphasis on maximizing the use of information at local levels, the traditional thinking of collecting data only for reporting purposes was still deeply rooted in the system. Some facilities still considered the submission of reports as the ultimate aim of the information system.

Williamson and Stoops (2001) give factors affecting non utilization of information as: poor skills transfer within clinics due to high staff turnover, and poor communication of new knowledge within facilities; lack of understanding of indicators, lack of feedback to clinics; lack of access to the denominator data needed for calculating indicators; and poor numeracy skills among health care workers and managers (Williamson and Stoops, 2001).

Salentine, Gichuhi and Hyslop (2007) also give constraints to information use as: inadequate information because of poor data collection; inadequate information because of weak reporting systems; and lack of capacity to use information (Salentine, Gichuhi and Hyslop, 2007).

Joint Classification of Data Quality and Information Use

The result of the diagnosis for the joint classification of data quality and information use for the CHIS found the CHIS to be in the ideal status, where the quality of data is good, and the information use is improving. Several studies concur with the findings of this study, that for consistent information use to occur, data need to be of high quality so that data users are

confident that the data they are consulting are accurate, complete, and timely. Without quality data, demand for data drops, data-informed decision making does not occur, and program efficiency and effectiveness will suffer (Foreit et al. 2006; Braa et al. 2012; Mavimbe et al. 2005).

CHAPTER FIVE

SUMMARY, RECOMMENDATIONS AND CONCLUSION

This chapter presents the summary of the assessment, the conclusion and the recommendations to programs and for future research, based on the findings of the assessment.

5.1 SUMMARY

The results of the assessment show that Completeness of Community Health Volunteers (CHVs) reporting for the three months being assessed was very good, with an average score of 90 percent (27/30), meaning that of the total 30 reports expected from the CHVs, 27 were received. The CHVs data element completeness was excellent with a score of 100 percent. This means that all the 27 received reports had no missing values. The completeness of Community Health Extension Workers (CHEWs) reporting was also excellent with a score of 96.4 percent (162/168). In each of the three months being assessed, 56 data elements required to be reported on, indicating a total of 168 data elements for the three months. The results show that a total of 162 data elements were reported on for the three months. This means that only 3.6 percent of the data elements expected to be reported by the CHEWs were not reported.

The accuracy of the process by which data were collated at the Community Health Unit, transmitted to the CHEW and entered into the DHIS2 was assessed by examining the degree of agreement between four selected data elements aggregated from the CHVs service delivery log book with the CHEW summary reports for the same data elements, and the CHEWs summary report against the DHIS2 and chalkboard reports for the same data elements. The accuracy of aggregated data from the CHVs service delivery log book compared to the way it was reported in the CHEW summary reports was excellent, at 98.8 percent (84/85), while that of the CHEW summary report compared to the DHIS2 and chalkboard report was not calculated, since none of the CHEW summary reports for the three months were entered into DHIS2 or the chalkboard.

Use of information indicated the beginning of active use of information, having scored 20 out of a total of 26 points. Dialogue scored 2 points out of a total score of 4. Action scored 2

out of 4 points; feedback scored 6 out of 6 points; referrals scored 4 out of 6; sharing scored 4 out of 4; while advocacy scored 2 out of 2.

The joint classification of data quality and information use classified the CHIS at Karurumo Community Health Unit in the ideal stage, where data quality and information use are both strong and improving.

5.2 RECOMMENDATIONS

5.2.1 Policy and Programmes

In view of the above findings, there is need for the policy makers to come up with a system to encourage all the Community Health Units to conduct routine data quality assessments, and to develop action plans to improve the quality of data, so as to ensure that the information that is produced by the Community Health Information System is of good quality and can be used to inform the process of decision making. This is very important, since there are situations, as noted in the joint classification of data quality and information use, where the CHIS produces poor quality data, that even when managers are motivated to use it, their decisions are jeopardized by the poor quality of information; or it can produce very good quality data which is not being used by managers.

The data collection tools also need to be reviewed to ensure that there is a system to measure the timeliness of the data collection and transmission processes. This can be done by including a place for indicating the date of receipt of reports at the higher levels.

The transmission of data from the manual CHIS forms (MOH 515) into the electronic form in DHIS should be a practice that is inculcated in all the CHUs, since it is a requirement for reporting.

Programmes that are using the CHIS can also conduct assessments of the CHIS to establish a baseline of CHIS performance for improvement. The findings will serve as a basis of comparison with information collected in later assessments. Assessment of the CHIS will thus be a quality improvement strategy for the CHIS.

Financial and technical support for dialogue and action days should be provided, to ensure that all the Community Health Units are functioning as required and also accomplish their set mandates.

For the referral system, the clinicians in the health facilities that attend to the clients that have been referred from the Community Health Units need to be sensitized on the need to complete the referral forms, so that the referrals are completed.

5.2.2 Future Research

The data from this study has helped identify areas of research for further study. Since this study only focused on assessing the data quality and information use of the CHIS, the factors that determine the quality of data and information use practice of an information system were not examined. Therefore, there is need to identify the factors that influence the quality of data of the CHIS, to enable the users of the system to identify the areas that need improvement and to come up with action plans for data quality improvement.

The scope of data quality was also limited to three dimensions of data quality (completeness, accuracy and timeliness). Future studies can also focus on other dimensions of data quality including: validity, periodicity, relevance, reliability, precision, integrity, confidentiality, comparability, consistency, concordance, granularity, repeatability, usability, objectivity, accessibility, transparency and representativeness.

Since Karurumo is considered a model CHU, the data quality and information use practice observed in the CHU are not the norm. future studies can therefore compare a model CHU and one that is not enjoying donor support to establish whether the data quality and information use practice of such a CHU are similar to those of a model CHU.

5.3 CONCLUSION

In conclusion, the study findings show that the Community Health Information System in Karurumo Community Health Unit produces acceptable quality of data. The data reporting by CHVs and CHEWs is of acceptable completeness. The accuracy of reporting is also good, but there is need to ensure that the routine system of reporting is up to date. For instance, the CHU needs to ensure that the data is entered into DHIS2 and updated on the chalkboard

on a monthly basis, since this is the requirement for the CHIS. On the other hand, the timeliness of reporting cannot be established if the date of receipt of reports is not indicated. There is need therefore to ensure that the reporting tools have a place for indicating the date of receipt of the reports by the next level, so as to establish timeliness of data transmission. Information is being used at the CHU to inform decision making and behavior change interventions, as well as by the higher levels of the health system (Sub County and County) for advocacy and allocation of resources. The use of information generated by the CHU contributes to better management of health services.

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APPENDIXES

APPENDIX 1: Data Collection Form

COMMUNITY HEALTH INFORMATION SYSTEM ASSESSMENT FORM				
Quality of Data and Information Use Assessment: Community Health Unit Form				
NAME OF COMMUNITY HEALTH UNIT				
SUB COUNTY AND COUNTY				
DATE OF ASSESSMENT				
REPORTING PERIOD VERIFIED		SEPTEMBER TO NOVEMBER, 2014		
PART 1: DATA QUALITY ASSESSMENT				
A. TIMELINESS				
QA1	Is the date of data collection clearly identified in the registers (MOH 513,514,515)?	1. YES 2. PARTLY 0. NO	Remarks	
QA2	Count the number of monthly reports submitted by the CHVs for the three months	MONTH: SEPTEMBER	MONTH: OCTOBER	MONTH: NOVEMBER
QA3	Is the deadline for submission to next level clearly identified in the registers?	1. YES 2. PARTLY 0. NO		
QA4	Record the submission deadlines for the registers	MOH 513	MOH 514	MOH 515
QA5	Does the CHEW document the date of receipt of reports from the CHVs?	1. YES 0. NO	If receipt dates are not recorded, go to QA7	

QA6	If QA5 yes, check the date of receipt for the three months. What is the total number of reports received before and after the deadline (should be the same as in QA2).							
		MONTH: SEPTEMBER		MONTH: OCTOBER		MONTH: NOVEMBER		
	ITEM	Before deadline	After deadline	Before deadline	After deadline	Before deadline	After deadline	
	NO. of CHVs reports							
		MONTH: SEPTEMBER		MONTH: OCTOBER		MONTH: NOVEMBER		
		Expected	Reported	Expected	Reported	Expected	Reported	
QA7	MOH 514 reported monthly by 2 nd of the next month	1. YES 2. PARTLY 0. NO						
QA8	MOH 515 reported monthly by 5 th of the next month	1. YES 2. PARTLY 0. NO						
QA9	MOH 516 updated monthly	1. YES 2. PARTLY 0. NO						
QA10	MOH 515 entered monthly into DHIS2	1. YES 0. NO						
B. COMPLETENESS								
		Month: SEPTEMBER		Month: OCTOBER		Month: NOVEMBER		
QB1	For the 3 months being assessed, how many reports (MOH 514) were expected from all CHVs? (A)							
QB2	How many reports were received? (B)							
Calculate the completeness of CHV reporting: number of received reports/number of expected reports (B/A)								
		Month: SEPTEMBER		Month: OCTOBER		Month: NOVEMBER		
QB3	Of the CHV reports received, how many were							

	complete? (complete means that the report contained all the required indicator data) (C)						
Calculate the CHV data element completeness: number of complete reports/number of received reports (C/B)							
		Month: SEPTEMBER	Month: OCTOBER	Month: NOVEMBER			
QB4	How many data elements does the CHEW need to report on in the monthly report? (D)						
		Month: SEPTEMBER	Month: OCTOBER	Month: NOVEMBER			
QB5	How many data elements are actually reported on by the CHEW in the selected month's report? (E)						
Calculate the completeness of CHEW reporting: number of data elements filled for the month/number of data elements expected to be filled for that month (E/D)							
C. ACCURACY							
Find the following information in the service delivery log book for the months September to November, 2014. Aggregate and Compare the figures with the CHEW summary reports for the same months.							
	Item	Month: SEPTEMBER		Month: OCTOBER		Month: NOVEMBER	
		No. from MOH 514	No. from MOH 515	No. from MOH 514	No. from MOH 515	No. from MOH 514	No. from MOH 515
QC1	Pregnant women referred for Ante Natal Care						
QC2	Home delivery referred for Post Natal Care						

QC3	Immunization defaulters referred						
QC4	Number of pregnant women counseled on Individual Birth Plan						

Compare the data in the hard copy of MOH 515, with the DHIS2 version of the MOH 515 for the same months

Item		Month: SEPTEMBER		Month: OCTOBER		Month: NOVEMBER	
		Hard copy (MOH 515)	DHIS2 (MOH 515)	Hard copy (MOH 515)	DHIS2 (MOH 515)	Hard copy (MOH 515)	DHIS2 (MOH 515)
QC5	Number of Pregnant women						
QC6	Newborn visited within 48 hours						
QC7	Deliveries by unskilled attendants						
QC8	Number of maternal deaths						

Compare the data in the hard copy of MOH 515, with the MOH 516 for the same months

Item		Month: SEPTEMBER		Month: OCTOBER		Month: NOVEMBER	
		Hard copy (MOH 515)	MOH 516	Hard copy (MOH 515)	MOH 516	Hard copy (MOH 515)	MOH 516
QC9	Number of Pregnant women						
QC10	Newborn visited within 48 hours						
QC11	Deliveries by unskilled attendants						
QC12	Number of maternal deaths ----						

PART 2: INFORMATION USE ASSESSMENT							
One Quarterly Dialogue meeting conducted in the last quarter	1. YES	0. NO	Remarks				
Last dialogue day conducted was informed by data	1. YES	0. NO	Remarks				
Three Monthly Action days conducted in the last quarter	1. YES	0. NO	Remarks				
Last action day conducted was informed by data	1. YES	0. NO	Remarks				
Three Monthly Feedback meetings conducted in the last quarter	1. YES	0. NO	Remarks				
In the feedback meeting, data was discussed	1. YES	0. NO	Remarks				
Data shared at sub county forums	1. YES	0. NO	Remarks				
CHU receives feedback from sub county on monthly reports	1. YES	0. NO	Remarks				
A system exists for referring clients to the next level	1. YES	0. NO	Remarks				
There are formalized referral forms used by CHVs to refer clients	1. YES	0. NO					
There is a system for the health facility to provide the CHV with information about the client once the referral has been made	1. YES	0. NO					
There are forums for disseminating CHU data	1. YES	0. NO					
Data is used to develop proposals for funding and for advocacy	1. YES	0. NO					