Republic of Kenya

Ministry of Health

DATA QUALITY REVIEW (DQR) REPORT

2016
Nairobi, February 2017

Any part of this document may be freely reviewed, quoted, reproduced or translated in full or in part, provided the source is acknowledged. It may not be sold or used for commercial purposes.

Data Quality Review, National Survey Report Published by:
Ministry of Health
Afya House, Cathedral Road
PO Box 30016 Nairobi - 00100
http://www.health.go.ke
Foreword

Health sector performance monitoring and evaluation is an integral role in the health systems that ensure accountability, efficiency and effectiveness in service delivery. The Constitution of Kenya under article 43 guaranteed all citizens the right to highest attainable standard of health that places accountability mechanism as a priority. Similarly, Kenya is a signatory to the global commitments on Sustainable Development Goals (SDG)s that require massive information to answer the SDG indicators. Therefore, having reliable/quality data is a priority to the sector with an extension of providing credible information for planning and strategic decision making in the sector.

The health sector data quality periodic checks are outlined in the Kenya Health sector strategic Plan, the Health sector monitoring and evaluation framework, the Monitoring and evaluation institutionalization guidelines (2016) as well as the data quality review (DQR) protocol of 2011. This DQR (2017) report is the second nation-wide DQR after devolution of health services to the Counties and the rolling out of the District Health Information Software (DHIS)2 reporting platform for the routine reporting of health facility service delivery and community health services and therefore, provides a fundamental feedback on the progress on data quality aspects after devolution.

It is my hope that this report will be disseminated widely and gives an insight on how much confidence can be placed in the health data that is used to assess health sector performance as well as to understand the relative strengths and weaknesses of the various data sources, in order to raise standards of service delivery. Further, it is my great desire that the recommendations stated in this report will be used to improve health data from all data sources to inform better decision making at all levels of the governments.

We look forward to your support for strengthening the data quality and future participation to assess the results of our collective efforts. On behalf of the Ministry of Health, I express appreciation to the Global Fund by providing the financial support required for this study. I therefore, call upon all stakeholders to guard all the achievements we have realised in terms of data management and continue to address areas of concern.

DR. CLEOPATRA MAILU, EGH
CABINET SECRETARY
MINISTRY OF HEALTH
Acknowledgement

The quality and reliability of health data and information systems is essential in addressing the health challenges that impede improvement of access and quality of health care at all levels of health systems. The Ministry of Health (MOH) Kenya is cognizant of the value of quality of data as the life line of decision-making processes as well as application/use as the raw material for programmes implementation and accountability. The DQR (2016) was the second national review after devolution of health services to the counties and was done through the support from Global Funds by the Ministry of Health Staff to inform the mid-term review (MTR) of the Kenya Health Sector Strategic Plan (KHSSP) (2014-2018).

In this regard, we would like to thank the Director of Medical Services Dr. Jackson Kioko for his able leadership, guidance and support during the work of the DQR. We would also like to express our sincere appreciation to the County Executive Committee (CEC)s who allowed the research teams to conduct the reviews in the counties and to all other health care personnel, who despite their busy schedules accorded the research team adequate time.

Special thanks go to the research team which comprised of MOH staff, County Department of Health staff, World Health Organization (WHO) technical team, consultants and a team of dedicated research assistants who were very effective during data collection and entry.

Many thanks goes to the contribution of our development partners; Global Fund and WHO for Financial and technical support. Appreciation goes to the Health & Economics Finance Development Consortium (HEFDC) team through Dr. Grace Muriithi and Alexander Kireria, WHO team lead by Dr. Benson Droti (WHO Headquarters), Dr. Hillary Kipruto, Cosmas Leonard and Kennedy Chitala (WHO Kenya country office), Consultants lead by Dr. Joseph Mungatu, Prof. Kanali and Jane Akiyuni.

Finally, we would like to thank the staff from the Ministry of Health for their commitment and hard work in stewarding and coordination of the process. Special mention goes to Dr. Isabella Maina, the Head of the Health sector M/E unit who was responsible for the overall coordination of the DQR process. My sincere gratitude also goes to the M&E unit team namely Dr. Helen Kiarie, Pepela Wanjala, Tom Mirasi, Samuel Cheburet, Dr. Elizabeth Wangia, Bernadette Ajwang, and as well as the interns: Joseph Mwangi, Anne Nduta, Paul Bartillol and Anabay Mamo. It is my sincere hope that this DQR report will help to improve the quality of our health data and subsequently increase its demand and use and further strengthen the monitoring and evaluation systems at national and county levels.

JULIUS KORIR, CBS
PRINCIPAL SECRETARY
# Table of Contents

Foreword .................................................. ii
Acknowledgement ........................................ iii
Executive Summary ....................................... vii
Abbreviations ........................................... xiii
List of Figures ........................................... xv
List of Tables ............................................ xvi

1 Introduction ........................................... 1
  1.1 Background ......................................... 1
  1.2 Goal and Objectives of the DQR .................... 2
  1.3 Data Quality Review (DQR) concept ............... 2
  1.4 Rationale of the Data Quality Review ............. 3
  1.5 Data quality review framework .................... 3
  1.6 Data Quality Review (DQR) Processes ............. 4

2 Methodology ........................................... 5
  2.1 Introduction ......................................... 5
  2.2 Kenya HIS Data Flow Model ....................... 5
  2.3 Dimensions of DQR approach ....................... 6
     2.3.1 Completeness and Timeliness of data: ...... 6
     2.3.2 Internal consistency of reported data ...... 6
     2.3.3 External consistency i.e. Agreement with other sources of data such as survey .......... 6
     2.3.4 External comparison of population data (review denominator data used to measure performance indicators) .......................... 7
  2.4 Sampling Procedure .................................. 7
     2.4.1 Introduction .................................... 7
     2.4.2 Design and sampling ........................... 7
  2.5 Indicators Selection .................................. 10
  2.6 Assessment Tools .................................... 10
  2.7 Data Collection Process ............................. 12
     2.7.1 Field data collection .......................... 12
     2.7.2 Quality Assurance ............................. 13
  2.8 Data Analysis ....................................... 13
  2.9 Desk Review – data Analysis ....................... 13
     2.9.1 Determination of Thresholds for quality of reporting ........................................ 14
     2.9.2 M&E systems assessments at health facility and sub county level ............................ 15
  2.10 Ethical Considerations ............................. 15
3 Results and Discussion

3.1 Introduction ......................................................... 17
3.2 Reporting Completeness and Timeliness .......................... 18
  3.2.1 Reporting Completeness ................................. 18
  3.2.2 Reporting Timeliness ..................................... 19
  3.2.3 Data Accuracy ............................................... 19
3.3 Internal Consistency of Reporting Data ........................... 20
  3.3.1 Consistency 1st ANC Visit over time .................. 21
  3.3.2 Consistency of 3rd dose DPT vaccine over time ...... 21
  3.3.3 Consistency of Number of HIV+ persons currently on ART over time ........................................... 22
3.4 External Consistency ............................................... 22
3.5 Data Quality Verification - Health Facility Assessment and Sub-County Assessment .............................................. 26
  3.5.1 Health Facilities in a Sub-Sample ....................... 26
  3.5.2 Facility availability of documents ..................... 27
  3.5.3 Match between source documents and monthly reports .. 28
  3.5.4 Verification ratio .......................................... 31
  3.5.5 Data Quality Verification Analysis Sub-County Level - Verification Factor ............................................. 31
3.6 Assessment of M&E Systems ........................................ 34
  3.6.1 Staff training and empowerment .......................... 34
  3.6.2 Indicator definition and reporting guidelines .......... 34
  3.6.3 Availability and use of reporting tools ................ 35
  3.6.4 Monitoring and feedback .................................. 35
  3.6.5 Supervision .................................................. 36
  3.6.6 Reports storage and archiving ........................... 36
  3.6.7 Denominator data availability ............................ 36
  3.6.8 Data demand and use ...................................... 37
  3.6.9 Comparison between DQA 2014 and DQR 2016 .......... 38
3.7 Summary of the key findings and discussions .................... 39
  3.7.1 Reporting Completeness and Timeliness ............... 39
  3.7.2 Reporting Timeliness ...................................... 39
  3.7.3 Internal Consistency of Reporting Data ................ 39
  3.7.4 External Consistency ...................................... 40
  3.7.5 Data Quality Verification Analysis ..................... 40
  3.7.6 M&E Systems Assessment .................................. 40

4 Conclusion and Recommendation ................................. 42
  4.1 Conclusion ...................................................... 42
  4.2 Recommendations .............................................. 43

References ........................................................................ 46

APPENDICES ........................................................................ 46
Executive Summary

background

The DQR and health facility assessments (HFA) are an integral measure of program quality improvement and progress including providing critical inputs for planning and implementation, monitoring and evaluation for national and sub-national levels of health system. The Ministry of Health (MOH) Kenya in recognition of the value of quality data as the life line of Planning, information management and overall decision-making including accountability conducted a data quality review in December 2016.

The DQR was specifically conducted to inform the MTR of the Kenya Health Strategic and Investment Plan (2014–2018). Further, the finding will be able to ascertain the progress being made in achievement of sector goals and objectives.

Methodology

The DQR was conducted at health facility and Sub-county levels using the WHO’s harmonized data verification tools to measure quality of facility reported data (at the national and sub-national levels) within the routine health information system (DHIS2) focusing on the four dimensions of quality namely; completeness, timeliness, accuracy and consistency of data.

Within each of the above DQR dimension, five core indicators were used to track progress. The five programmatic indicators which were used included:

(a) Maternal health: Antenatal care first visit
(b) Immunization: Pentavalent/DTP third doses in children under one year
(c) HIV indicators: ART coverage
(d) Tuberculosis: TB cases
(e) Malaria: Confirmed malaria cases

Analysis was done using STATA statistical package as well as excel to generate results on the data quality verification that was carried out to assess the quality of data and factors that would affect the quality of data at the health facility, sub-county and national level.

Key Findings

Overall Data Quality Consistency

Overall, the reporting rate and timeliness for the indicators assessed was generally good, with a completeness rate of 91.7% and timeliness of 95.6%. The trend on both completeness and timeliness has shown a steady improvement over time since 2013. However, the reporting rates do not take into account the non-reporting facilities. The accuracy of DHIS data against what is in the summary tools showed some discrepancies with ART having over half (53.7%) of the sub-counties recording mismatch between reported data and that in the summary tool. ANC visits had the most accurate data with only 7.3 % of Sub- Counties having a
discrepancy. Generally, the inconsistency seen in the results could be attributed to the multiple sources of summaries at different levels of care, lack of guidelines and standard operating procedures (SOP)s, in the counting within tools as well as frequent revision of tools on most of the indicators.

Data Accuracy

On examination of accuracy of the reporting system against the summary tools /summary sheets reflected what was in the reporting system (DHIS2), the DQR found some inconsistencies across the selected indicators. ART had the most discrepancies with over half of sub-counties recording a mis-match between reported data and what was in the summary tools. The discrepancies could be attributed to the availability of different reporting tools which could result in inconsistencies in the counting and transcription. Additionally, frequent revision of tools may have had a negative effect on most of the indicators like immunization and malaria. Antenatal Care (ANC) visits had the most accurate data with only 7.3% of Sub-Counties having a discrepancy.

Completeness

This dimension of data quality was assessed to establish the extent to which reported data through M&E system are available and adequate. In this context, completeness of data was assessed by measuring whether all entities that are supposed to report actually do so. This included facility level, sub-county level and data elements within submitted reports. Overall, the trend for both sub-county and facility report completeness rate had been on the rise since the year 2013. The sub-counties completeness rate was above 80% in 2013 while the current result of DQR (2016) shows that, both facilities and sub-counties attained a report completeness rate of above 90% and the sub-county Mean report completeness was 94%.

Timeliness of data

On measuring whether the health facilities submitted reports on or before a pre-defined period, the assessment established that 92.1% of the Sub-Counties reports were timely submitted. However, 10.3% of the sub-counties had a timeliness of less than 75%. Some of the factors (identified by the M&E system assessment) as contributing to the sub-counties not achieving the threshold of 75% timeliness rate include: i) Sub-counties not supplying health facilities in the sub county with blank data collection tools (e.g. registers, reporting forms)/ not having sufficient copies available in the sub county to meet the needs of all health facilities; (ii) not receiving regular supervisory visits from the county or national level; (iii) sub county not conducting regular supervisory visits to health facilities; (iv) sub-counties not receiving regular supervisory visits from the county or national level.

Internal consistency of reported data

On examination on internal consistency based on trends of reported data including reporting accuracy for selected indicators, the results shows the overall outliers of Sub Counties with percentage changes between current year (2016)
and preceding 3 years (2013 – 2015) of more than 33% above or below the national average change for four indicators: Malaria indicator (62%) had the highest number of Sub counties with outliers (inconsistent data values/reports between levels) followed by HIV/AIDS with 30 (38.5%) sub counties having moderate outliers. The indicators that registered minimal outliers in the reports were ANC 1 14(18%) and DPT3 18 (23%).

External comparison of population data (review denominator data used to measure performance indicators)

On comparison of reliability and uniformity of routine data with Population-based Survey Values from the Same Period, the DQR survey established that (29.4%) 5 counties among the sampled 19 counties, data for ANC 1 visit in the routine system was not comparable to that obtained from the surveys.

M&E Systems Assessment

Availability of reporting documents: The results of DQR showed that the most available primary data capture documents was the register; DPT3/Penta3 register was available in 117 (84.6%) health facilities, ART registers in 112 (83.6%), TB registers in 132 (92.9%), Malaria registers in 194 (80.3%) and ANC registers in 203 (97.1%) health facilities respectively.

Therefore, based on the above findings the rate of availability of main documents for reporting the five indicators did not compromise the validity of the Verification Factor. However, it is notable that TB indicator was using other main reporting documents other than the listed. The TB programme has a parallel reporting system, which is not yet integrated with the health management information systems (HMIS)

Match between source documents and monthly reports

On percentage of facilities that have an exact match between recounted numbers of main source documents and monthly reports, by facility type, the DQR established that very few health facilities had data events (numbers) in the primary document matching those reported in the monthly reports across the five indicators. On the basis of health programme’s indicators assessed, the results from dispensaries and nursing homes with discrepancies are indicated as follows:

(i) ANC 1st visit indicator- only 18.9% of the health facilities had the reported number in the monthly report matching the number in the primary document.

(ii) DPT3/Penta3 indicator - only 24.4% of the health facilities had the reported number in the monthly report matching the number in the primary document.

(iii) ART indicator - only 18.5% of the health facilities had the reported number in the monthly report matching the number in the primary document.
(iv) TB indicator: Only 16.4% of the health facilities had the reported number in the monthly report matching the number in the primary document.

(v) Malaria indicator: Only 34.5% of the health facilities had the reported number in the monthly report matching the number in the primary document.

On comparison of levels of discrepancies between data in the main source document and the monthly report (based on the average percentage of responses across the five indicators that were given established that the findings are not a true representation of the reasons for the discrepancies given that no data was collected for 50% of the discrepancies. More detailed reasons for discrepancies between the main source document and monthly report on programme indicators are presented in chapter three of this report.

Indicator definition and reporting guidelines

The DQR survey team established that in some sub-Counties there were no written documents on indicators definitions. Facility-level recording staff mostly relied on their common knowledge from pre-service training or verbal instructions given by sub-county HRIOs for definitions of indicators. Eighty three percent (82.7%) had clear definition on the indicator of patients’ current on ART, indicators on TB cases notified, number of DPT3 and number of ANC 3 had on average 65% of sub-Counties with clear definitions.

Availability and use of reporting tools

the DQR survey established that 87% of the sampled sub-counties, the source documents and reporting forms/tools specified by the HMIS, were consistently being used in all the facilities. Standard registers have general instructions on the reverse side of the cover pages about data recording procedures. Though instructions are given, only 79.2% reported to have provided clear instructions to the health facilities in the sub-county, on how to complete the data collection and reporting forms/tools. Only 46.8% of the sub-counties reported to have sufficient copies of registers and reporting forms and were supplying to the health facilities.

Monitoring and feedback

Of the sub-counties interviewed, 87.3% were monitoring timeliness and completeness of reporting from health facilities, while only 45.6% were providing feedback to the health facilities. Only 47.4% of the sub-counties reported to have a routine and systematic process in the sub-county for checking the quality of data at the health facility and 34.2% routinely conducted accuracy checks by either re-compiling priority indicators for a given period and comparing with reported values for the same period. There are no policy and guiding document at the sub-county on how to conduct data quality. Only 21.5% of the counties had these documents available.

Supervision

The review established that 50% of sub-counties had supervisory staff who conducted regular supervisory visits to health facility, 84% had supervisory staff visit
each health facility at least once in the past 12 months, 73% has written documentation on the results of supervisory visits conducted in health care facilities, 47% indicated that they received regular supervisory visits from the county, while 74% has supervisory visits conducted in the past 6 months. The study found that 90% of sub-counties and facility levels had available archived reports; however, only 27% of sub counties had appropriate and adequate space for storage of archived reports. Only 34% of facilities had data backed up appropriately. There was a high number of sub counties with password protected computerized systems at 95%.

**Denominator data availability**

With reference to population denominator data availability and use, 75(98.7%) had target populations for priority indicators such as vaccination coverage, 32(42.1%) had map of sub county showing health facilities and the services, 32(42.7%) of the sub counties had data on the number of births and deaths occurring in the sub-county year to year such registers or line listing of births and deaths.

**Data demand and use**

In terms of data use and demand, 84.8% of the sub counties monitor coverage for priority indicators, 71.8% tracked progress towards realistic targets for priorities. 81% of Sub-Counties had assigned staff to interpret and analyse the data/results, while 46% had set mechanisms through which HMIS staff can obtain support

**Comparison between DQA 2014 and DQR 2016.**

Overall, in comparison with the previous Data Quality Audit 2014, the MOH DQR 2016 showed a significant improvement in data quality reporting and completeness across all programme indicators: Completeness of data stood at 83.2% in 2014 ,remarkable increase to 94% in 2016 with only two of the sampled sub-counties falling below the 80% threshold. On timeliness of the data, DQA 2014 indicated that 8 of the sampled 34 counties were below the threshold of 75% while DQR 2016 found that out of the 19 sampled counties only 2 counties were below the timeliness threshold of 80%.

Comparing the DQR results to the MTR of KHSSP 2014-2018 indicated that, overall, the DHIS is working and its coverage, completion and reporting rates has improved. Its completion and timeliness rate had reached 89 and 77 percent respectively. This was closer to the results of DQR 2016 on completion and timeliness of 94 and 92.4% respectively. This has enhanced credibility in the data used to develop the MTR report of the KHSSP 2014-2018.

**Conclusion and Recommendations**

**Conclusion**

Internal consistency of reporting data showed a high degree of correlation of coverage between the three preceding year’s monthly averages and the current year coverage. There is external consistency with routine data comparing favourably with the survey data. However, in some Sub- Counties it was not comparable.
On the systems assessments, five key functional components of data management and reporting systems were assessed (i.e., Structure, functions and capabilities, Indicator definition and reporting guideline, Data collection and reporting tools). Generally, all visited facilities have data management and reporting systems in place. There is a mixed picture on the functioning of the system.

However, the process identified some weaknesses in the data management and reporting systems. These included no documentation on indicators definitions, no regular data quality control systems that checked for and corrected errors before submitting to the DHIS. In some sub-counties, registers were also not available. There was also no regular supportive supervision to facilities and is inadequate, clean and dry space for storing the records.

**Recommendations** The data can be further analysed to identify the nature of discrepancies, data verification should be institutionalized at all levels, there should be regular data quality checks at facility level and documentation of indicator definitions. More resources should be set aside for data collection and supervision by HRIOs should be regular.
**Abbreviations**

ANC antenatal care.
ART antiretroviral therapy.
CEC County Executive Committee.
CSO civil society organizations.
DHIS District Health Information Software.
DQR data quality review.
FBO faith based organizations.
GAVI Global Alliance for Vaccines and Immunization.
GF Global Fund.
HEFDC Health & Economics Finance Development Consortium.
HFA health facility assessments.
HIS health information systems.
HMIS health management information systems.
HRIO health records and information officers.
JSI John Snow Incorporated.
KAIS Kenya AIDS Indicator Survey.
KDHS Kenya Demographic and Health Survey.
KEPH Kenya Essential Package for Health.
KHSSP Kenya Health Sector Strategic Plan.
MFL Master Facility List.
MIS Malaria Indicator Survey.
MOH Ministry of Health.
MTR mid-term review.

NGO non-governmental organizations.

RDT rapid diagnostic test.

SARA Service Availability Readiness Assessment.

SDG Sustainable Development Goals.

SOP standard operating procedures.

SPSS Statistical Package for the Social Sciences.

SRS Simple Random Sampling.

ToT Trainer of Trainers.

VF verification factor.

WHO World Health Organization.
List of Figures

1.1 systematic data quality review frame ................................. 4
3.1 Percentage of Health facilities visited ................................. 17
3.2 Trend in Sub-County and Facility Report Completeness (2013–2016) 19
3.3 Proportions of indicators with discrepancies .......................... 20
3.4 Trend and consistency of ANC 1st Visit over time ..................... 22
3.5 Trend and consistency of 3rd dose DPT- vaccine over time ........ 23
3.6 Trend and consistency of number of HIV+ persons currently on ART over time ......................................................... 24
3.7 Trend and consistency of Malaria cases over time ..................... 25
3.8 ANC Comparison of Routine Data with Population-based Survey Values from the Same Period .............................. 25
3.9 Immunization 3rd dose DPT Comparison of Routine Data with Population-based Survey Values from the Same Period ........ 26
3.10 Reasons for the discrepancy between main source document and the monthly report ......................................................... 29
3.11 Frequency Distribution of responses on reasons for the discrepancies between the re-aggregated numbers from the reports received from all health facilities and the aggregated result contained in the summary report prepared by the sub counties ....................... 29
3.12 Percentage of health facilities that have an exact match between recounted numbers of main source documents and monthly reports 30
3.13 Health Facilities Verification Factor ................................. 32
3.14 Verification Factor of Selected Indicators at the Sub-county Level 32
3.15 staff training and empowerment ......................................... 34
3.16 Sub-Counties with Clear definitions for indicators ................. 35
3.17 Availability and use of reporting tools ................................. 35
3.18 Monitoring and feedback of submitted data ......................... 36
<table>
<thead>
<tr>
<th>Table</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>Kenya HIS Data Flow Model</td>
<td>6</td>
</tr>
<tr>
<td>2.2</td>
<td>Sampling Frame by Manning Agency</td>
<td>8</td>
</tr>
<tr>
<td>2.3</td>
<td>Deriving Sample size using TB indicator</td>
<td>9</td>
</tr>
<tr>
<td>2.4</td>
<td>Proportional allocation of facilities by managing authority and facility level</td>
<td>9</td>
</tr>
<tr>
<td>2.5</td>
<td>Sampling by Counties and Level of Care</td>
<td>10</td>
</tr>
<tr>
<td>2.6</td>
<td>Selected Core Indicators for 2016 DQR</td>
<td>11</td>
</tr>
<tr>
<td>2.7</td>
<td>Quality Thresholds</td>
<td>14</td>
</tr>
<tr>
<td>2.8</td>
<td>Calculated sample size per county</td>
<td>16</td>
</tr>
<tr>
<td>3.1</td>
<td>Overall sub-county reporting completeness rate in 2016</td>
<td>18</td>
</tr>
<tr>
<td>3.2</td>
<td>Facility reporting completeness rate in 2016</td>
<td>18</td>
</tr>
<tr>
<td>3.3</td>
<td>Facility reporting timeliness rate in 2016</td>
<td>19</td>
</tr>
<tr>
<td>3.4</td>
<td>Sub-counties with outliers</td>
<td>19</td>
</tr>
<tr>
<td>3.5</td>
<td>Overall sub-county reporting completeness rate in 2016</td>
<td>20</td>
</tr>
<tr>
<td>3.6</td>
<td>Consistency of 1st ANC visit over time</td>
<td>21</td>
</tr>
<tr>
<td>3.7</td>
<td>Consistency of Immunization - 3rd dose DPT-containing vaccine over time</td>
<td>21</td>
</tr>
<tr>
<td>3.8</td>
<td>Consistency of HIV/AIDS Number of HIV+ persons currently on ART over time</td>
<td>23</td>
</tr>
<tr>
<td>3.9</td>
<td>Consistency of Malaria - Number of confirmed malaria cases reported over time</td>
<td>24</td>
</tr>
<tr>
<td>3.10</td>
<td>Percentage of facilities in the sample providing each health service</td>
<td>27</td>
</tr>
<tr>
<td>3.11</td>
<td>Percentage of facilities in the sample providing each health service, by stratum</td>
<td>27</td>
</tr>
<tr>
<td>3.12</td>
<td>Availability of main documents used by a facility to report service data for monthly reports, by programme area</td>
<td>27</td>
</tr>
<tr>
<td>3.13</td>
<td>Percentage of facilities in the sample providing each health service</td>
<td>28</td>
</tr>
<tr>
<td>3.14</td>
<td>Percentage of facilities with an exact match between recounted numbers of main source documents and monthly reports, by facility type</td>
<td>29</td>
</tr>
<tr>
<td>3.15</td>
<td>Health Facilities verification Factor</td>
<td>30</td>
</tr>
<tr>
<td>3.16</td>
<td>Verification Factor of Selected Indicators at the Sub-county Level</td>
<td>32</td>
</tr>
<tr>
<td>3.17</td>
<td>Regular supervision to facilities</td>
<td>37</td>
</tr>
<tr>
<td>3.18</td>
<td>Regular supervision to facilities</td>
<td>37</td>
</tr>
<tr>
<td>3.19</td>
<td>Population data availability and use</td>
<td>38</td>
</tr>
<tr>
<td>3.20</td>
<td>Data demand and use</td>
<td>38</td>
</tr>
</tbody>
</table>
Chapter 1

Introduction

1.1 Background

The quality and reliability of health data and information systems is pivotal in addressing the health challenges that impede improvement of access and quality of health care at all levels of health systems. Globally, and specifically in the Sub-Saharan region, the healthcare industry is data rich but information poor. Moreover, the volume and quality of data being generated from various sources of health care is often poor, inadequate and too disjointed. In Kenya a number of investments in infrastructure, human skills (resources) and equipment has been made towards improving the Health information system and quality of data and this has so far seen a significant progress in information generation, data management, analysis and information use at various level. However, in spite the progress, there still remain challenges on data generation, synthesis, analysis, storage and interoperability of systems that need to be addressed.

Globally, there are currently unparalleled concerted calls for improved data to inform the sustainable development. In the document “Transforming our world: the 2030 Agenda for Sustainable Development,” Member States underscored the importance of quality, accessible, timely and reliable disaggregated data. Likewise, the Constitution of Kenya 2010 devolved health services to the counties and has put much emphasis on the need for transparency, accountability as well as public participation as key focus for effective and participatory monitoring and tracking progress in implementation of the Vision 2030 and its Medium-Term Plan as well as the sector specific strategic plans. This need is enhanced through digitized records and health information system within the Ministry of Health. Furthermore, the KHSSP 2014-2018, spells out the need for a robust monitoring and evaluation system and further identifies improving data quality as a priority for strengthening planning, resources, monitoring and evaluation, as well as the overall decision making process. Given that the bulk of health services are currently delivered by county health units while the national level provides policy support, guidelines and management of national programmes, there is a greater need for quality data and harmonization to inform decision making at the multiple units of health sector.

Consequently, health sector has adopted the existing health information systems (HIS) tools and the ICT web based platform (DHIS2), as the MOH’s routine aggregated reporting systems, to enhance harmonized data collection, analysis and
dissemination as stipulated in the Kenya health policy framework. Making this information widely available to key sectors of government and private entities has also been anchored in the Bill of rights to information as enshrined in the Kenyan Constitution and collection efforts are enforced in the Health Act. Therefore, ensuring that data is of high quality is essential to maintain confidence in decisions made on its basis. The aim of the data quality review was to ensure systematic assessment of completeness and internal and external consistency of the reported data and intervention coverage rates and to identify any data quality problems that need to be addressed.

1.2 Goal and Objectives of the DQR

The purpose of Kenya’s DQR was to support the health sector strategic planning cycle (MTR of the KHSSP undertaken in 2016) in validating the facts and figures as presented in the MTR report. Broadly, the objective of the DQR was to verify that the information contained in primary source documents at the facility level was transmitted correctly to the next level of reporting which is the sub-county and other reporting levels. And specifically the objectives were;

(i) To conduct systematic and comprehensive assessments of data quality;

(ii) To carry out independent verification of the quality of data on a sample of facilities that includes reviews of service and patient records;

(iii) To carry out in-depth assessments of programmatic (antenatal care (ANC), Immunization, TB, HIV, and Malaria) data reporting system;

(iv) To identify and document the gaps on facility data and suggest remedial action.

(v) To disseminate findings and develop a data quality improvement plan in order to address quality problems identified in the DQR

(vi) To provide assurance of reliability of data used for the Mid Term Review of KHSSP 2014-2018

1.3 Data Quality Review (DQR) concept

DQR and HFA are an integral measure of program quality improvement, planning and implementation, as well as monitoring and evaluation. Data quality assessment should always be done to understand how much level of confidence can be placed in the health data reported in terms of its’ validity, completeness, consistency, accuracy and verifiability. The Kenya DQR (2016), was conducted in conjunction with the Health Facility Assessment (Mini-SARA), Clients Satisfaction survey and Work Environment survey respectively, to assess the quality of facility reported data (at national and sub-national levels) within the routine health information system (DHIS2) to determine completeness and consistency of data and information as reported in the health sector M&E system. The results of the DQR were meant to validate the facts and figures as reported in the MTR report of the Kenya Health Strategic plan (2014 -2018).
1.4 Rationale of the Data Quality Review

The healthcare industry is data rich across all the health system building blocks but information poor. Good health information systems are pivotal for addressing health challenges and improving health service delivery. However, the quality of the volume of data being produced by such systems is often sub-optimal and the information is not used effectively for decision-making.

In the past decade, Kenya’s Health information, monitoring and Evaluation system has made remarkable improvement through streamlined data collection; defining data flow conduits; generation of sector reports and information sharing among the different stakeholders under the stewardship of the Ministry of Health.

DQR therefore, enables the understanding of the adequacy of the routine data that is used for health sector planning, monitoring and evaluation and permits stakeholders to know that the routine data has undergone a known minimum level of scrutiny which lends credibility and confidence in the data. The review forms a sound basis for programmatic and financial decision making by providing relevant data that is an important source of information to ascertain the progress being made towards the achievement of sector goals and objectives.

1.5 Data quality review framework

The DQR module developed collaboratively by WHO, Global Fund (GF), Global Alliance for Vaccines and Immunization (GAVI), John Snow Incorporated (JSI) and Measure Evaluation was employed for the Kenya’s DQR for country-led data collection, analysis as well as assessment of quality assurance by Ministry of Health and GF Service Provider. The assessment measured the capacity of the system to produce good-quality data. It evaluated the extent to which critical elements of the reporting system adhere to a set of minimum acceptable standards. The elements of the reporting system that were evaluated in the system assessment are as follows:

(i) Monitoring and evaluation (M&E) structure and function

(ii) Indicator definitions and reporting guidelines

(iii) Data collection tools and reporting forms

(iv) Data quality monitoring and supervision

(v) Data maintenance and confidentiality

(vi) Demographic information (district level only)

Health facility data forms a critical input in assessing national progress and performance on an annual basis and they provide the basis for Sub-National/district performance assessment. The process of review of micro data quality start with the information recorded at the health-facility level and aggregated up through the reporting chain. Although this can provide important information, it does not cover two important sources of error: unrecorded occurrences and erroneously recorded occurrences. Some, but not all, of these errors can be detected by
studying the data. Gaining an understanding of what is happening in the process of service delivery and documentation of occurrences is an important aspect of studying data quality.

As shown in the review framework in Figure 1.1, data quality from the sampled facilities were assessed systematically for consistency, completeness and accuracy from source documents at the Health facility level, then the facility summary. The same was followed up at the sub-county and county level to determine any form of discrepancy and the extent of their completeness and accuracy.

![Figure 1.1: systematic data quality review frame](image)

1.6 Data Quality Review (DQR) Processes

The DQR processes at the Health facility was undertaken procedurally as follows;

(i) Recounting of data of the selected indicators from the pre-identified primary source documents at the health facility;

(ii) Comparison of the recounted/verified values of the indicator data to the value reported by the health facility for the same reporting period.

(iii) Calculation of the Verification factor to determine if there was under reporting or over reporting.

While at the sub-county level the procedures that were undertaken included;

(i) Aggregation of reported data values by health facilities in the sub-county from reports submitted by health facilities;

(ii) Comparison of the recounted/verified values of the indicator data to the value entered in the DHIS2.

(iii) Calculation of the Verification factor to determine if there was under reporting or over reporting.
Chapter 2

Methodology

2.1 Introduction

The Kenya 2016 DQR assessment included the following three components: i) Desk Review of the data that have been reported to national level; ii) Data Quality Review at Health Facility and Sub County levels; (iii) M&E systems assessments at health facility and sub county level. The desk review involved manual extraction/mining of data and analysis using the DQR Excel analysis tool, by examining the quality of aggregate reported data for the recommended programmes indicators and analysing using standardised data quality assessment metrics/WHO tools. The data quality review component covered the sampled 250 health facilities and 78 sub counties in 19 counties.

Facilities sampled included public health facilities (facilities owned and managed by the Ministry of Health and county governments), Private not for profit Facilities (facilities owned and managed by Faith Based Health services, non-governmental organizations (NGOs), civil society organizations (CSOs)), Private-for-profit facilities (facilities manned by private individuals, organisations, or groups, as profit making enterprises). Analysis of this data was undertaken using Stata and Excel. The M&E assessment data was analysed using Stata and Excel tool. Interpretation of the findings involved programmes that are well versed in health data processes in the country. Validation of the findings was undertaken with participation of county health departments and national health departments respectively. Quality Assurance of the surveys was undertaken by the Global Fund service provider.

2.2 Kenya HIS Data Flow Model

Every month the staffs at the different primary health-care facilities collate the data and send monthly summaries on paper to sub-county Health Records and Information Office. The monthly summaries are then entered into web-based District Health Information Software (DHIS2) system by a health records and information officers (HRIO) based within the sub-county health office. Larger facilities such as referral hospital and County hospitals have dedicated facility recording officers who themselves enter the facility data into the DHIS2 system. Sub-county HRIOs oversee the input of all data into the DHIS2. Table 2.1 shows flow of data in the Kenyan health system by level.
Table 2.1: Kenya HIS Data Flow Model

<table>
<thead>
<tr>
<th>Year of DRQ analysis</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reporting/Aggregation levels</td>
<td>Facility, Sub-County</td>
</tr>
<tr>
<td>Reporting System at all Level (Facility)</td>
<td>Standardized paper based system/tools</td>
</tr>
<tr>
<td>Reporting System at Sub-county level</td>
<td>Web-based DHIS system</td>
</tr>
<tr>
<td>Periodicity of reporting/aggregation from 1st level (Facility)</td>
<td>Monthly</td>
</tr>
<tr>
<td>Periodicity of reporting/aggregation from Sub-County level</td>
<td>Monthly</td>
</tr>
<tr>
<td>Administrative Units Assessed</td>
<td>123 facilities, 78 Sub Counties, 19 Counties</td>
</tr>
</tbody>
</table>

2.3 Dimensions of DQR approach

The Kenya Data Quality Review 2016 focused on the following four dimensions of data quality:

2.3.1 Completeness and Timeliness of data:

This data quality dimension focused on extent to which reported data through M&E system are available and adequate for planning, monitoring and evaluation. In this context, completeness of data was assessed by measuring whether all entities that are supposed to report actually do so. This includes submission of facility level and sub-county level reports and identified data elements within the submitted reports. Timeliness on the other hand was assessed by measuring whether the entities that submitted reports did so before a pre-defined period.

2.3.2 Internal consistency of reported data

This process examined trends of reported data to determine whether reported value are extreme relative to other values reported during the year or across several years; Secondly, the process also made assessment of programme indicators which have a predictable relationship to determine whether the expected relationship exists; thirdly, internal consistency of reported data involved made assessment of reporting accuracy for selected indicators through the review of source documents in health facilities (data verification).

2.3.3 External consistency i.e. Agreement with other sources of data such as survey

The process involved assessing the level of agreement between two sources of data measuring the same health indicator. Examples of source of data: DHIS data or programme specific information and periodic population based survey.
2.3.4 External comparison of population data (review denominator data used to measure performance indicators)

The process involved comparison of two different sources of population estimates that is namely the national and sub county levels to ascertain the level of congruence between the two sources; The higher the level of congruency between denominators from difference sources, the more confidence can be placed in the accuracy of the population projections.

2.4 Sampling Procedure

2.4.1 Introduction

The procedure for determining the sample size and sampling strategy was informed by the objectives of the assessment. The overarching objective of the exercise was to conduct an integrated Service Availability Readiness Assessment (SARA), Customer and employee experience Index and DQR studies to inform MTR process for KHSSP (2014–2018). With this in mind, the sampling strategy used was aimed at getting a nationally representative sample obtained by taking a simple random sample of facilities within each stratum (facility type and managing authority) at the national level.

2.4.2 Design and sampling

A descriptive cross-sectional design was adopted for this assessment targeting the data collected between the months of July- September 2016. The survey utilised both qualitative and quantitative methods to verify the data from source documents for select indicators against summary data, DHIS data. The assessment also collected qualitative data on the data management systems to determine their ability for collecting, managing and reporting quality data.

2.4.2.1 Determination of eligible facilities

The characteristics of the facilities that form the study population was agreed upon based on the following:

- Managing authority - Private, NGO/faith based organizations (FBO) and Public
- Facility level – Primary health facilities (Levels 2 and 3), Hospitals (Levels 4 and 5)

2.4.2.2 Construction of sampling frame

The sample frame used to draw the samples sizes for this study was the complete census of Health facilities as contained in the Master Facility List (MFL). The MFL contains a list of all registered health facilities in Kenya including private, public and NGO/FBO and are uniquely identified. Facilities were clustered into ten (10) regions (the former administrative boundaries before devolution). Multi stage method of sampling was used to draw the sample sizes from regional clusters up to County level while Simple Random Sampling (SRS) technique was used to pick at least two counties in each of the region.
2.4.2.3 Determination of domains/strata

A stratified sampling plan was followed for the survey to ensure representation across the various domains/strata of the eligible facilities. The sampling frame was partitioned into strata. The sample size was calculated for the various strata. The defined strata included:

- Public hospitals (Levels 4 and 5)
- Private hospitals (Levels 4 and 5)
- NGO/FBO hospitals (Levels 4 and 5)
- Public primary health facilities (Levels 2 and 3)
- Private primary health facilities (Levels 2 and 3)
- NGO/FBO primary health facilities (Levels 2 and 3)

2.4.2.4 Sample size determination

The sampling frame for this study was categorized by facility type and managing authority as shown in Table 2.2.

<table>
<thead>
<tr>
<th>Facility type/ managing authority</th>
<th>Total number of facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital- public</td>
<td>315</td>
</tr>
<tr>
<td>Hospital- private</td>
<td>148</td>
</tr>
<tr>
<td>Hospital – NGO/FBO</td>
<td>100</td>
</tr>
<tr>
<td>Primary Health Facility – public</td>
<td>4,873</td>
</tr>
<tr>
<td>Primary Health Facility – private</td>
<td>3,644</td>
</tr>
<tr>
<td>Primary Health Facility – NGO/FBO</td>
<td>1,451</td>
</tr>
<tr>
<td>Total</td>
<td>10,531</td>
</tr>
</tbody>
</table>

The following formula was used to determine the number of primary health facilities and hospitals to be included in the sample.

\[ n = \left( \frac{(z^2 \times p \times q) + ME^2}{ME^2 + z^2 \times p \times q/N} \right) \times d \] (2.1)

Where: \( n \) = sample size, \( z \) = confidence level at 95% (1.96), \( ME \) = margin of error (15%), \( p \) = the anticipated proportion of facilities with the attribute of interest, \( q = 1 - p \) and \( d \) = design effect (1 for stratified sampling).

Determination of the sample was based on the 5 core indicators of the DQR. TB indicator resulted into the highest sample size of 220 facilities and therefore was used as the sample size for this study. Based on the TB indicator, a sample of 220 was selected. The sample was adjusted by 13% to account for non-response or missing facilities that resulted into a total sample size of 250. The sample was proportionally allocated to the defined strata of managing authority and facility level. This final sample size contains a total of 112 hospitals and 138 primary health facilities for public, private and NGO/FBO managing authorities as shown in Table 2.3.
Table 2.3: Deriving Sample size using TB indicator

<table>
<thead>
<tr>
<th>All facilities</th>
<th>z</th>
<th>p</th>
<th>q</th>
<th>ME</th>
<th>Primary facility Hospitals</th>
<th>Total sample size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital– public</td>
<td>315</td>
<td>1.96</td>
<td>0.68</td>
<td>0.32</td>
<td>0.15</td>
<td>0</td>
</tr>
<tr>
<td>Hospital– private</td>
<td>148</td>
<td>1.96</td>
<td>0.47</td>
<td>0.53</td>
<td>0.15</td>
<td>0</td>
</tr>
<tr>
<td>Hospital – NGO/FBO</td>
<td>100</td>
<td>1.96</td>
<td>0.61</td>
<td>0.39</td>
<td>0.15</td>
<td>0</td>
</tr>
<tr>
<td>Primary Health Facility – public</td>
<td>4,873</td>
<td>1.96</td>
<td>0.68</td>
<td>0.32</td>
<td>0.15</td>
<td>38</td>
</tr>
<tr>
<td>Primary Health Facility – private</td>
<td>3,644</td>
<td>1.96</td>
<td>0.47</td>
<td>0.53</td>
<td>0.15</td>
<td>43</td>
</tr>
<tr>
<td>Primary Health Facility – NGO/FBO</td>
<td>1,451</td>
<td>1.96</td>
<td>0.61</td>
<td>0.39</td>
<td>0.15</td>
<td>41</td>
</tr>
<tr>
<td>Total</td>
<td>10,531</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>122</td>
</tr>
</tbody>
</table>

Proportional allocation of facilities by managing authority and facility level

The final agreed sample size was 250. This was proportionally allocated to the various strata using the formula;

\[ n = \frac{x}{220} \times 250 \]  

(2.2)

Where, \( n \) = the final sample size for each strata after adjustment and \( x \) = the initial sample size for each strata before adjustment.

Table 2.4: Proportional allocation of facilities by managing authority and facility level

<table>
<thead>
<tr>
<th>Number</th>
<th>Initial Sample size (before adjustment)</th>
<th>Final sample size (after adjustment)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital- public</td>
<td>315</td>
<td>34</td>
</tr>
<tr>
<td>Hospital- private</td>
<td>148</td>
<td>34</td>
</tr>
<tr>
<td>Hospital – NGO/FBO</td>
<td>100</td>
<td>30</td>
</tr>
<tr>
<td>Primary Health Facility – public</td>
<td>4,873</td>
<td>38</td>
</tr>
<tr>
<td>Primary Health Facility – private</td>
<td>3,644</td>
<td>43</td>
</tr>
<tr>
<td>Primary Health Facility – NGO/FBO</td>
<td>1,451</td>
<td>41</td>
</tr>
<tr>
<td>Total</td>
<td>10,531</td>
<td>220</td>
</tr>
</tbody>
</table>

Sampling by Counties

All the 47 counties were zoned into 10 regions based on the former administrative boundaries. A total of 19 Counties were randomly selected from the 10 clusters using Microsoft Excel. The county referral hospital in each of the 19 counties was purposively selected. The selected counties are as shown in Table 2.5 and Table
2.8 shows the calculated sample size as per county.

### Table 2.5: sampling by Counties and Level of Care

<table>
<thead>
<tr>
<th>County</th>
<th>Cluster</th>
<th>Referral (Purposive)</th>
<th>Total Level 4 HF</th>
<th>Sample Size (Level 4)</th>
<th>Total Primary HF</th>
<th>Sample Size (Primary facilities)</th>
<th>Total Sample size per cluster</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elgeyo Marakwet</td>
<td>1 1</td>
<td>8 3</td>
<td>124 4</td>
<td>7 14</td>
<td>124 4</td>
<td>7 10</td>
<td>19</td>
</tr>
<tr>
<td>Nakuru</td>
<td>1 1</td>
<td>27 12</td>
<td>414 14</td>
<td>14 27</td>
<td>414 14</td>
<td>14 27</td>
<td>21</td>
</tr>
<tr>
<td>Nandi</td>
<td>2 1</td>
<td>6 3</td>
<td>197 7</td>
<td>7 10</td>
<td>197 7</td>
<td>7 10</td>
<td>21</td>
</tr>
<tr>
<td>Kericho</td>
<td>2 1</td>
<td>14 6</td>
<td>208 7</td>
<td>14 27</td>
<td>208 7</td>
<td>14 27</td>
<td>21</td>
</tr>
<tr>
<td>Vihiga</td>
<td>3 1</td>
<td>4 2</td>
<td>93 3</td>
<td>3 6</td>
<td>93 3</td>
<td>3 6</td>
<td>12</td>
</tr>
<tr>
<td>Bungoma</td>
<td>3 1</td>
<td>10 4</td>
<td>176 6</td>
<td>6 11</td>
<td>176 6</td>
<td>6 11</td>
<td>12</td>
</tr>
<tr>
<td>Tharaka Nithi</td>
<td>4 1</td>
<td>7 3</td>
<td>125 4</td>
<td>4 8</td>
<td>125 4</td>
<td>4 8</td>
<td>12</td>
</tr>
<tr>
<td>Marsabit</td>
<td>4 1</td>
<td>4 2</td>
<td>109 4</td>
<td>7 7</td>
<td>109 4</td>
<td>7 7</td>
<td>12</td>
</tr>
<tr>
<td>Garissa</td>
<td>5 1</td>
<td>14 6</td>
<td>151 5</td>
<td>12</td>
<td>151 5</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Siaya</td>
<td>6 1</td>
<td>12 5</td>
<td>170 10</td>
<td>16</td>
<td>170 10</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Kisii</td>
<td>6 1</td>
<td>23 10</td>
<td>146 5</td>
<td>16</td>
<td>146 5</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Makueni</td>
<td>7 1</td>
<td>12 5</td>
<td>279 10</td>
<td>16</td>
<td>279 10</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Kajiado</td>
<td>7 1</td>
<td>14 6</td>
<td>297 10</td>
<td>17</td>
<td>297 10</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>Nyeri</td>
<td>8 1</td>
<td>10 4</td>
<td>424 15</td>
<td>20</td>
<td>424 15</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Murang’a</td>
<td>8 1</td>
<td>10 4</td>
<td>278 10</td>
<td>15</td>
<td>278 10</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Tana River</td>
<td>9 1</td>
<td>1 0</td>
<td>66 2</td>
<td>4</td>
<td>66 2</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Mombasa</td>
<td>9 1</td>
<td>19 8</td>
<td>303 11</td>
<td>20</td>
<td>303 11</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Usain Gishu</td>
<td>10 1</td>
<td>13 6</td>
<td>183 6</td>
<td>13</td>
<td>183 6</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>Turkana</td>
<td>10 1</td>
<td>9 4</td>
<td>212 7</td>
<td>12</td>
<td>212 7</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Sub-Total</td>
<td>19</td>
<td>217 93</td>
<td>3955 138</td>
<td>250</td>
<td>3955 138</td>
<td>250</td>
<td>250</td>
</tr>
</tbody>
</table>

### 2.5 Indicators Selection

Five (5) indicators were pre-selected taking into account the Kenya Essential Package for Health (KEPH) levels of care as well as high priority health interventions and a high level of continuity of care. The selected core programme indicators are indicated in Table 2.6.

### 2.6 Assessment Tools

This data quality review was conducted using the pre-designed WHO harmonized tools. The tools included:

**Facility level data verification tool**

The facility reporting data verification tool is a questionnaire used to verify the availability of specific services provided at the facility level followed by verification...
Table 2.6: Selected Core Indicators for 2016 DQR

<table>
<thead>
<tr>
<th>Program Area</th>
<th>Indicator Name</th>
<th>Full Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal Health</td>
<td>ANC 1st Visit (ANC1)</td>
<td>Number(%) of pregnant women who attended at least once during their pregnancy</td>
</tr>
<tr>
<td>Immunization</td>
<td>DTP3/Penta3</td>
<td>Number (%) of children under 1 year receiving three doses of DTP/Penta Vaccine</td>
</tr>
<tr>
<td>HIV/AIDS</td>
<td>antiretroviral therapy (ART) Coverage</td>
<td>Number and % of people living with HIV who are currently receiving ART</td>
</tr>
<tr>
<td>TB</td>
<td>Notified cases of all forms of TB</td>
<td>Number(%) of all forms of TB cases (i.e. bacteriologically confirmed plus clinically diagnosed) reported to the national health authority in the past year (new and relapse)</td>
</tr>
<tr>
<td>Malaria</td>
<td>Confirmed malaria cases</td>
<td>Number(%) of all suspected malaria cases that were confirmed by microscopy or rapid diagnostic test (RDT)</td>
</tr>
</tbody>
</table>

of source documents and reports. The tool further probed into listing out the discrepancies observed, if any. The questionnaire included the 5 core recommended indicators as stated above in section 2.3.

**Facility level system assessment tool**

The system assessment tool examined attributes that affect system functioning at the facility level and included:

- Structure and function
- Indicator definitions and reporting guidelines
- Data collection tools and reporting forms
- Data quality and supervision
- Data maintenance and confidentiality

**Sub-county level data verification tool**

The sub county level data verification tool compared the reports at the sub county level of the same indicators examined at the facility level. It assessed the following sections:

- Reporting performance
- Data verification
- Re-aggregation of health facility monthly report values
Sub-county level system assessment tool

This questionnaire examined system attributes that can affect data quality at the sub county level. The questionnaire included sections on:

- Structure and function
- Indicator definitions and reporting guidelines
- Data collection tools and reporting forms
- Data quality and supervision
- Data maintenance and confidentiality
- Demographic information
- Data use

2.7 Data Collection Process

2.7.1 Field data collection

Teams each comprising of two officers were trained on data collection techniques using the DQR tool during a four day workshop held at four different venues; Machakos, Meru, Uasin Gishu and Kisumu based on the ten regions; Coast, Nairobi, Nyanza, Western, Upper eastern, Lower eastern, South Rift, North Rift, Central and North eastern. An earlier pre-test/ Practice of the tools by the Trainer of Trainers (ToT) had taken place at Machakos Level 5 Hospital in Machakos County during the ToT training.

The data collection teams were deployed to the field to collect data in the 19 sampled counties. Each team was assigned to collect data at the sampled facilities and Sub-County in the assigned County. A total of 38 supervisors supported the teams with 19 from the Counties and 19 from the National level. From among the national level supervisors, 3 were assisting with technical issues arising from the tools.

The period for review was from 21st November to 1st December 2016. All sampled facilities and Sub-County health records offices were visited. The data was collected through document review for data verifications, and interviews with key informants, for systems assessment. Ideally, routine health data is collected in registers at each facility where health-care services are delivered.

Data verification was done through recounting data from the source documents for each indicator, for the months of July, August and September 2016. In addition, the teams verified with the figure in the summary tool for the corresponding month. The data reported in the DHIS for the period was obtained and compared with the recounted and summary data.

Systems assessment was conducted through qualitative questions administered to health workers within the facilities to evaluate data management capacity. Information was collected on five areas of data management and reporting systems:
• Monitoring and evaluation capabilities, roles and responsibilities/ training
• Indicator definitions and data reporting requirements
• Data collection tools and reporting forms
• Data management processes and data quality controls
• Links with national reporting system

2.7.2 Quality Assurance

Both internal and external Quality Assurance (QA) was undertaken to ensure the quality of the collected data.

2.7.2.1 Internal Quality Assurance

This was undertaken by the National and County supervisors who had the responsibility of checking the quality of data collection process and quality of the collected data.

2.7.2.2 External Quality Assurance

The Global Fund’s Service Provider (HEFDC Group) undertook data validation quality assurance through re-assessment of a sample of 5% of the sampled health facilities and the Sub-Counties. The process involved field data re-collection and analysis for accuracy covering health facilities in four (4) of the sampled Counties, namely, Murang’a, Nyeri Kericho and Vihiga Counties respectively. The external quality assurance report is available.

2.8 Data Analysis

Data was entered by the Research Assistants into DHIS 2 during the data collection process and validated by the supervisors. During the analysis, data was extracted from the database and cleaned to remove duplicates and missing values. Preliminary computations were done by facility types and county to highlight divergent characteristics as far as quality of data is concerned.

A single sheet showing the summary of all the recounted data, summary data from the summary tools and DHIS data for the relevant indicators was prepared. A comparison across the different data sources was done and the proportion for accuracies calculated. Analysis was done using WHO DQR tool and Stata.

2.9 Desk Review – data Analysis

A desk review was conducted to input population, survey and routine data over the reporting period (2013 to 2016) for the selected indicators into the WHO DQR (Ms Excel) tool. Verification of the formulae was done and in some cases changed to suit the available data; these included; computation of completeness and timeliness in reporting whereby, in the sheet “expected reports hidden”, the formula in M7 (MTR tool) was changed from using expected reports and total actual reports to percent of reporting rates. This is because these were not easily
available in DHIS2.

The following data were customized:

- Basic information
- Program indicators
- Quality thresholds

The following data were entered:

- Administrative data—Counties and sub counties assessed
- Reports received over the review period per program/indicator to assess reporting rates from the DHIS2
- Population denominators for each indicator from Kenya National Bureau of Statistics (KNBS) estimates
- Estimates for each indicator from external data from various surveys including Kenya Demographic and Health Survey (KDHS) 2014, Kenya AIDS Indicator Survey (KAIS) 2013, Malaria Indicator Survey (MIS) 2015
- Data collected in facilities over the period of assessment for each indicator (input indicator data)
- Trend data for each indicators over the reporting period (2013-2016)
- Data verification results
- Data Verification weights

This information was then used to generate inbuilt reports within the tool on the major areas of assessment.

2.9.1 Determination of Thresholds for quality of reporting

Quality thresholds are the values that set the limits of acceptable error in data reporting. The analyses in the DQR compare results to these thresholds to judge the quality of the data. Quality thresholds were customized to fit the Kenyan situation based on previous reports as outlined below.

<table>
<thead>
<tr>
<th>Table 2.7: Quality Thresholds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain</td>
</tr>
<tr>
<td>Completeness of Reporting from Aggregation Levels</td>
</tr>
<tr>
<td>Timeliness of Reporting</td>
</tr>
<tr>
<td>Completeness of Indicator Reporting</td>
</tr>
<tr>
<td>Maternal Health</td>
</tr>
<tr>
<td>Immunization</td>
</tr>
<tr>
<td>HIV/AIDS</td>
</tr>
<tr>
<td>Malaria</td>
</tr>
<tr>
<td>Consistency of reporting completeness</td>
</tr>
</tbody>
</table>

The data quality review is organized into 3 domains namely: Reporting completeness and timeliness, internal consistency and external consistency.
2.9.1.1 Reporting Completeness and timeliness

The purpose of this dimension is to examine if all reports assigned to a facility are reported to the next administrative level as per the defined date. The indicators in this dimension include completeness of reporting at the health facility level—usually the 1st administrative unit level and completeness of reporting at levels higher than a health facility (Sub County).

2.9.1.2 Internal consistency

This dimension looks at the accuracy and reliability of the category of data that are classified as Numerators (or event data) when calculating coverage indicators. Proposed indicators within this sub dimension examine outliers (more than 2 and/or 3 standard deviations from the annual average), comparison of events (numerator information) of similar indicators to see the level of congruence, examine trends over time, and comparing source data from health facility registers to actual reported data in the DHIS2.

2.9.1.3 External consistency

The purpose of this dimension is to compare two different sources of population estimates (values are calculated differently) to see the level of congruence between the two sources. If the two data sources have discrepancies, therefore, coverage estimates for the program area can be very different based on the source used. The higher the level of consistency between denominators from different sources, the more confidence can be placed in the accuracy of the population projections.

2.9.2 M&E systems assessments at health facility and sub county level

Evaluation of the M&E system was done by assessing thematic areas including: supervision, Monitoring and feedback and availability and use of tools and guidelines as well as availability of personnel with relevant training using data analysis software such as STATA, Excel, Statistical Package for the Social Sciences (SPSS) etc.

2.10 Ethical Considerations

Relevant authorization from the Ministry of Health was sought before the commencement of the exercise. Authorization from the relevant county organs was also sought and from facilities in charges. The data collection teams were briefed on confidentiality and care was taken to ensure that the facility records were treated with utmost confidentiality and no records were carried away from the facilities. Where photographs were taken to illustrate the qualitative findings, care was taken not to expose the patients’ details.
## Table 2.8: Calculated sample size per county

<table>
<thead>
<tr>
<th>County Clusters</th>
<th>Total No. of Facilities by Managing Authority</th>
<th>Sample size</th>
<th>Proportional allocation of sample by Managing Authority per County</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Level 4 Hospitals</td>
<td>Primary Health Facilities</td>
<td>County Referral Hospital (Sampled)</td>
</tr>
<tr>
<td>County Name</td>
<td>Private</td>
<td>Gok</td>
<td>NGO/PFO</td>
</tr>
<tr>
<td>Elgeyo Marakwet</td>
<td>0</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>Nakuru</td>
<td>9</td>
<td>14</td>
<td>4</td>
</tr>
<tr>
<td>Nandi</td>
<td>1</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Kericho</td>
<td>6</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>Vihiga</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Bungoma</td>
<td>0</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>Tharaka Nithi</td>
<td>1</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Marsabit</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Garissa</td>
<td>2</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>Siaya</td>
<td>5</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>Kisii</td>
<td>7</td>
<td>14</td>
<td>2</td>
</tr>
<tr>
<td>Makeni</td>
<td>0</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>Kajiado</td>
<td>9</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Nyeri</td>
<td>2</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Murang’a</td>
<td>0</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>Tana River</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Mombasa</td>
<td>11</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Uasin Gishu</td>
<td>7</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Turkana</td>
<td>0</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>Sub-Total</td>
<td>19</td>
<td>93</td>
<td>138</td>
</tr>
</tbody>
</table>
Chapter 3

Results and Discussion

3.1 Introduction

This chapter provides the results of analysis derived from the following key dimensions of DQR; completeness and timeliness of data, internal consistency of the reported data, external consistency and external comparison of population data (review denominator data used to measure performance indicators). The dimensions were analysed under the following indicators within the following programme areas; maternal health, immunization, HIV/AIDS, TB and Malaria respectively.

A total of 248 facilities were visited for the DQR exercise; of these 132 were from the rural setting and 116 from the urban. Sixty percent (60%) were public, 29% were private-for-profit with 10% being private-not-for-profit that included the FBO and NGO owned health facilities as shown in Figure 3.1.

Among the facilities assessed, some did not offer services that corresponded to the indicators under assessment and therefore do not contribute data to these indicators. The facilities not providing a given service were excluded from the denominators in the calculation of proportions in the different DQR findings.
3.2 Reporting Completeness and Timeliness

3.2.1 Reporting Completeness

Completeness of reporting was analysed through a desk review. In Kenya, reporting of health service delivery data is done through DHIS2 which is a web based system. However, the lower level facilities still use standardized paper based system/tools to submit their reports to the next level (Sub-County). At the facility level, reports are supposed to be ready and submitted to the respective Sub-Counties by 5th of every month. Due to the web based system of reporting, measuring of completeness is only done at two levels (Facility and Sub-County level). The other levels of the reporting chain i.e the County and the National level are no longer entering data but conduct data validation checks using internally embedded validation codes in the DHIS system. Therefore, report completeness for a facility or a sub-county is the number of reports received against the total number of reports expected for that month expressed as a percentage. The completeness of reporting is analysed to determine whether there are significant gaps in the figures reported through the DHIS. However, for this particular DQR, data quality check was done to validate the facts and figures as reported in the Medium term review of the Kenya Health Strategic and Investment plan (2014 -2018) as well as affirming reliability of the same.

The standard practice for reporting is that, all facilities and sub-counties are supposed to ensure 100% report completeness and timeliness in submitting their reports. However, for this DQR exercise, quality thresholds based on performance were set at 80% for completeness and 75% for reporting timeliness. Report completeness was 94% with only 2.6% of the sub-counties having a reporting rate of less than 80% as indicated in Table 3.1. The facilities reporting completeness rate was 91.7% as shown in Tables 3.2. About 30% of the sub-counties had a facility’s completeness rate of less than 90%.

<table>
<thead>
<tr>
<th>Table 3.1: Overall sub-county reporting completeness rate in 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall sub-counties reporting completeness rate</td>
</tr>
<tr>
<td>Number of sub-counties with completeness rate below 80%</td>
</tr>
<tr>
<td>Percent of sub-counties with completeness rate below 80%</td>
</tr>
<tr>
<td>Sub-counties with reporting completeness rate below 80%</td>
</tr>
<tr>
<td>Luanda, Turkana Central</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 3.2: Facility reporting completeness rate in 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facility reporting completeness rate</td>
</tr>
<tr>
<td>Number of sub-counties with facility reporting completeness rate below 90%</td>
</tr>
<tr>
<td>Percent of sub-counties with facility completeness rate below 90%</td>
</tr>
<tr>
<td>Sub-counties with facility reporting completeness rate below 90%: AlegoUsonga, Balambala, Changamwe, Dadaab, Fafi, Gilgil, Kajiado East, Kajiado North, Kanduyi, Kieni West, Kiharu, Kimilili, Kisauni, Kitutu Chache South, Likoni, Luanda, Murang’a West, Mvita, Sigowet/Soin, Soy, Tetu, Vihiga, Webuye West</td>
</tr>
</tbody>
</table>
As shown in Figure 3.2, the trend for both sub-county and facility report completeness rate had been on the rise since the year 2013. The sub-counties completeness rate was above 80% in 2013. By 2016, both facilities and sub-counties attained a report completeness rate of above 90%. The facility completeness rate has been lower than the sub-county completeness rate until 2015, when they were almost the same.

![Figure 3.2: Trend in Sub-County and Facility Report Completeness (2013–2016)](image)

### 3.2.2 Reporting Timeliness

As shown in Table 3.3, 92.1% of the Sub-Counties reports were timely however, 10.3% of the sub-counties had a timeliness of less than 75%. Facilities reporting timeliness rate was 95.6% as shown in Table 3.4. About 2.6% of the sub-counties had a facility’s timeliness rate of less than 75%.

<table>
<thead>
<tr>
<th>Sub-Counties reporting timeliness rate</th>
<th>92.1%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Sub-counties with timeliness rate below 75%</td>
<td>8</td>
</tr>
<tr>
<td>Percent of Sub-counties with reporting timeliness below 75%</td>
<td>10.3%</td>
</tr>
</tbody>
</table>

**Sub-Counties with reporting timeliness rate below 75%**: Kibwezi East, Kimilili, Likoni, Mukurweini, Tharaka South, Naivasha, Tongaren, Vihiga

<table>
<thead>
<tr>
<th>Table 3.4: sub-counties with outliers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub-counties reporting timeliness rate</td>
</tr>
<tr>
<td>Number of Sub-counties with timeliness rate below 75%</td>
</tr>
<tr>
<td>Percent of Sub-counties with reporting timeliness below 75%</td>
</tr>
<tr>
<td>Sub-counties with reporting timeliness rate below 75%</td>
</tr>
</tbody>
</table>

### 3.2.3 Data Accuracy

Accuracy of the reporting system against the summary tools was also examined. The assessment determined to what extent data in the summary sheets reflected
what was in the reporting system (DHIS2). The findings illustrated in Figure 3.3 shows the inconsistencies across the selected indicators. ART had the most discrepancies with over half of sub-counties recording a mis-match between reported data and what was in the summary tools. This could be attributed to the different reporting tools which could result in inconsistencies in the counting and transcription. Frequent revision of tools may have had a negative effect on most of the indicators like immunization and malaria. ANC visits had the most accurate data with only 7.3% of Sub-Counties having a discrepancy.

![Figure 3.3: Proportions of indicators with discrepancies](image)

### 3.3 Internal Consistency of Reporting Data

Table 3.5 shows the overall outliers of Sub Counties with percentage changes between current year (2016) and preceding 3 years (2013–2015) of more than 33% above or below the national average change for four indicators Malaria indicator (62%) had the highest number of Sub counties with outliers (inconsistent data values/reports between levels) followed by HIV/AIDS with 30 (38.5%) sub counties having moderate outliers. The indicators that registered minimal outliers in the reports were ANC 1 14 (18%) and DPT3 18 (23%).

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Number (%) of sub-counties monthly data that are moderate outliers</th>
<th>Number (%) of sub-counties with moderate outlier higher than mean 33%+</th>
<th>Number (%) sub-counties with moderate outlier lower than mean 33%+</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANC 1</td>
<td>14 (18%)</td>
<td>7 (9%)</td>
<td>7 (9%)</td>
</tr>
<tr>
<td>DPT 3</td>
<td>18 (23%)</td>
<td>9(11.5%)</td>
<td>9(11.5%)</td>
</tr>
<tr>
<td>Malaria</td>
<td>48(62%)</td>
<td>8(10.2%)</td>
<td>40(51.2%)</td>
</tr>
<tr>
<td>HIV/AIDS(ART)</td>
<td>30(38.5%)</td>
<td>22(29.2%)</td>
<td>8(10.29%)</td>
</tr>
</tbody>
</table>
3.3.1 Consistency 1st ANC Visit over time

Table 3.6 shows that, the national score for this indicator was 97% with 18% divergent scores from about fourteen counties. The divergent scores was based on 33% from the mean national scores.

<table>
<thead>
<tr>
<th>Year</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expected trend</td>
<td>Increasing</td>
</tr>
<tr>
<td>Compare sub-counties to:</td>
<td>expected result</td>
</tr>
<tr>
<td>Quality threshold</td>
<td>33%</td>
</tr>
<tr>
<td>National score (%)</td>
<td>97%</td>
</tr>
<tr>
<td>Number of sub-counties with divergent scores</td>
<td>14</td>
</tr>
<tr>
<td>Percent of sub-counties with divergent scores</td>
<td>18%</td>
</tr>
</tbody>
</table>

**Sub-counties with divergent scores:** Changamwe, Fafi, Kibwezi East, Kiharu, Kuresoi South, Likoni, Makueni, Moiben, Mvita, Naivasha, Nakuru North, Nakuru West, Nyali, Subukia

As shown in Figure 3.4a the trend of first ANC has generally been on the increase. Despite the impressive National quality score for this indicator at 97% in Table 3.6, some sub-Counties (n=14, 18%) had a divergent score lying well above and below quality threshold of 33% as shown in Figure 3.4b (the two dotted lines). These discrepancies in the consistency in the 14 counties point to the errors in reporting between the facilities and the sub counties and further upwards.

3.3.2 Consistency of 3rd dose DPT vaccine over time

Table 3.7 shows that, the national score for this indicator was 102% with 23% divergent scores from about eighteen counties. The divergent scores was based on 33% from the mean national scores. Just like the ANC 1 indicator, the indicator showed an annual increase since 2013 with a drop between the years 2014 and 2015 attributed to shocks from devolution of health care services to the counties as shown in Figure 3.5a.

<table>
<thead>
<tr>
<th>Year</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expected trend</td>
<td>Increasing</td>
</tr>
<tr>
<td>Compare sub-counties to:</td>
<td>national result</td>
</tr>
<tr>
<td>Quality threshold</td>
<td>33%</td>
</tr>
<tr>
<td>National score (%)</td>
<td>102%</td>
</tr>
<tr>
<td>Number of sub-counties with divergent scores</td>
<td>18</td>
</tr>
<tr>
<td>Percent of sub-counties with divergent scores</td>
<td>23%</td>
</tr>
</tbody>
</table>

**Names of sub-counties with divergent scores:** Changamwe, Cheptais, Chesumei, Fafi, Kibwezi East, Kisauni, Kuresoi South, Likoni, Makueni, Mvita, Naivasha, Nakuru North, Nakuru West, Nyali, South Mugirango, Subukia, Tharaka South, Ugenya
3.3.3 Consistency of Number of HIV+ persons currently on ART over time

As shown in Table 3.8, the consistency of the number of persons currently on ART is increasing with a national score of 1.29 (129%), however, 30 sub counties (38.5%) reported divergent scores based on a national threshold of 33%, meaning serious variation of data values and reports between the sub counties and the national level.

3.3.3.1 Consistency of Number of confirmed malaria cases reported, over time

While it is assumed that malaria treatment is largely clinical, the number of confirmed malaria cases is increasing and the national score was 1.06 (106%) as shown in Table 3.9. However, 48 (62%) had serious data quality/reports issues.

3.4 External Consistency

Comparison of Routine Data with Population-based Survey Values from the Same Period Consistency pertains to reliability and uniformity of events that occur again and again. Healthcare data must be consistent to prevent misinterpretation.
of results or present any ambiguity in the documentation. Both routine and survey data should be reliable and the same. Figure 3.8 shows that (29.4%) 5 counties among the sampled 19 counties, data for ANC 1st visit in the routine system was not comparable to that obtained from the surveys. The counties with inconsistent data include Uasin-Gishu, Nyeri, Murang’a, TharakaNithi and
Figure 3.6: Trend and consistency of number of HIV+ persons currently on ART over time

Table 3.9: Consistency of Malaria - Number of confirmed malaria cases reported over time

<table>
<thead>
<tr>
<th>Year</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expected trend</td>
<td>Increasing</td>
</tr>
<tr>
<td>Compare sub-counties to:</td>
<td>national result</td>
</tr>
<tr>
<td>Quality threshold</td>
<td>33%</td>
</tr>
<tr>
<td>National score (%)</td>
<td>106%</td>
</tr>
<tr>
<td>Number of sub-counties with divergent scores</td>
<td>48</td>
</tr>
<tr>
<td>Percent of sub-counties with divergent scores</td>
<td>62%</td>
</tr>
</tbody>
</table>

**Sub-counties with divergent scores:** Aldai, Bobasi, Bomachoge Chache, Changanwe, Cheptais, Dadaab, Eingwen, Fafi, Garissa, Ijara, Jomvu, Kabuchai, Kajiado East, Kanduyi, Keiyo North, Kibwezi East, Kibwezi West, Kigumo, Kiharu, Kimilili, Kisauni, Kitutu Chache South, Kuresoi South, Likoni, Loitokitok, Luanda, Makuenei, Marakwet East, Mbooni, Mt Elgon, Mukurweini, Murang’a West, Mvita, Naivasha, Nakuru North, Nakuru West, Nyali, NyaribariChache, Nyeri Central, Rarieda, Rongai, South Mugirango, Subukia, Tetu, Tharaka South, Turbo, Turkana Central, Webuye West

Turkana. TharakaNithi had facility rates that were way too high compared to the survey data and in Turkana County, the facility rates were lower compared to the survey data.
Figure 3.7: Trend and consistency of Malaria cases over time.

Figure 3.8: ANC Comparison of Routine Data with Population-based Survey Values from the Same Period

Figure 3.9 shows that in 5 (29.4%) of the 19 counties had inconsistent data between the survey and the facility rates for the indicator on immunization-3rd dose DPT. In Tharaka Nithi County, the health facility rate was very high compared to that of the survey while in Turkana, the health facility rate was way too low compared to the survey data.
3.5 Data Quality Verification - Health Facility Assessment and Sub-County Assessment

This was internal consistency measure undertaken among health facilities that were providing services reported for the indicator to determine the extent to which information in the primary source documents had been transferred correctly into the reporting document (monthly/quarterly report) for onward transmission to the next level (aggregation level) which was the Sub-county for entry into DHIS2. The verification identified systemic errors that occurred in the reporting of the data and the analysis provided the degree of over-reporting or under-reporting in the HMIS system at the national level for the specific indicators.

The process involved re-counting of data in the primary source documents such as registers and tally sheets. The re-counted numbers were compared to the data entered into HMIS reports in order to determine the proportion of the reported numbers that could be verified from the primary source documents.

3.5.1 Health Facilities in a Sub-Sample

The Table 3.10 shows the number of health facilities included in the sub-sample for analysis of each indicator was adequate: ANC 1st visit sub-sample of health facilities was 88.2% of 238 health facilities; DPT 85%; ART 58.7%; TB 61.6% and Malaria 98.3%. The high number of health facilities in each sub-sample of the indicator was adequate to provide confidence in the data verification factor (VF) for the specific indicator.

Table 3.11 shows the number of health facilities in sub-samples of each stratum was adequate and hence adequate confidence in the VF for the specific indicators except for the following which had low numbers of health facilities:

(i) TB indicator – had low numbers of health facilities in the sub sample for NGO (50%) and private (26.1%)

(ii) ART indicator – had low number of health facilities in the sub sample for private (23.9%).
Table 3.10: Percentage of facilities in the sample providing each health service

<table>
<thead>
<tr>
<th>Facility Type</th>
<th>% facilities</th>
<th>No. of facilities</th>
<th>County Referral</th>
<th>Health Centers</th>
<th>Dispensary/Clinic</th>
<th>Nursing Home</th>
<th>Sub County Hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANC1</td>
<td>88.2%</td>
<td>209</td>
<td>22</td>
<td>100%</td>
<td>36</td>
<td>100%</td>
<td>67</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>76.30%</td>
</tr>
<tr>
<td>DPT3</td>
<td>85%</td>
<td>199</td>
<td>22</td>
<td>100%</td>
<td>34</td>
<td>94.40%</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>67.40%</td>
</tr>
<tr>
<td>ART</td>
<td>58.70%</td>
<td>134</td>
<td>20</td>
<td>90.90%</td>
<td>25</td>
<td>73.50%</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>23</td>
</tr>
<tr>
<td>TB</td>
<td>61.60%</td>
<td>142</td>
<td>22</td>
<td>100%</td>
<td>28</td>
<td>80%</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>26.40%</td>
</tr>
<tr>
<td>Malaria</td>
<td>98.30%</td>
<td>229</td>
<td>21</td>
<td>100%</td>
<td>36</td>
<td>100%</td>
<td>84</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>95.50%</td>
</tr>
</tbody>
</table>

Table 3.11: Percentage of facilities in the sample providing each health service, by stratum

<table>
<thead>
<tr>
<th>Managing Authority</th>
<th>Overall</th>
<th>FBO</th>
<th>NGO</th>
<th>Private</th>
<th>Public</th>
<th>Urban</th>
<th>Rural</th>
</tr>
</thead>
<tbody>
<tr>
<td>% facilities</td>
<td>88.20%</td>
<td>209</td>
<td>24</td>
<td>96%</td>
<td>3</td>
<td>75%</td>
<td>100%</td>
</tr>
<tr>
<td>No. of facilities</td>
<td>177</td>
<td>112</td>
<td>36</td>
<td>100%</td>
<td>64</td>
<td>97.8%</td>
<td>75%</td>
</tr>
<tr>
<td>ANC1</td>
<td>83.6%</td>
<td>177</td>
<td>94</td>
<td>46.3%</td>
<td>62</td>
<td>46.5%</td>
<td>24.0%</td>
</tr>
<tr>
<td>DPT3</td>
<td>83.6%</td>
<td>177</td>
<td>62</td>
<td>46.5%</td>
<td>66</td>
<td>24.0%</td>
<td>55</td>
</tr>
<tr>
<td>ART</td>
<td>50.7%</td>
<td>62</td>
<td>37</td>
<td>37.3%</td>
<td>53</td>
<td>34.9%</td>
<td>80</td>
</tr>
<tr>
<td>TB</td>
<td>53%</td>
<td>62</td>
<td>37</td>
<td>37.3%</td>
<td>53</td>
<td>34.9%</td>
<td>80</td>
</tr>
<tr>
<td>Malaria</td>
<td>34.9%</td>
<td>62</td>
<td>37</td>
<td>37.3%</td>
<td>53</td>
<td>34.9%</td>
<td>80</td>
</tr>
</tbody>
</table>

3.5.2 Facility availability of documents

Table 3.12 shows the availability of the main documents used for reporting monthly data at the time of the assessment. The most available primary data capture documents was the register; DPT3/Penta3 register was available in 117 (84.6%) health facilities, ART registers in 112 (83.6%), TB registers in 132 (92.9%), Malaria registers in 194 (80.3%) and ANC registers in 203 (97.1%) health facilities respectively.

Table 3.12: Availability of main documents used by a facility to report service data for monthly reports, by programme area

<table>
<thead>
<tr>
<th>Programme</th>
<th>DPT</th>
<th>ART</th>
<th>TB</th>
<th>Malaria</th>
<th>ANC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Register</td>
<td>84.6%</td>
<td>83.6%</td>
<td>112</td>
<td>92.9%</td>
<td>132</td>
</tr>
<tr>
<td>Patient Cards</td>
<td>44.9%</td>
<td>46.3%</td>
<td>62</td>
<td>46.5%</td>
<td>66</td>
</tr>
<tr>
<td>Tally Sheet</td>
<td>82.3%</td>
<td>50.7%</td>
<td>68</td>
<td>37.3%</td>
<td>53</td>
</tr>
<tr>
<td>Improvised documents</td>
<td>0.0%</td>
<td>7.3%</td>
<td>10</td>
<td>50.7%</td>
<td>72</td>
</tr>
<tr>
<td>Others</td>
<td>2.4%</td>
<td>53.7%</td>
<td>72</td>
<td>97.2%</td>
<td>138</td>
</tr>
</tbody>
</table>

Therefore, based on the above findings the rate of availability of main documents for reporting the five indicators did not compromise the validity of the Verification Factor. However, it is notable that TB indicator was using other main reporting documents other than the listed. The TB programme has a parallel reporting system, which is not yet integrated with the HMIS.
3.5.3 Match between source documents and monthly reports

Findings in Table 3.13 show very few health facilities had data events (numbers) in the primary document matching those reported in the monthly reports across the five indicators; the number of dispensaries and nursing homes with discrepancies were the highest:

Table 3.13: Percentage of facilities in the sample providing each health service

<table>
<thead>
<tr>
<th>Facility Type</th>
<th>No. of facilities</th>
<th>County Referral</th>
<th>Health Centers</th>
<th>Dispensary/Clinic</th>
<th>Nursing Home</th>
<th>Sub County Hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANC1</td>
<td>45</td>
<td>1</td>
<td>8</td>
<td>15</td>
<td>6</td>
<td>15</td>
</tr>
<tr>
<td>DPT3</td>
<td>58</td>
<td>9</td>
<td>11</td>
<td>16</td>
<td>4</td>
<td>18</td>
</tr>
<tr>
<td>ART</td>
<td>44</td>
<td>4</td>
<td>10</td>
<td>3</td>
<td>1</td>
<td>25</td>
</tr>
<tr>
<td>TB</td>
<td>39</td>
<td>5</td>
<td>10</td>
<td>2</td>
<td>1</td>
<td>21</td>
</tr>
<tr>
<td>Malaria</td>
<td>82</td>
<td>8</td>
<td>9</td>
<td>28</td>
<td>4</td>
<td>31</td>
</tr>
</tbody>
</table>

ANC 1st visit indicator - only 18.9% of the health facilities had the reported number in the monthly report matching the number in the primary document. Which translates to 81.1% of health facilities with mis-match had either over reported or under reported.

DPT3/Penta3 indicator - only 24.4% of the health facilities had the reported number in the monthly report matching the number in the primary document. Which translates to 75.6% of health facilities with mis-match had either over reported or under reported.

ART indicator - only 18.5% of the health facilities had the reported number in the monthly report matching the number in the primary document. Which translates to 81.5% of health facilities with mis-match had either over reported or under reported.

TB indicator - only 16.4% of the health facilities had the reported number in the monthly report matching the number in the primary document. Which translates to 83.6% of health facilities with mis-match had either over reported or under reported.

Malaria indicator - only 34.5% of the health facilities had the reported number in the monthly report matching the number in the primary document. Which translates to 65.5% of health facilities with mis-match had either over reported or under reported.

The findings in Table 3.14 show the highest number of health facilities with discrepancies (over/under reporting) were the privately owned.

Figure 3.10 shows results of the average percentage of responses across the five indicators that were given for the discrepancies (mis-match) between the data in the main source documents and monthly reports. The findings are not a true representation of the reasons for the discrepancies/ mis-match because no data was collected for 50% of the discrepancies/mis-match. The reasons given for the
Table 3.14: Percentage of facilities with an exact match between recounted numbers of main source documents and monthly reports, by facility type

<table>
<thead>
<tr>
<th>Managing Authority</th>
<th>Urban/ Rural</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FBO</td>
</tr>
<tr>
<td>ANC1</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>26.90%</td>
</tr>
<tr>
<td>DPT3</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>30.80%</td>
</tr>
<tr>
<td>ART</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>23.10%</td>
</tr>
<tr>
<td>TB</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>11.50%</td>
</tr>
<tr>
<td>Malaria</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>34.60%</td>
</tr>
</tbody>
</table>

Figure 3.10: Reasons for the discrepancy between main source document and the monthly report

discrepancy/mis-match was data entry errors (18%), arithmetic errors (18%), and data not compiled correctly (14%).

Figure 3.11: Frequency Distribution of responses on reasons for the discrepancies between the re-aggregated numbers from the reports received from all health facilities and the aggregated result contained in the summary report prepared by the sub counties

The above findings show a high percentage of health facilities with mis-match between the recounted numbers in the main source documents and the reported number. This is a serious data quality issue, which has given rise to under and
Figure 3.12: Percentage of health facilities that have an exact match between recounted numbers of main source documents and monthly reports

over reporting by health facilities. Hence, data submitted to the sub-county health records office for entry into DHIS2 system already has serious data quality issues.

Table 3.15 shows the verification factor for health facilities with the discussion below.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Verification Factor (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Missing</td>
</tr>
<tr>
<td>ANC1</td>
<td>1.1%</td>
</tr>
<tr>
<td>DPT3</td>
<td>1.1%</td>
</tr>
<tr>
<td>ART</td>
<td>0.0%</td>
</tr>
<tr>
<td>TB</td>
<td>43.3%</td>
</tr>
<tr>
<td>Malaria</td>
<td>1.4%</td>
</tr>
</tbody>
</table>

Proportion of pregnant women who attended at least one visit during their pregnancy:

Thirty one percent of the 209 health facilities providing ANC services had a verification Factor (VF) of less than one (<1) hence had over reported, and 23.9% under reported (VF >1). Only 44.1% of the health facilities had data in the primary source documents matching with the numbers submitted in the report. Missing records were not an issue as shown in table 3.19 above. This finding is an indication of the inaccuracy of the data reported through HMIS for this indicator during the reporting period.

**Proportion of children under 1 year receiving three doses of DPT/Penta Vaccine**

Thirty one percent of the 199 health facilities providing immunization services had a verification Factor (VF) of less than one (<1) hence had over reported, and 20.9% under reported (VF >1). Only 46.9% of the health facilities had data in the primary source documents matching with the numbers submitted in the report. Missing records were not an issue as shown in table 3.19 above. This finding is an indication of the inaccuracy of the data reported through HMIS for
this indicator during the reporting period.

Proportion of people living with HIV who are currently receiving ART

Forty one percent of the 134 health facilities providing ART services had a verification Factor (VF) of less than one (<1) hence had over reported, and 20.4% under reported (VF >1). Only 38.9% of the health facilities had data in the primary source documents matching with the numbers submitted in the report. Missing records were not an issue as shown in table 3.19 above. This finding is an indication of the inaccuracy of the data reported through HMIS for this indicator during the reporting period.

Proportion of all forms of TB cases (i.e bacteriologically confirmed plus clinically diagnosed) reported to the national health authority in the past year (new and relapse)

Ten percent (10.4%) of the 142 health facilities providing TB services had a verification Factor (VF) of less than one (<1) hence had over reported, and 6% under reported (VF >1). Only 40.3% of the health facilities had data in the primary source documents matching with the numbers submitted in the report. A high number (43.3%) of health facilities had missing records; this is due to the parallel reporting system for TB data. This finding is an indication of the inaccuracy of the data reported through HMIS for this indicator during the reporting period.

Proportion of all suspected malaria cases that were confirmed by microscopy or RDT

Thirty four percent (33.8%) of the 229 health facilities providing Malaria services had a verification Factor (VF) of less than one (<1) hence had over reported, and 28.4% under reported (VF >1). Only 36.5% of the health facilities had data in the primary source documents matching with the numbers submitted in the report. Missing records were not an issue as shown in table 3.x6 above. This finding is an indication of the inaccuracy of the data reported through HMIS for this indicator during the reporting period.

3.5.4 Verification ratio

Figure 3.13 shows the verification ratio matching recounted events from source documents with recorded events in HMIS (Facility Level)

3.5.5 Data Quality Verification Analysis Sub-County Level - Verification Factor

Table 3.16 and Figure 3.14 above shows the verification factors of each of the DQR selected indicators. This was determined by aggregating the value of selected indicators reported from the health facilities during the months of July to September 2016, and submitted as monthly summary report forms to the sub-county health records office. The aggregated value was divided by the value reported by the sub-county for the reporting period in the DHIS2. Based on the
findings only the TB indicator had best accuracy of reported data based on the verification factor. These are further discussed below.

Proportion of pregnant women who attended at least once during their pregnancy:
Thirty two percent of the 78 sub-counties had a verification Factor (VF) of less than one (<1) hence had over reported, and 21.8% under reported (VF >1). Only 44.9% of the sub-counties had data in the summary report forms matching with that in the HMIS (DHIS2). Missing records were not an issue as shown in Table 3.16. This finding is an indication of the inaccuracy of the data reported through HMIS for this indicator during the reporting period.

**Proportion of children under 1 year receiving three doses of DPT/Penta Vaccine**

Twenty three percent of the 78 sub-counties had a verification Factor (VF) of less than one (<1) hence had over reported, and 25.6% under reported (VF >1). Only 44.9% of the sub-counties had data in the summary report forms matching with that in the HMIS (DHIS2). Missing records were not an issue as shown in Table 3.16. This finding is an indication of the inaccuracy of the data reported through HMIS for this indicator during the reporting period.

**Proportion of people living with HIV who are currently receiving ART**

Twenty-three percent of the 78 sub-counties had a verification Factor (VF) of less than one (<1) hence had over reported, and 20.8% under reported (VF >1). Majority (54.5%) of the sub-counties had data in the summary report forms matching with that in the HMIS (DHIS2). Missing records were not an issue as shown in Table 3.16. This finding is an indication of the inaccuracy of the data reported through HMIS for this indicator during the reporting period.

**Proportion of all forms of TB cases (i.e bacteriologically confirmed plus clinically diagnosed) reported to the national health authority in the past year (new and relapse)**

Only 3.8% of the 78 sub-counties had a verification Factor (VF) of less than one (<1) hence had over reported, and 3.8% under reported (VF >1). Majority (92.3%) of the sub-counties had data in the summary report forms matching with that in the HMIS (DHIS2). Missing records were not an issue as shown in Table 3.16. This finding is an indication of the accuracy of the data reported through TIBU system for this indicator during the reporting period.

**Proportion of all suspected malaria cases that were confirmed by microscopy or RDT**

Twenty-five percent of the 78 sub-counties had a verification Factor (VF) of less than one (<1) hence had over reported, and 27.8% under reported (VF >1). Only 45.8% of the sub-counties had data in the summary report forms matching with that in the HMIS (DHIS2). Missing records were not an issue as shown in Table 3.16. This finding is an indication of the inaccuracy of the data reported through HMIS for this indicator during the reporting period.
3.6 Assessment of M&E Systems

The detailed results of the M&E system assessment are shown in an excel spreadsheet that can be viewed through the link https://drive.google.com/open?id=0B2peXlPr3n-QRWtKczVDUWtyczQ

3.6.1 Staff training and empowerment

Interviews were conducted at the sub-county level, to assess data management systems and reporting performance by facilities within the sub-county. All facilities are expected to submit summary reports on key health indicators on a monthly basis. A total of 79 SCHRO’s were interviewed.

Figure 3.15 shows that, most of the sub-counties (92.4%) had their staffs, who are relevant, assigned to compile data from the health facilities to the next level trained and empowered with clear responsibility. About 64.6% of the staffs had received the appropriate training while 87.3% of the sub-counties had a pre-designated staff responsible for reviewing the quality of data on issues to do with accuracy, completeness and timeliness.

![Figure 3.15: staff training and empowerment](image)

3.6.2 Indicator definition and reporting guidelines

The Health Monitoring and Evaluation, Research development and Informatics Division (formerly Div-HIS) of the MOH developed the standard operational definitions for all audited indicators at the national level. However, from Figure 3.16, the audit team noted that in some sub-Counties there were no written documents on indicators definitions. Facility-level recording staff mostly relied on their common knowledge from pre-service training or verbal instructions given by SCHROs for definitions of indicators. Eighty three percent (82.7%) had clear definition on the indicator of patients’ current on ART, indicators on TB cases notified, number of DPT3 and number of ANC 3 had on average 65% of sub-Counties with clear definitions.
3.6.3 Availability and use of reporting tools

In 87% of the sampled sub-counties, the source documents and reporting forms/tools specified by the HMIS, were consistently being used in all the facilities. Standard registers have general instructions on the reverse side of the cover pages about data recording procedures. Though instructions are given, only 79.2% reported to have provided clear instructions to the health facilities in the sub-county, on how to complete the data collection and reporting forms/tools. Only 46.8% of the sub-counties reported to have sufficient copies of registers and reporting forms and were supplying to the health facilities. This is shown in Figure 3.17.

![Figure 3.16: Sub-Counties with Clear definitions for indicators](image)

![Figure 3.17: Availability and use of reporting tools](image)

3.6.4 Monitoring and feedback

Of the sub-counties interviewed, 87.3% were monitoring timeliness and completeness of reporting from health facilities, while only 45.6% were providing feedback to the health facilities, Figure 3.18. Most of the sub-counties visited had no re-
gular data quality control system to identify and correct errors before submitting summary reports, or entering data to the DHIS 2 system. Only 47.4% of the sub-counties reported to have a routine and systematic process in the sub-county for checking the quality of data at the health facility and 34.2% routinely conducted accuracy checks by either re-compiling priority indicators for a given period and comparing with reported values for the same period. There are no policy and guiding document at the sub-county on how to conduct data quality. Only 21.5% of the counties had these documents available.

![Figure 3.18: Monitoring and feedback of submitted data](image)

3.6.5 Supervision

Of the sub counties that reported, 50% had supervisory staff who conducted regular supervisory visits to health facility, 84% had supervisory staff visit each health facility at least once in the past 12 months, 73% has written documentation on the results of supervisory visits conducted in health care facilities, 47% indicated that they received regular supervisory visits from the county, while 74% has supervisory visits conducted in the past 6 months. As indicated in Table 3.17. The recommendation is quarterly supervision visits, a requirement met by over two-thirds of the counties.

3.6.6 Reports storage and archiving

On report storage and archiving, availability of archived reports at facility and sub-county levels were above 90%. However, only 27% of sub-counties had appropriate and adequate space for storage of archived reports. Only 34% of facilities had data backed up appropriately. There was a high number of sub-counties with password protected computerized systems at 95% as indicated in Table 3.18.

3.6.7 Denominator data availability

In reference to population denominator data availability and use, 75(98.7%) had target populations for priority indicators such as vaccination coverage, 32(42.1%) had map of sub-county showing health facilities and the services, 32(42.7%) of the sub-counties had data on the number of births and deaths occurring in the sub-
Table 3.17: Regular supervision to facilities

<table>
<thead>
<tr>
<th>Regular supervision to facilities index</th>
<th>Reported Number(N)</th>
<th>Number Complied(n)</th>
<th>Percent Complied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub county conduct regular supervisory visits to health facility</td>
<td>79</td>
<td>40</td>
<td>50.6</td>
</tr>
<tr>
<td>Staff from the sub county visited each health facility at least once in the past 12 months</td>
<td>79</td>
<td>67</td>
<td>84.8</td>
</tr>
<tr>
<td>Written documentation on the results of supervisory visits conducted in health care facilities.</td>
<td>79</td>
<td>58</td>
<td>73.4</td>
</tr>
<tr>
<td>The sub county receives regular supervisory visits from the county</td>
<td>71</td>
<td>34</td>
<td>47.9</td>
</tr>
<tr>
<td>Has a supervisory visit been conducted at the sub county in the past 6 months</td>
<td>70</td>
<td>52</td>
<td>74.3</td>
</tr>
</tbody>
</table>

Table 3.18: Regular supervision to facilities

<table>
<thead>
<tr>
<th>Reports storage &amp; archiving Index</th>
<th>Reported Number(N)</th>
<th>Number Complied(n)</th>
<th>Percent Complied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copies of monthly reports submitted by the sub county to the next level available for the past 12 months.</td>
<td>79</td>
<td>73</td>
<td>92.4</td>
</tr>
<tr>
<td>Archived monthly reports from health facilities submitted to the sub-county available for the last 12 months.</td>
<td>79</td>
<td>78</td>
<td>98.7</td>
</tr>
<tr>
<td>Archived data organized such that records are easily retrievable</td>
<td>79</td>
<td>71</td>
<td>89.9</td>
</tr>
<tr>
<td>Appropriate (e.g. clean dry) and adequate space (sufficient)</td>
<td>77</td>
<td>21</td>
<td>27.3</td>
</tr>
<tr>
<td>Latest date of back-up appropriate given the frequency of update</td>
<td>61</td>
<td>21</td>
<td>34.4</td>
</tr>
<tr>
<td>Computerized system password protected</td>
<td>60</td>
<td>57</td>
<td>95</td>
</tr>
</tbody>
</table>

county year to year such registers or line listing of births and deaths as indicated in Table 3.19.

3.6.8 Data demand and use

In terms of data use and demand, 84.8% of the sub counties monitor coverage for priority indicators, 71.8% tracked progress towards realistic targets for priorities. A good number (81%) of Sub-Counties had assigned staff to interpret and analyse the data/results, while 46% had set mechanisms through which HMIS staff can obtain support, Table 3.20.
Table 3.19: Population data availability and use

<table>
<thead>
<tr>
<th>Population/Denominator data availability and use</th>
<th>Reported Number(N)</th>
<th>Number Complied(n)</th>
<th>Percent Complied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub county have target populations for priority indicators (e.g vaccination coverage)</td>
<td>76</td>
<td>75</td>
<td>98.7</td>
</tr>
<tr>
<td>Map of sub county showing health facilities and the services</td>
<td>76</td>
<td>32</td>
<td>42.1</td>
</tr>
<tr>
<td>Sub county have data on the number of births and deaths occurring in the sub-county year to year such registers or line listing of births and deaths.</td>
<td>75</td>
<td>32</td>
<td>42.7</td>
</tr>
</tbody>
</table>

Table 3.20: Data demand and use

<table>
<thead>
<tr>
<th>Data demand and use</th>
<th>Reported Number(N)</th>
<th>Number Complied(n)</th>
<th>Percent Complied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub county monitor coverage for priority indicators</td>
<td>79</td>
<td>67</td>
<td>84.8</td>
</tr>
<tr>
<td>Sub county track progress towards realistic targets for priorities.</td>
<td>78</td>
<td>56</td>
<td>71.8</td>
</tr>
<tr>
<td>Assigned staff to interpret and analyze the data/results?</td>
<td>79</td>
<td>64</td>
<td>81</td>
</tr>
<tr>
<td>Programmatic decisions taken by the sub county</td>
<td>78</td>
<td>36</td>
<td>46.2</td>
</tr>
<tr>
<td>Mechanism through which sub county HMIS staff can obtain support</td>
<td>79</td>
<td>37</td>
<td>46.8</td>
</tr>
</tbody>
</table>

3.6.9 Comparison between DQA 2014 and DQR 2016.

The previous Data Quality Audit had been done in 2014 and was the first nationwide DQA since the rolling out of the DHIS reporting platform for routine health facility service delivery and community health services. Previously, the preceding DQA was conducted in 2010 whose results informed the development of the DQA protocol. Since then, only vertical and sporadic DQAs have been conducted by programs to meet localized needs.

Data Quality Review 2016 used reporting of children immunized for DPT (III) as a proxy for children immunized. Comparing this with reporting of Data Quality Audit 2014, completeness of data stood at 83.2% in 2014 and made remarkable increase to 94% in 2016 with only two of the sampled sub-counties below the 80% threshold. On timeliness of the data, DQA 2014 indicates that 8 of the sampled 34 counties were below the threshold of 75% while DQR 2016 found that out of the 19 sampled counties only 2 counties were below the timeliness threshold of 80%.

Comparing the DQR results to the MTR of KHSSP 2014-2018 indicated that, overall, the DHIS is working and its coverage, completion and reporting rates had improved. Its completion and timeliness rate had reached 89 and 77 percent.
respectively. This was more nearer to the results of DQR 2016 of completion and timeliness of 94 and 92.4% respectively. This has however put some trust in the data used to develop the MTR report of the KHSSP 2014-2018.

3.7 Summary of the key findings and discussions

3.7.1 Reporting Completeness and Timeliness

Report completeness was 94% with only 2.6% of the sub-counties having a reporting rate of less than 80%, that was set as the quality thresholds for completeness. The trend for both sub-county and facility report completeness rate had been on the rise since the year 2013 from 80% in 2013 to 94% in 2016. Among the counties reporting lower completeness than the threshold, the health records office had partial guidelines on reporting protocols on what they are supposed to report on as well as when reports are due. They had not received regular supervisory visits from the county/national level and storage of documents was partly appropriate with no backup system. They also did not have definition for the ANC1st visit and DPT3 (penta3) indicators definitions. Staff were partly trained on what they were supposed to report on, and how reports are submitted.

3.7.2 Reporting Timeliness

Out of the sub-counties that were sampled, 92.1% of them were timely in reporting. However, 10.3% of the sub-counties had a timeliness of less than 75%, that was set as the quality thresholds for timeliness. Factors that would contribute to the counties not to the threshold of 75% timeliness rate include the following identified by the M&E systems assessment:

(i) sub-counties not supplying health facilities in the sub county with blank data collection tools (e.g. registers, reporting forms)/ not having sufficient copies available in the sub county to meet the needs of all health facilities;

(ii) not receiving regular supervisory visits from the county or national level;

(iii) sub county not conducting regular supervisory visits to health facilities;

(iv) sub-counties not receiving regular supervisory visits from the county or national level. Sub-county reporting timeliness rate at the threshold of 75% is very good at 95.6%.

3.7.3 Internal Consistency of Reporting Data

Malaria indicator (62%) had the highest number of sub-counties with outliers (inconsistent data values/reports between levels) followed by HIV/AIDS with 30 (38.5%) sub counties having moderate outliers. The indicators that registered minimal outliers in the reports were ANC 1 14(18%) and DPT3 18 (23%). The average percentage of responses across the five indicators that were given for the discrepancies (mis-match) between the data in the main source documents and monthly reports. The findings are not a true representation of the reasons for the discrepancies/ mis-match because no data was collected for 50% of the discrepancies/mis-match. The reasons given for the discrepancy/mis-match was data entry errors (18%), arithmetic errors (18%), and data not compiled correctly (14%).
3.7.4 External Consistency

The data revealed that 29.4% counties among the sampled 19 counties, data for ANC 1 visit and the indicator on immunization, that is, 3rd dose DPT in the routine system was not comparable to that obtained from the surveys.

3.7.5 Data Quality Verification Analysis

The results indicate that there existed inaccuracy of the data reported through HMIS for this indicator during the reporting period. The main areas considered were:

Proportion of pregnant women who attended at least once during their pregnancy: 32% of the sub-counties had a verification Factor (VF) of less than one (<1) implying over-reporting and 21.8% under reported (VF >1). Only 44.9% of the sub-counties had data in the summary report forms matching with that in the HMIS (DHIS2).

Proportion of children under 1 year receiving three doses of DPT/Penta Vaccine: 23% of the sub-counties had a verification Factor (VF) of less than one (<1) implying over reported data, and 25.6% under reported (VF >1). Only 44.9% of the sub-counties had data in the summary report forms matching with that in the HMIS (DHIS2).

Proportion of people living with HIV who are currently receiving ART: 23.4% of the sub-counties had a verification Factor (VF) of less than one (<1) hence had over reported, and 20.8% under reported (VF >1). Majority (54.5%) of the sub-counties had data in the summary report forms matching with that in the HMIS (DHIS2).

Proportion of all forms of TB cases: Only 3.8% of the sub-counties had a verification Factor (VF) of less than one (<1) hence had over reported, and 3.8% under reported (VF >1). Majority (92.3%) of the sub-counties had data in the summary report forms matching with that in the HMIS (DHIS2).

Proportion of all suspected malaria cases that were confirmed by microscopy or RDT: 25% of the sub-counties had a verification Factor (VF) of less than one (<1) hence had over reported, and 27.8% under reported (VF >1). Only 45.8% of the sub-counties had data in the summary report forms matching with that in the HMIS (DHIS2).

3.7.6 M&E Systems Assessment

Staff Training and Empowerment: Most of the sub-counties (92.4%) had relevant staff relevant, assigned to compile data from the health facilities to the next level trained and empowered with clear responsibility.

Indicator Definition and reporting Guidelines: 82.7% had clear definition on the indicator of patients’ current on ART, indicators on TB cases notified, number of DPT3 and number of ANC 3 had on average 65% of sub- Counties with clear
definitions.

Ability and use of reporting tools: In 87% of the sampled sub-counties, the source documents and reporting forms/tools specified by the HMIS, were consistently being used in all the facilities.

Monitoring and Feedback: Majority of the sub counties (87.3%) were monitoring timeliness and completeness of reporting from health facilities.

Supervision: Of the sub counties that reported, 50% had supervisory staff who conducted regular supervisory visits to health facility.

Reports and Archiving: Availability of archived reports at facility and sub county levels were above 90%.

Denominator Data Availability: Majority, (98.7%) of the sub-counties had target populations for priority indicators such as vaccination coverage.

Data Demand and Use: Majority (84.8%) of the sub counties monitor coverage for priority indicators.
Chapter 4

Conclusion and Recommendation

4.1 Conclusion

The trend on both completeness and timeliness has shown a steady improvement over time since 2013. However, the reporting rates do not take into account the habitually non reporting facilities. There is need to look into the depth of the reports in terms of how complete each report is; reporting for all the indicators instead of just submitting empty reports.

The accuracy of DHIS data against what is in the summary tools showed some discrepancies with ART having over half (53.7%) of the sub-counties recording mismatch between reported data and that in the summary tool. ANC visits had the most accurate data with only 7.3% of Sub-Counties having a discrepancy. This indicates that though most of data entry from summary sheets into the DHIS is done by HRIOs, there are still a number of issues contributing to data inaccuracies among them multiple sources of summaries, lack of guidelines, there are chances that there could be inconsistencies in the counting within tools. Frequent revision of tools had a negative effect on most of the indicators.

Internal consistency of reporting data which shows a degree of correlation of coverage between the three preceding year’s monthly averages and the current year coverage has shown a high degree of correlation as expected, considering the indicators assessed were based on the KEPH levels of care as well as being the high priority health interventions with a high level of continuity of care. There was stagnation between 2014 and 2015 for some indicators like trend for 1st ANC, this could be attributed to the shocks following devolution of healthcare services. A number of Sub-Counties had divergent score lying well above and below quality threshold set at 33%. Confirmed malaria cases recorded the highest number of sub-counties (62%) with divergent scores. This could be attributed to strengthened interventions in malaria program and also considering malaria is seasonal. The discrepancies in the consistency point the errors in reporting between the facilities and Sub-Counties.

There is positive external consistency with routine data comparing favourably with the survey data. However, some Sub-Counties like Tharaka Nithi had facility rate way too high compared to survey data and Turkana facility rates were lower compared to the survey data for 1st ANC indicator and DPT 3rd dose.
On the systems assessments, the aim was to understand factors that affect overall data quality, i.e. data accuracy, completeness and timeliness. Five key functional components of data management and reporting systems were assessed (i.e., Structure, functions and capabilities, Indicator definition and reporting guideline, Data collection and reporting tools). In general, all visited facilities including non-government (private and FBOs) facilities have data management and reporting systems in place. There is a mixed picture on the functioning of the system.

The findings identified that in most of the Sub-Counties (92.4%), the responsibility of compiling data from the health facilities to the next level was clearly assigned to the relevant staff and 87.3% had pre-designated staff responsible for reviewing the quality of data on issues to do with accuracy, completeness and timeliness. The prescribed tools are consistently being used for the collection of data and denominator data/target populations for priority indicator such as vaccination are available.

The following weaknesses were identified in the data management and reporting systems:

(i) In some sub-counties there were no written documents on indicators definitions. Facility level recording staff mostly relied on their common knowledge from pre-service training or verbal instructions given by Health Records and Information officers.

(ii) Most of the sub-counties visited had no regular data quality control systems to identify and correct errors before submitting to the DHIS. There are uncoordinated structures for providing feedback from the sub-county level to the facility. Only 45.6% of the sub-counties were providing feedback to the facilities and 32.4% routinely conducted accuracy checks by re-compiling priority indicators for a given period and comparing with reported values for the same period.

(iii) Registers and reporting tools at the sub-county level are not available with only 46.8% of the Sub-Counties reporting to have sufficient copies.

(iv) No regular supportive supervision to facilities by HRIOs from county and sub-county.

(v) Though instructions are given on the reverse side of the data collection tools, only 79.2% reported to have provided clear instructions to the health facilities in the sub-county, on how to complete the data collection and reporting forms/tools.

(vi) There is no adequate, clean and dry space for storing the records, only 34.4% had latest date of back-up appropriate given, together with the frequency of update.

4.2 Recommendations

(i) Further analyze the data to identify the nature of discrepancies, whether there is a consistency in the pattern of discrepancies and the nature of
discrepancies. Also further explore the contributing factors to the discrepancies.

(ii) Institutionalize data verification at all levels; facility, sub-county and county levels.

(iii) Institute regular data quality checks mechanism at facility level to identify and address data errors such as inaccurate records, incomplete data, double counting, and aggregation errors.

(iv) Operational definitions of indicators and data capturing and compiling procedures guidelines should be clearly documented and shared to all facilities, including private and faith-based facilities.

(v) Regular supervision by Sub-County/County HRIOs/National level to provide technical supports, ensure their adherences to standard tools and data management procedures at facility level.

(vi) National and County levels of government to commit resources to avail data collection tools.

(vii) Institutionalize computerized system for back up.

(viii) Put in place internal data quality tool that can be used to check data quality on real time basis.
References


Appendices

Data Quality Review

Data collection tools

Working document
November 2015
Appendices

Data Quality Review

Data collection tools

Working document
November 2015
Appendices

Data Quality Review

Data collection tools

Working document
November 2015
Appendices

Data Quality Review

Data collection tools

Working document
November 2015
Data Quality Review

Data collection tools

Working document
November 2015
Appendices

Data Quality Review

Data collection tools

Working document
November 2015
Appendices

Data Quality Review

Data collection tools

Working document
November 2015
Appendices

Data Quality Review

Data collection tools

Working document
November 2015
Appendices

Data Quality Review

Data collection tools

Working document
November 2015
Data Quality Review

Data collection tools

Working document
November 2015
Appendices

Data Quality Review

Data collection tools

Working document
November 2015
Appendices

Data Quality Review

Data collection tools

Working document
November 2015
Appendices

Data Quality Review

Data collection tools

Working document
November 2015
Appendices

Data Quality Review

Data collection tools

Working document
November 2015
Appendices

Data Quality Review

Data collection tools

Working document
November 2015
Appendices

Data Quality Review

Data collection tools

Working document
November 2015
Appendices

Data Quality Review

Data collection tools

Working document
November 2015
Appendices

Data Quality Review

Data collection tools

Working document
November 2015
Appendices

Data Quality Review

Data collection tools

Working document
November 2015
Appendices

Data Quality Review

Data collection tools

Working document
November 2015
Appendices

Data Quality Review

Data collection tools

Working document
November 2015
Appendices

Data Quality Review

Data collection tools

Working document
November 2015
Appendices

Data Quality Review

Data collection tools

Working document
November 2015
Appendices

Data Quality Review

Data collection tools

Working document
November 2015
Appendices

Data Quality Review

Data collection tools

Working document
November 2015

World Health Organization
Appendices

Data Quality Review

Data collection tools

Working document
November 2015
Appendices

Data Quality Review

Data collection tools

Working document
November 2015
Appendices

Data Quality Review

Data collection tools

Working document
November 2015
Appendices

Data Quality Review

Data collection tools

Working document
November 2015
Appendices

Data Quality Review

Data collection tools

Working document
November 2015
Appendices

Data Quality Review

Data collection tools

Working document
November 2015
Appendices

Data Quality Review

Data collection tools

Working document
November 2015
Appendices

Data Quality Review

Data collection tools

Working document
November 2015
Appendices

Data Quality Review

Data collection tools

Working document
November 2015
Appendices

Data Quality Review

Data collection tools

Working document
November 2015
Appendices

Data Quality Review

Data collection tools

Working document
November 2015
Appendices

Data Quality Review

Data collection tools

Working document
November 2015

World Health Organization