

REPUBLIC OF KENYA



MINISTRY OF HEALTH

# DATA QUALITY ASSESSMENT REPORT

## 2020



**NATIONAL TUBERCULOSIS, LEPROSY  
AND LUNG DISEASE PROGRAM**

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# Abstract

**Introduction:** Tuberculosis remains a major public health concern and among the top 10 causes of death worldwide. Immense resources have been utilized to find and treat people with TB and there is need to show gains in terms of case notification, reduction in incidence and deaths. Quality of data reported to the national program is critical for effective programming. Data quality assessment is one of the mechanisms implemented by the NTP to contribute in data quality improvement. The overall objective of this DQA was to assess the quality of TB, DR TB, Leprosy and IPT data reported to the program in 2018 and 2019. Kenya has 300 TB control zones across 47 counties with more than 4000 facilities reporting TB and 300 managing DR TB.

**Methodology:** A retrospective assessment was carried out in 14 sub counties across 7 counties randomly selected using multi stage sampling while excluding counties that had recently carried out DQA. All the TB facilities were visited in the selected sub counties where quantitative comparison was done for reported data across all the available data sources. A total of 178 facilities were visited over a period of 3 weeks. Data collection was done using a digitized tool (open data kit).

Data was uploaded into a central server then exported to EXCEL and STATA for cleaning and analysis. Analysis involved comparing aggregate and case-based data across three data sources to show the level of agreement. Kappa score was used to measure consistency and completeness of the data in the facility register and electronic surveillance system (TIBU). Kappa score was included to measure the statistical significance of the level of agreement for consistency and completeness in the facility register and TIBU.

**Results:** The level of agreement between TB4 register and TIBU for all forms of TB, national reporting system was down from 95% in 2018 to 94%. This could be attributed to under reporting and recording and reporting challenges especially on the type of patients. In terms of use of records cards the level of agreement between Patient record card (TB5) and facility register (TB4) was low at 72% while between TIBU and record it was an improvement from 68% in 2018 to 76% in 2019. However, this was still lower than the expected standard of 95%, which points to documentation challenges at facility level.

Overall levels of agreement of aggregate IPT data between register and TIBU for 2018 and 2019 were 80% and 89%, respectively. This shows an improvement of 9% between the two years

There are data quality challenges for DR TB; the level of agreement between patient log book and facility register was 107% while between the facility register and TIBU was 120% in 2018. The same trend is also noted in 2019, where the level of agreement between patient log book and facility register was 114%, while between the facility register and TIBU was 107%.

These findings are however varied from one sub county to another with some counties showing good data quality compared to others.

For timeliness of reporting, median score was computed for both DS TB and DR TB data. For DS TB the median time for notification was 8 days while for DR TB was 14 days. DS TB median time is expected to be longer than DR TB since the DR TB patients are started on treatment after notification as per the national guidelines.

Most facilities visited had over 80% of the required M&E tools with the least available being the commodity tools (FCDRR or DADR).

**Recommendations:** There is need to review M&E tools to ensure uniformity of data collection and HCW sensitized on the new tools to improve the quality of recording and reporting. For the long term, the program should simplify DR TB data collection. During routine supervision more emphasis should be put on capacity building of HCWs on data collection and use to enhance data quality at the facility level. It is encouraged that the Health Management Team (HMT) at the facility level should include TB data in any facility digitization initiative.

# ACKNOWLEDGEMENT

Division of National Tuberculosis, Leprosy and Lung Disease Program would like to thank The Global Fund for their financial support that made implementation of DQA possible.

We are also grateful to the respective health management teams of counties visited led by the county directors of health for their support and facilitation.

The M&E section at the program is acknowledged for their coordination and planning. Special thanks to IT team who designed the electronic data collection tool and the entire team that carried out the field work for their dedication.

We appreciate USAID through TB ARC II for supporting the development of this report by providing financial and technical support.

Finally, we acknowledge the team from the program and TB ARC II that took time to put together this report and the communication team for their editorial contribution.

# Abbreviations

1. **TB** - Tuberculosis
2. **HIV** - Human Immunodeficiency Virus
3. **WHO** – World Health Organization
4. **DS TB** – Drug Susceptible TB
5. **DR TB** – Drug resistant TB
6. **NTLD-P** - National Tuberculosis, Leprosy & Lung Diseases Program
7. **DQA** – Data Quality Audit
8. **SCTLCS** - Sub County TB and Leprosy Coordinators
9. **IPT** - Isoniazid Preventive Therapy
10. **CTLCS** – County TB and Leprosy coordinators
11. **TC** – Treatment completed
12. **LTFU** – Lost to Follow up
13. **TO** – Transfer out
14. **USAID** - United States Agency for International Development
15. **JICA** - Japan International Cooperation Agency





USAID APHIA II  
Western Project

This Comprehensive Care Centre and Waiting Bay  
were renovated through the  
generous support of the American people  
through the  
United States Agency for International Development (USAID)  
APHIA II Western Project  
(2008/2009)

Service delivery in this facility is made possible by the generous support of the American people through the United States Agency for International Development (USAID) funded AMPATHPlus project

USAID AMPATH



# CHAPTER ONE

## INTRODUCTION

### 1.1 Background

Tuberculosis is a communicable disease of global public health concern and among the top 10 causes of death. It is caused by a bacteria known as bacillus *mycobacterium tuberculosis*. It is estimated that about a quarter of the world population are infected by M. tuberculosis and are at risk of developing active TB disease (WHO report 2019). According to WHO report 2019, about 10 million fell ill with TB in 2018 with varied burden of disease among countries. These high burden countries contributed about 87% of the TB burden globally in 2018. In the recent past, DR TB has emerged as a new challenge especially among high burden countries including Kenya. In 2018, a total of 186,772 people were diagnosed with DR TB, this only represents one third of the estimated burden of DR TB. The main challenge remains the gap between the reported and estimated cases where most people with TB are not diagnosed.

In Kenya, the estimated TB incidence in 2019 was 150,000 with an incidence rate of 292 per 100,000 population. During the period under review, the country notified 86,504 people with DS TB where 9.7% were children (<15 Years). HIV testing rate was 98% with a coinfection rate of 26% and 96% of those who were HIV positive started on ART. The treatment success rate for all forms of TB was 84%. DR TB notified cases were 692 where 75% were rifampicin resistant (Annual report 2019).



The country is in post leprosy elimination stage with few endemic counties mainly in the coast and western counties. There were 164 leprosy reported cases in 2019.

Monitoring and evaluation of interventions (case detection and treatment) is critical for effective programming. Recently the program rolled out ACF in facilities to find missing people with TB that is expected to increase case notification and hence quality of data generated is important. Resources have been dedicated to quality data improvement that includes but not limited to; routine support supervisions at all levels, periodic performance review and capacity building. The program also carries out targeted data quality assessment every two years where findings are incorporated into data quality improvement initiatives.

## 1.2 Problem statement

There are over 300 TB control zones across the 47 counties in the country. Each county has its own administrative and geographical challenges with varied health system challenges including low number of health care workers. For program effectiveness, the program monitors a number of indicators; number of TB cases notified, Treatment success rate and number of leprosy cases detected. Considering the number of cases and facility work load, gaps in accurate recording and reporting are anticipated. Since TIBU was rolled out, the need for manual routine summaries was eliminated, but transcription errors remain a data quality issue. TB treatment takes a minimum of 6 months and for DR TB and leprosy even a longer period of time, this poses a challenge of consistent recording and reporting. The problem is confounded by number of patients who are transferred or are on transit and may not be well documented at both ends of the treatment sites. From routine data, patient follow up has been identified as a challenge with significant proportions of LTFU and transfer outs not assigned correct treatment outcomes.

## 1.3 Justification for DQA

The country together with partners notably; The Global Fund, USAID, JICA, World Bank and WHO has invested significant resources in TB control efforts. There is need to show the results of the efforts in terms of public health gains that include; improved case notification, treatment outcomes and overall quality of care. This is heavily dependent on the quality of data reported. Previous DQA reports have shown that the data quality has not met the desired standard in terms of completeness, accuracy, integrity, consistency, timeliness and validity. Resources have been allocated to improve data quality in the program, but this has been hampered by lack of capacity to manage and analyze data especially at sub national level.

## 1.4 General Objective

The general objective was to assess data quality for DS TB, DR TB, leprosy and IPT data for year 2019 and respective cohorts.

## 1.5. Specific Objectives

1. To evaluate the consistency of aggregate and case-based data for DS TB, DR TB, leprosy and IPT in
2. Facility registers, patient record cards and TIBU
3. To determine the completeness of data on DS TB, DR TB, leprosy and IPT in facility registers, patient record cards and TIBU.
4. To assess the availability of recording and reporting tools.

Table 1.1: Performance on Data Quality over time

Level of Agreement (Registers Vs TIBU)					
No	Indicator	2017	2018	2019	Quality Remarks
1	Number of DSTB Cases All Forms	96%	93%	94%	Below Expectation
2	Number of Bacteriologically confirmed PTB Cases	96%	94%	97%	Met Expectation
3	Number of Bacteriologically confirmed who completed treatment	111%	112%	N/A	Below Expectation
4	Number of TB Cases who have patient type correctly classified (Case-based)	N/A	93%	75%	Below Expectation
5	Number of TB Cases with a Cured outcome	107%	102%	N/A	Met Expectation
6	Number of DRTB Cases Registered	116%	108%	107%	Below Expectation
7	Number of IPT Cases (under 5) registered	74%	80%	89%	Below Expectation
8	Number of IPT Cases (under 5) the completed therapy	91%	111%	N/A	Below Expectation

**Key**

>105	Below Expectation
95 - 105	Met Expectation
90 - 95	Below Expectation
80 - 90	Below Expectation
<80	Below Expectation



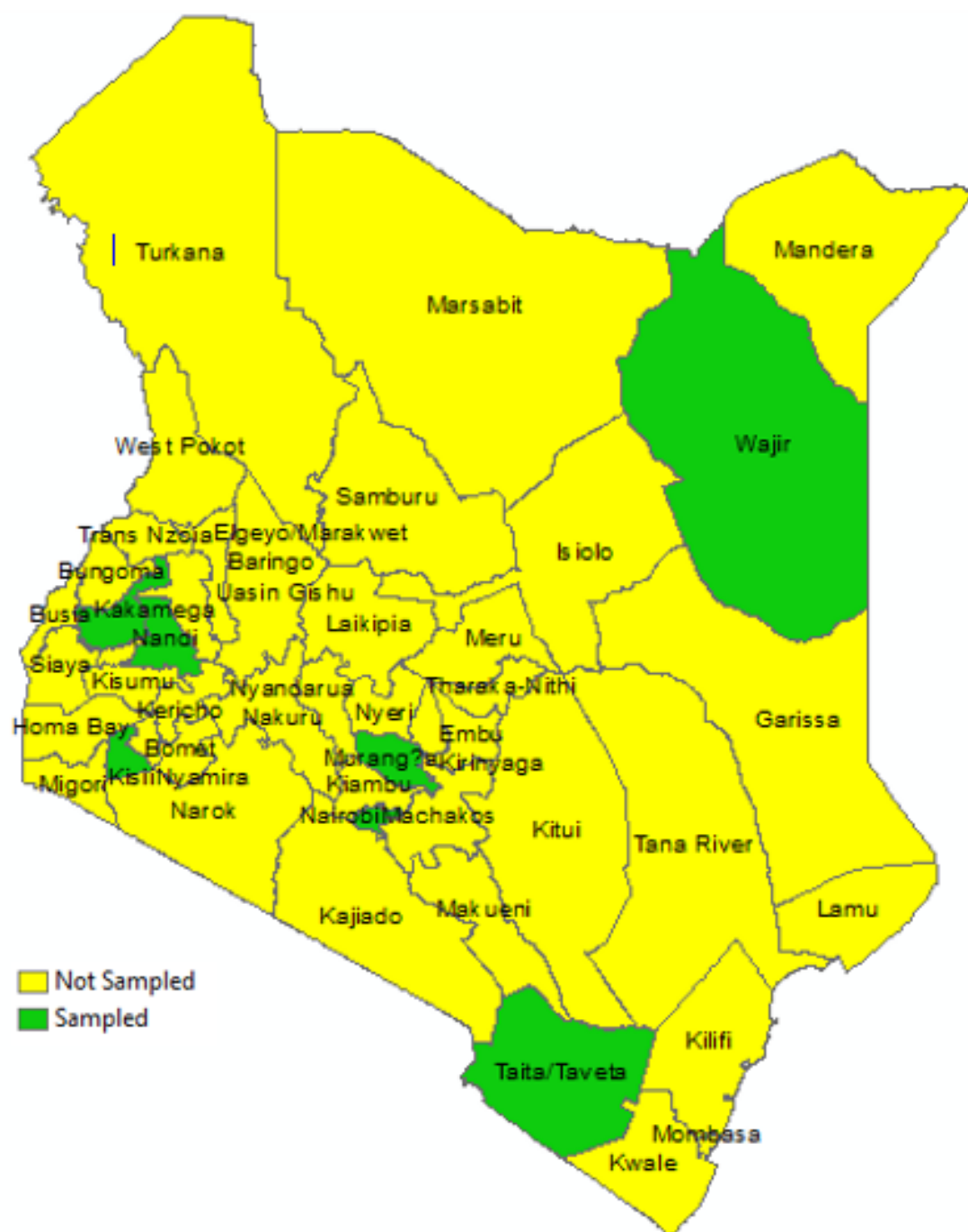




# CHAPTER TWO

## Methodology

### 2.1. Study Sites



## 2.2. Study Design

A retrospective assessment was conducted in 14 sub counties spread across 7 counties that were randomly selected (*Map 1.0 above*). The DQA approach was a quantitative comparison of recorded to reported data on the facility TB and leprosy records targeting the population of cases registered during the period of interest.

A total of 178 health facilities with notified case(s) of DS TB, DR TB, leprosy and/or IPT (under five) during the period of interest were visited.

## 2.3. Study Period

The assessment was conducted for three weeks in the month of June 2020. Aggregate data from the facility registers, patient record cards and TIBU for the period of interest was reviewed. For case-based data, five records were randomly sampled for quarter one 2019 (DSTB) and 2019(DR TB).

## 2.4. Sampling Procedure

A multi-stage sampling criterion was adopted, whereby 24 counties that were previously visited during the DQA exercise in 2019 were excluded from the sampling frame then 6 counties were randomly sampled. Nairobi county was purposively sampled due to the high TB burden of notified cases. Two sub counties in each of the sampled counties were randomly picked.

For case-based records, 5 patients from the facility registers were systematically sampled in Q1 2019 (DS TB) and 2019 all year (DR TB). In instances where there were five or less patients, all records were abstracted

## 2.5. Study Population

The study population was all TB records of cases within the given period in the selected sub counties in Kenya.

### 2.5.1. Inclusion Criteria

All TB treatment health facilities within the sampled sub counties (Annex 1) in Kenya that notified or reported any of the following in the period of interest were included:

1. DS TB cases
2. DR TB cases
3. Children under 5 who were contacts of bacteriological confirmed (BC) TB and initiated on IPT
4. Leprosy cases.

County	Sub Counties	
Kakamega	Ikolomani	Butere
Kisii	Bobasi	Bomachoge Borabu
Murang'a	Gatanga	Kahuro
Nairobi	Dagoretti North	Dagoretti South
Nandi	Aldai	Chesumei
Taita Taveta	Mwatate	Taveta
Wajir	Wajir East	Wajir West

### 2.5.2. Patient Records

All records of patients (patient record cards, log books, treatment registers) who were notified for DS TB, DR TB and leprosy in the period of interest; IPT for children under 5 years who are contacts of Bacteriologically confirmed TB.

### 2.5.3. Exclusion Criteria

Records of patients documented as Transferred In (TI) in the visited health facilities

## 2.6. Operational Definitions

### Cured Outcome

The outcome cured is given to pulmonary TB cases that were bacteriologically confirmed either through a smear microscopy test or through GeneXpert. However, the outcome is determined by two or more negative follow up smears taken at least 30 days apart.

### Treatment Completion

Refers to the treatment completion as recommended by the national policy without evidence of failure but no record that three or more consecutive negative cultures/smears taken at least 30 days apart after intensive phase

### Died

Refers to a patient who dies for any reason during the course of treatment

## 2.7. Data Collection

### 2.7.1. Field Work Preparation

The DQA teams were constituted considering appropriate skill-mix comprising a clinician, laboratory personnel, Monitoring and evaluation officer and a driver. Teams underwent an online capacity strengthening session to orient themselves on the customized DQA tool and familiarize themselves with the proposed indicators.

The team leader contacted the CTLC early to plan for a courtesy call and in consultation with the county teams organized day to day activities which involved planning of the facilities to be visited and ensured all logistics for the teams were in place.

### **2.7.2. Data Collection**

Upon entry to a county, each team made a courtesy call to the County Health Management Team/CDH/CEC where the purpose of the DQA mission was explained and the facilities to be visited. The team was accompanied by the CTLC(s) and respective SCTL(s) to the health facilities where a courtesy call was done. TB source documents were reviewed and TB clinic staff were interviewed. Data was abstracted from TIBU and facility records. The DQA tool generated a summary which acted as a guide during feedback highlighting strengths, best practices and areas of improvement

### **2.7.3. Data Assessment Tool**

The data assessment tool was a web-based tool (with offline functionality) designed using Microsoft excel forms with ODK syntax and data was relayed to the central server at NTLD-P. This tool was customized to include core indicators being tracked by the TB program.

#### **2.7.3.1. Strengths of the Data Assessment Tool**

- The tool can be used on various devices e.g. tablets, laptops, android phones. This minimized challenges with power outages and enhanced flexibility of data collection
- Data is automatically synchronized hence minimizing the risk of losing information
- The tool can be used off-line
- It provided a timely summary for feedback
- It minimized transcription errors
- It ensured standardization of the data collection process

#### **2.7.3.2. Limitations of the Data Assessment Tool**

Internet connection is required for initial installation and submission of data  
Data for Nairobi (Dagoretti) was manually entered into TIBU by data clerks due to erroneous server decommissioning which ended up distorting sub county registration numbers.

### **2.7.4. Source of Data**

The source documents for the data were:

- Patient record cards (TB5)
- TB facility registers (TB4)
- DR TB registers
- DR TB log books
- IPT registers
- ICF cards
- Leprosy register
- IPT record cards
- Electronic surveillance system (TIBU)
- Contact Management Register



### 2.7.5. Indicators Assessed

The assessment focused on the following TB, leprosy, and IPT indicators across all the recording and reporting tools;

- Number of DSTB cases (all forms) registered
- Number of bacteriologically confirmed TB cases
- Number of TB cases who completed treatment
- Number of bacteriologically confirmed TB cases with a cured outcome
- Number of DRTB cases registered
- Number of DR TB cases who have been correctly classified
- Number of IPT (under 5) cases registered
- Number of IPT (under 5) cases that completed treatment

## 2.8. Data Management and Analysis

Data entry was captured directly into the online DQA data capture tool at the health facility. The teams re-checked these data for completeness and accuracy with the patient record cards, registers and TIBU before leaving the health facilities.

Upon completion of the exercise, the entire data set was uploaded to a central server for storage, from where it was later downloaded and exported to Excel and STATA for cleaning and analysis. The data was backed up periodically in a secondary location.

Cleaning involved checking for duplicates and missing data. The data was then summarized in tables, bar graphs and box plots. The facility register was used as the basis for comparison. Acceptable levels of agreements were 95-105. Kappa score (table below) was used to measure consistency of the data in the facility register and electronic surveillance system (TIBU).

Kappa score	Interpretation
< 0	Less than chance agreement
0.01 - 0.20	Slight Agreement
0.21 - 0.40	Fair Agreement
0.41 - 0.60	Moderate Agreement
0.61 - 0.80	Substantial Agreement
0.81 - 0.90	Almost Perfect Agreement

## 2.9. Limitation of the assessment

The exercise was affected by insecurity whereby three facilities in Wajir county could not be visited.

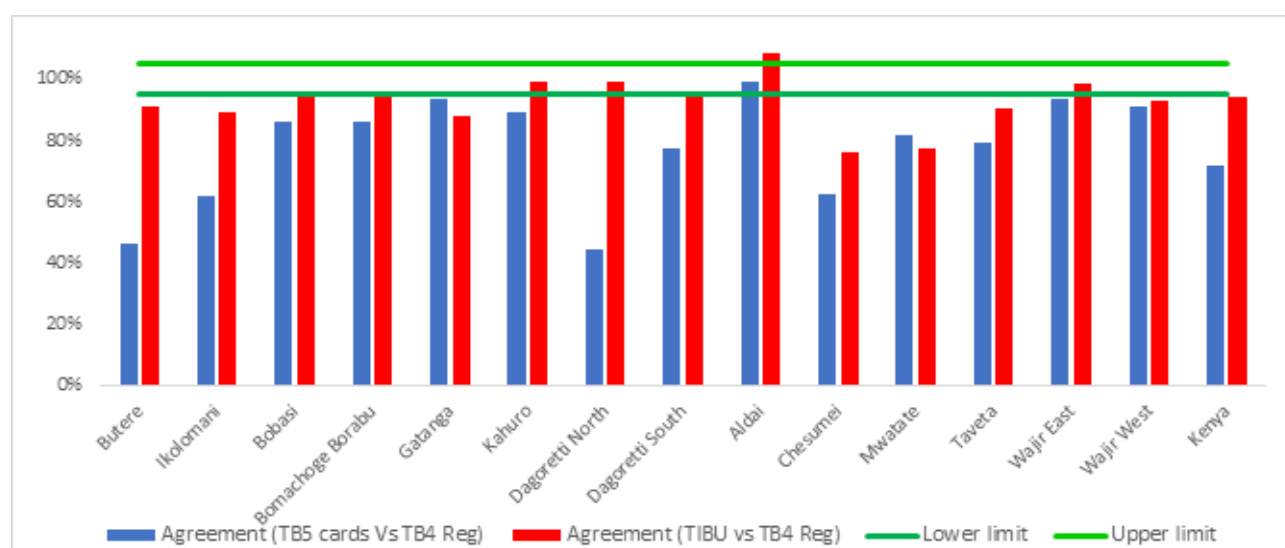
## 2.10. Ethical Considerations

Permission for the activity was obtained from the respective county health departments before embarking on the exercise. Confidentiality was adhered to during the assessment as records were reviewed hence no contact with the patients, similarly, there were no identifiers to link them with the information collected

# CHAPTER THREE

## Results and Discussion

### 3.1: Levels of agreement of all forms (Figure 1)



#### Agreement between TB facility Register and TIBU

The overall level of agreement between facility register (TB4) and the national surveillance system (TIBU) was 94%. Between 2018 and 2019, there was a slight decrease from 95% to 93%. (refer to detailed table in Annex 3). This meant that there were more records in the facility register than in TIBU, which could be attributed to delayed or missed notification of TB patients. In some scenarios, there is a mix up in documenting the type of patient variable across recording tools, especially for patients who are transferred from one facility to the other across sub counties.

Out of the 14 sub counties visited, five (36%) were within the acceptable reporting range. These were Bobasi, Kahuro, Dagoretti North, Dagoretti South and Wajir East. Aldai Sub county's TIBU data had more records in 2018 (132%) and less in 2019 (85%), a pointer for challenges with documentation in both years of assessment. Among the Sub Counties which had recorded lower cases in TIBU compared to facility register, Chesumei and Mwatate sub counties had the least at 76% and 77% respectively, which is consistent for the two years of review. More technical assistance in data recording and reporting is needed.

#### Agreement between patient record cards and TB facility register

The overall level of agreement between the patient record cards (TB5) and facility register was at 72%. Whereas the performance is still below the acceptable reporting range, there was an improvement from (68%) in 2018 to 76% in 2019. Aldai was the only Sub County that had optimal utilization of the patient record cards at 99%. Butere, Ikolomani, Dagoretti North and

Chesumei Sub Counties reported very low utilization of the patient record cards. Generally, the underutilization of record cards may be attributed to knowledge gap among HCWs on the use and importance of the tool as the primary source document of TB data.

**Table 2a: Levels of agreement for aggregated data for Bacteriological Confirmed TB in Patient record cards and TIBU data in comparison to TB4 facility registers**

County	Sub Counties	2018			Agree- ment (TB5 Cards vs TB4 Reg)	Agree- ment (TIBU vs TB4 Reg)	2019			Agree- ment (TB5 Cards vs TB4 Reg)	Agree- ment (TIBU vs TB4 Reg)	Average (2018/2019)	
		TB5 Cards	TB4 Reg	TIBU			TB5 Cards	TB4 Reg	TIBU			Agree- ment (TB5 cards Vs TB4 Reg)	Agree- ment (TIBU vs TB4 Reg)
Kaka- mega	Butere	22	53	48	42%	91%	26	76	63	34%	83%	38%	87%
	Ikolomani	66	123	112	54%	91%	103	146	130	71%	89%	62%	90%
<b>Kakamega County</b>		<b>88</b>	<b>176</b>	<b>160</b>	<b>50%</b>	<b>91%</b>	<b>129</b>	<b>222</b>	<b>193</b>	<b>58%</b>	<b>87%</b>	<b>54%</b>	<b>89%</b>
Kisii	Bobasi	75	94	94	80%	100%	82	94	96	87%	102%	84%	101%
	Boma- choge Borabu	69	79	76	87%	96%	46	64	53	72%	83%	80%	90%
<b>Kisii County</b>		<b>144</b>	<b>173</b>	<b>170</b>	<b>83%</b>	<b>98%</b>	<b>128</b>	<b>158</b>	<b>149</b>	<b>81%</b>	<b>94%</b>	<b>82%</b>	<b>96%</b>
Murang'a	Gatanga	157	190	173	83%	91%	178	185	165	96%	89%	89%	90%
	Kahuro	85	96	95	89%	99%	92	96	99	96%	103%	92%	101%
<b>Murang'a County</b>		<b>242</b>	<b>286</b>	<b>268</b>	<b>85%</b>	<b>94%</b>	<b>270</b>	<b>281</b>	<b>264</b>	<b>96%</b>	<b>94%</b>	<b>90%</b>	<b>94%</b>
Nairobi	Dagoretti North	197	379	402	52%	106%	225	318	365	71%	115%	61%	110%
	Dagoretti South	103	161	169	64%	105%	133	176	168	76%	95%	70%	100%
<b>Nairobi County</b>		<b>300</b>	<b>540</b>	<b>571</b>	<b>56%</b>	<b>106%</b>	<b>358</b>	<b>494</b>	<b>533</b>	<b>72%</b>	<b>108%</b>	<b>64%</b>	<b>107%</b>
Nandi	Aldai	60	51	58	118%	114%	54	54	55	100%	102%	109%	108%
	Chesumei	70	96	77	73%	80%	62	115	84	54%	73%	63%	77%
<b>Nandi County</b>		<b>130</b>	<b>147</b>	<b>135</b>	<b>88%</b>	<b>92%</b>	<b>116</b>	<b>169</b>	<b>139</b>	<b>69%</b>	<b>82%</b>	<b>79%</b>	<b>87%</b>
Taita Taveta	Mwatate	45	65	52	69%	80%	45	55	44	82%	80%	76%	80%
	Taveta	49	87	86	56%	99%	58	61	65	95%	107%	76%	103%
<b>Taita Taveta County</b>		<b>94</b>	<b>152</b>	<b>138</b>	<b>62%</b>	<b>91%</b>	<b>103</b>	<b>116</b>	<b>109</b>	<b>89%</b>	<b>94%</b>	<b>75%</b>	<b>92%</b>
Wajir	Wajir East	264	283	274	93%	97%	172	189	191	91%	101%	92%	99%
	Wajir West	35	39	39	90%	100%	44	42	43	105%	102%	97%	101%
<b>Wajir County</b>		<b>299</b>	<b>322</b>	<b>313</b>	<b>93%</b>	<b>97%</b>	<b>216</b>	<b>231</b>	<b>234</b>	<b>94%</b>	<b>101%</b>	<b>93%</b>	<b>99%</b>
<b>Kenya</b>		<b>1297</b>	<b>1796</b>	<b>1755</b>	<b>72%</b>	<b>98%</b>	<b>1320</b>	<b>1671</b>	<b>1621</b>	<b>79%</b>	<b>97%</b>	<b>76%</b>	<b>97%</b>

The overall level of agreement between TB patient record cards and facility registers was 76% while it was 97% between TIBU and the facility register. Regarding patient record cards and facility registers, Butere had the least (38%) while Aldai had more at 109%.

Comparing TIBU and facility registers, Chesumei had the least records (77%) while Aldai (108%) and Dagoretti North (110%) had more.

The level of agreement between TIBU data with facility TB registers for bacteriologically-confirmed (BC) TB in 2018 was 98% and 97% in 2019. Comparing TB patient record cards and facility registers, the agreement was 72% in 2018 and 79% in 2019.



Only Aldai Sub County was above the threshold of reporting at 118% between patient record cards and facility registers and 114% between TIBU and facility registers. The rest of the sub counties were below 95% with Butere recording the lowest at 42%.

In 2018, seven sub counties were within the acceptable range between TIBU and facility registers while in 2019 five sub counties met the required threshold.

In conclusion, utilization of TB patients record cards in Butere was too low (38%) indicating poor documentation.

**Table 2b: Levels of agreement for aggregated data for Clinically Diagnosed TB in Patient record cards and TIBU data in comparison to TB4 facility registers**

County	Sub Counties	2018			Agree- ment (TB5 Cards vs TB4 Reg)	Agree- ment (TIBU vs TB4 Reg)	2019			Agree- ment (TB5 Cards vs TB4 Reg)	Agree- ment (TIBU vs TB4 Reg)	Average (2018/2019)	
		TB5 Cards	TB4 Reg	TIBU			TB5 Cards	TB4 Reg	TIBU			Agree- ment (TB5 cards Vs TB4 Reg)	Agree- ment (TIBU vs TB4 Reg)
Kaka- mega	Butere	44	99	93	44%	94%	53	79	71	67%	90%	56%	92%
	Ikolomani	48	87	77	55%	89%	52	90	78	58%	87%	56%	88%
<b>Kakamega County</b>		<b>92</b>	<b>186</b>	<b>170</b>	<b>49%</b>	<b>91%</b>	<b>105</b>	<b>169</b>	<b>149</b>	<b>62%</b>	<b>88%</b>	<b>56%</b>	<b>90%</b>
Kisii	Bobasi	43	50	44	86%	88%	42	57	48	74%	84%	80%	86%
	Bomachoge Borabu	43	42	43	102%	102%	35	49	48	71%	98%	87%	100%
<b>Kisii County</b>		<b>86</b>	<b>92</b>	<b>87</b>	<b>93%</b>	<b>95%</b>	<b>77</b>	<b>106</b>	<b>96</b>	<b>73%</b>	<b>91%</b>	<b>83%</b>	<b>93%</b>
Murang'a	Gatanga	82	105	89	78%	85%	76	76	64	100%	84%	89%	84%
	Kahuro	79	124	94	64%	76%	72	79	75	91%	95%	77%	85%
<b>Murang'a County</b>		<b>161</b>	<b>229</b>	<b>183</b>	<b>70%</b>	<b>80%</b>	<b>148</b>	<b>155</b>	<b>139</b>	<b>95%</b>	<b>90%</b>	<b>83%</b>	<b>85%</b>
Nairobi	Dagoretti North	67	231	200	29%	87%	129	252	224	51%	89%	40%	88%
	Dagoretti South	53	75	63	71%	84%	82	78	64	105%	82%	88%	83%
<b>Nairobi County</b>		<b>120</b>	<b>306</b>	<b>263</b>	<b>39%</b>	<b>86%</b>	<b>211</b>	<b>330</b>	<b>288</b>	<b>64%</b>	<b>87%</b>	<b>52%</b>	<b>87%</b>
Nandi	Aldai	19	20	20	95%	100%	7	13	3	54%	23%	74%	62%
	Chesumei	18	32	20	56%	63%	7	10	4	70%	40%	63%	51%
<b>Nandi County</b>		<b>37</b>	<b>52</b>	<b>40</b>	<b>71%</b>	<b>77%</b>	<b>14</b>	<b>23</b>	<b>7</b>	<b>61%</b>	<b>30%</b>	<b>66%</b>	<b>54%</b>
Taita Taveta	Mwatate	46	60	53	77%	88%	28	26	19	108%	73%	92%	81%
	Taveta	41	67	56	61%	84%	34	38	31	89%	82%	75%	83%
<b>Taita Taveta County</b>		<b>87</b>	<b>127</b>	<b>109</b>	<b>69%</b>	<b>86%</b>	<b>62</b>	<b>64</b>	<b>50</b>	<b>97%</b>	<b>78%</b>	<b>83%</b>	<b>82%</b>
Wajir	Wajir East	137	205	135	67%	66%	111	202	131	55%	65%	61%	65%
	Wajir West	12	35	18	34%	51%	14	24	16	58%	67%	46%	59%
<b>Wajir County</b>		<b>149</b>	<b>240</b>	<b>153</b>	<b>62%</b>	<b>64%</b>	<b>125</b>	<b>226</b>	<b>147</b>	<b>55%</b>	<b>65%</b>	<b>59%</b>	<b>64%</b>
<b>Kenya</b>		<b>732</b>	<b>1232</b>	<b>1005</b>	<b>59%</b>	<b>82%</b>	<b>742</b>	<b>1073</b>	<b>876</b>	<b>69%</b>	<b>82%</b>	<b>64%</b>	<b>82%</b>

## Agreement between TB facility Register and TIBU

The overall level of agreement between TB4 and TIBU was 82% in both 2018 and 2019. Out of the 14 sub counties visited, only one (Bomachoge Borabu) performed within the acceptable reporting range. Kahuro and Wajir West Sub counties were the most improved between 2018 and 2019 while Aldai, Chesumei and Mwatate had the biggest drop in the period of assessment. Aldai (62%) and Chesumei (51%) reported the least level of agreement among the sub counties visited.

## Agreement between patient record cards and TB facility register

The overall level of agreement between the patient record card and facility register was at 64%. None of the sub counties visited was able to report a level of concordance that was within the acceptable range. Wajir West (46%), Dagoretti North (40%), Butere (56%) and Ikolomani (56%) had the least level of agreement.

**Table 3: Levels of agreement for aggregated data for Extra Pulmonary TB in Patient record cards and TIBU data in comparison to TB4 facility registers**

County	Sub Counties	2018			Agreement (TB5 Cards vs TB4 Reg)	Agreement (TIBU vs TB4 Reg)	2019			Agreement (TB5 Cards vs TB4 Reg)	Agreement (TIBU vs TB4 Reg)	Average (2018/2019)	
		TB5 Cards	TB4 Reg	TIBU			TB5 Cards	TB4 Reg	TIBU			Agreement (TB5 cards Vs TB4 Reg)	Agreement (TIBU vs TB4 Reg)
Kakamega	Butere	7	16	12	44%	75%	9	30	26	30%	87%	37%	81%
	Ikolomani	6	12	9	50%	75%	13	21	17	62%	81%	56%	78%
<b>Kakamega County</b>		<b>13</b>	<b>28</b>	<b>21</b>	<b>46%</b>	<b>75%</b>	<b>22</b>	<b>51</b>	<b>43</b>	<b>43%</b>	<b>84%</b>	<b>45%</b>	<b>80%</b>
Kisii	Bobasi	7	12	10	58%	83%	10	14	12	71%	86%	65%	85%
	Bomachoge Borabu	9	23	21	39%	91%	21	23	22	91%	96%	65%	93%
<b>Kisii County</b>		<b>16</b>	<b>35</b>	<b>31</b>	<b>46%</b>	<b>89%</b>	<b>31</b>	<b>37</b>	<b>34</b>	<b>84%</b>	<b>92%</b>	<b>65%</b>	<b>90%</b>
Murang'a	Gatanga	28	23	23	122%	100%	31	21	15	148%	71%	135%	86%
	Kahuro	20	23	27	87%	117%	12	8	13	150%	163%	118%	140%
<b>Murang'a County</b>		<b>48</b>	<b>46</b>	<b>50</b>	<b>104%</b>	<b>109%</b>	<b>43</b>	<b>29</b>	<b>28</b>	<b>148%</b>	<b>97%</b>	<b>126%</b>	<b>103%</b>
Nairobi	Dagoretti North	49	232	226	21%	97%	70	247	231	28%	94%	25%	95%
	Dagoretti South	31	48	46	65%	96%	44	50	46	88%	92%	76%	94%
<b>Nairobi County</b>		<b>80</b>	<b>280</b>	<b>272</b>	<b>29%</b>	<b>97%</b>	<b>114</b>	<b>297</b>	<b>277</b>	<b>38%</b>	<b>93%</b>	<b>33%</b>	<b>95%</b>
Nandi	Aldai	17	12	13	142%	108%	8	6	5	133%	83%	138%	96%
	Chesumei	14	20	18	70%	90%	7	14	14	50%	100%	60%	95%
<b>Nandi County</b>		<b>31</b>	<b>32</b>	<b>31</b>	<b>97%</b>	<b>97%</b>	<b>15</b>	<b>20</b>	<b>19</b>	<b>75%</b>	<b>95%</b>	<b>86%</b>	<b>96%</b>
Taita Taveta	Mwatate	13	19	15	68%	79%	9	14	7	64%	50%	66%	64%
	Taveta	10	10	10	100%	100%	9	12	10	75%	83%	88%	92%
<b>Taita Taveta County</b>		<b>23</b>	<b>29</b>	<b>25</b>	<b>79%</b>	<b>86%</b>	<b>18</b>	<b>26</b>	<b>17</b>	<b>69%</b>	<b>65%</b>	<b>74%</b>	<b>76%</b>
Wajir	Wajir East	82	85	80	96%	94%	56	80	66	70%	83%	83%	88%
	Wajir West	17	15	12	113%	80%	9	15	11	60%	73%	87%	77%
<b>Wajir County</b>		<b>99</b>	<b>100</b>	<b>92</b>	<b>99%</b>	<b>92%</b>	<b>65</b>	<b>95</b>	<b>77</b>	<b>68%</b>	<b>81%</b>	<b>84%</b>	<b>87%</b>
<b>Kenya</b>		<b>310</b>	<b>550</b>	<b>522</b>	<b>56%</b>	<b>95%</b>	<b>308</b>	<b>555</b>	<b>495</b>	<b>55%</b>	<b>89%</b>	<b>56%</b>	<b>92%</b>

The agreement in EPTB cases reported between facility register and TIBU averaged 92%, which was slightly below the acceptable range. The findings in Kahuro sub county at 140% implies that there were more EPTB cases in TIBU than in the facility register. In Mwatate, Wajir West, and Ikolomani sub counties, there were less EPTB cases in facility register than in TIBU.

There was a low level of agreement in documentation of correct type of TB between facility register and patient record cards at 56%. This was largely observed in Dagoretti North (25%), Butere (37%), Ikolomani (56%) and Chesumei (60%).

Classification of TB by anatomy guides in understanding the location of TB among the patients and subsequently their planning and management. The findings demonstrated 8% discrepancy between facility register and TIBU, an indication of possible under reporting of ETPB to the national surveillance system. In addition, there was a discrepancy between the patient record cards and facility register implying that the type of TB is not being updated.

### Aggregated patient outcomes

**Table 4a: Levels of agreement for aggregated data for Cured outcomes for TB in Patient record cards and TIBU data in comparison to TB4 facility registers**

County	Sub Counties	TB5 Cards	TB4 Reg	TIBU	Agreement (TB5 Cards vs TB4 Reg)	Agreement (TIBU vs TB4 Reg)
Kakamega	Butere	8	40	45	20%	113%
	Ikolomani	15	80	76	19%	95%
<b>Kakamega County</b>		<b>23</b>	<b>120</b>	<b>121</b>	<b>19%</b>	<b>101%</b>
Kisii	Bobasi	60	84	83	71%	99%
	Bomachoge Borabu	18	66	60	27%	91%
<b>Kisii County</b>		<b>78</b>	<b>150</b>	<b>143</b>	<b>52%</b>	<b>95%</b>
Murang'a	Gatanga	86	117	109	74%	93%
	Kahuro	40	83	68	48%	82%
<b>Murang'a County</b>		<b>126</b>	<b>200</b>	<b>177</b>	<b>63%</b>	<b>89%</b>
Nairobi	Dagoretti North	154	227	248	68%	109%
	Dagoretti South	40	114	124	35%	109%
<b>Nairobi County</b>		<b>194</b>	<b>341</b>	<b>372</b>	<b>57%</b>	<b>109%</b>
Nandi	Aldai	39	41	46	95%	112%
	Chesumei	22	67	56	33%	84%
<b>Nandi County</b>		<b>61</b>	<b>108</b>	<b>102</b>	<b>56%</b>	<b>94%</b>
Taita Taveta	Mwatate	18	30	32	60%	107%
	Taveta	18	59	59	31%	100%
<b>Taita Taveta County</b>		<b>36</b>	<b>89</b>	<b>91</b>	<b>40%</b>	<b>102%</b>
Wajir	Wajir East	198	232	246	85%	106%
	Wajir West	22	25	33	88%	132%
<b>Wajir County</b>		<b>220</b>	<b>257</b>	<b>279</b>	<b>86%</b>	<b>109%</b>
<b>Kenya</b>		<b>738</b>	<b>1265</b>	<b>1285</b>	<b>58%</b>	<b>102%</b>

The level of agreement between the patient record cards and facility register was 58%, implying under-utilization of the record cards. In seven sub counties, the level of agreement was below 50%. These were; Butere (20%), Ikolomani (19%) Bomachoge Borabu (27%) Kahuro (48%), Dagoretti South (35%), Chesumei (33%) and Taveta (31%).

The level of agreement between facility register and TIBU was at 102%. While this indicator was within the acceptable range, it was noted that there were more cases assigned an outcome of cured (2%) in TIBU than the facility register. Only Taveta sub county had a 100% level of agreement. This meant that wrong documentation of outcomes was persistently witnessed in the patients' records. It is therefore likely that HCWs may not have a clear understanding and application of the terms "cured" and "treatment complete"

**Table 4b: Levels of agreement for aggregated data for Treatment Completed outcomes for TB in Patient record cards and TIBU data in comparison to TB4 facility registers**

County	Sub Counties	TB5 Cards	TB4 Reg	TIBU	Agreement (TB5 Cards vs TB4 Reg)	Agreement (TIBU vs TB4 Reg)
Kakamega	Butere	10	63	89	16%	141%
	Ikolomani	20	102	99	20%	97%
Kakamega County		30	165	188	18%	114%
Kisii	Bobasi	50	53	54	94%	102%
	Bomachoge Borabu	33	60	68	55%	113%
Kisii County		83	113	122	73%	108%
Murang'a	Gatanga	65	135	119	48%	88%
	Kahuro	49	95	106	52%	112%
Murang'a County		114	230	225	50%	98%
Nairobi	Dagoretti North	90	419	506	21%	121%
	Dagoretti South	27	108	112	25%	104%
Nairobi County		117	527	618	22%	117%
Nandi	Aldai	20	32	29	63%	91%
	Chesumei	18	43	39	42%	91%
Nandi County		38	75	68	51%	91%
Taita Taveta	Mwatate	23	77	58	30%	75%
	Taveta	25	68	83	37%	122%
Taita Taveta County		48	145	141	33%	97%
Wajir	Wajir East	152	146	209	104%	143%
	Wajir West	27	32	34	84%	106%
Wajir County		179	178	243	101%	137%
Kenya		609	1433	1605	42%	112%

The overall level of agreement between facility register and TIBU was 112%, which was above the acceptable range. Ikolomani, Bobasi and Dagoretti South sub counties reported agreements within the acceptable range while Butere (141%), Bomachoge Borabu (113%), Kahuro (112%), Dagoretti North (121%), Taveta (122%) and Wajir East (143%) reported high level of disagreement.

The overall level of agreement between the patient record card and facility register was at 42% with Wajir East (104%) being the only sub county within the acceptable range. The counties that performed below the range included Kakamega (18%), Nairobi (22%) and Taita Taveta (33%).

This may be attributed to the current practice of notification at point of diagnosis, knowledge gap among HCWs on outcomes definitions and failure to update facility TB records post data validation meetings at sub county level.



**Table 4c: Levels of agreement for aggregated data for Death outcomes for TB in Patient record cards and TIBU data in comparison to TB4 facility registers**

County	Sub Counties	TB5 Cards	TB4 Reg	TIBU	Agreement (TB5 Cards vs TB4 Reg)	Agreement (TIBU vs TB4 Reg)
Kakamega	Butere	8	17	17	47%	100%
	Ikolomani	4	26	23	15%	88%
<b>Kakamega County</b>		<b>12</b>	<b>43</b>	<b>40</b>	<b>28%</b>	<b>93%</b>
Kisii	Bobasi	8	10	7	80%	70%
	Bomachoge Borabu	3	9	8	33%	89%
<b>Kisii County</b>		<b>11</b>	<b>19</b>	<b>15</b>	<b>58%</b>	<b>79%</b>
Murang'a	Gatanga	8	27	23	30%	85%
	Kahuro	2	11	14	18%	127%
<b>Murang'a County</b>		<b>10</b>	<b>38</b>	<b>37</b>	<b>26%</b>	<b>97%</b>
Nairobi	Dagoretti North	10	42	39	24%	93%
	Dagoretti South	5	27	28	19%	104%
<b>Nairobi County</b>		<b>15</b>	<b>69</b>	<b>67</b>	<b>22%</b>	<b>97%</b>
Nandi	Aldai	4	7	7	57%	100%
	Chesumei	0	5	4	0%	80%
<b>Nandi County</b>		<b>4</b>	<b>12</b>	<b>11</b>	<b>33%</b>	<b>92%</b>
Taita Taveta	Mwatate	10	24	21	42%	88%
	Taveta	0	6	3	0%	50%
<b>Taita Taveta County</b>		<b>10</b>	<b>30</b>	<b>24</b>	<b>33%</b>	<b>80%</b>
Wajir	Wajir East	46	52	24	88%	46%
	Wajir West	3	3	2	100%	67%
<b>Wajir County</b>		<b>49</b>	<b>55</b>	<b>26</b>	<b>89%</b>	<b>47%</b>
<b>Kenya</b>		<b>111</b>	<b>266</b>	<b>220</b>	<b>42%</b>	<b>83%</b>

The findings showed that there were 17% less deaths reported in TIBU compared to facility register. Acceptable level of agreements was noted in Butere (100%), Aldai (100%) and Dagoretti South (104%). Wajir East, Taveta and Wajir West sub counties reported less deaths in the facility register compared to TIBU. Kahuro sub county had more deaths documented in TIBU than facility register.

The agreement between facility register and patient record cards was low at 42%, an indication of gaps in updating outcomes in patient record cards. This was reflected in most of the sub counties visited. Only Wajir West had 100% agreement between the facility register and patient record cards. In Taveta and Chesumei sub counties, the death outcomes were not updated in patient record cards.

As the country walks to achieve the set target on zero TB deaths, accurate information on the proportion of patients dying while on TB treatment is important.

**Table 5a: Availability of Patient record cards and TIBU data in comparison to TB4 facility registers (case-based data)**

County	Sub county	Numbers			Agreement	
		Patient Record cards	TB4 registers	TIBU	TB4 registers vs Record cards	TB4 registers vs TIBU
Kakamega	Butere	18	27	27	67%	100%
	Ikolomani	21	32	32	66%	100%
Kisii	Bobasi	20	23	22	87%	96%
	Bomachoge Borabu	15	17	17	88%	100%
Murang'a	Gatanga	31	35	32	89%	91%
	Kahuro	19	23	18	83%	78%
Nairobi	Dagoretti North	13	38	38	34%	100%
	Dagoretti South	22	26	24	85%	92%
Nandi	Aldai	13	14	14	93%	100%
	Chesumei	11	16	16	69%	100%
Taita Taveta	Mwatate	21	22	22	95%	100%
	Taveta	7	11	11	64%	100%
Wajir	Wajir East	9	9	9	100%	100%
	Wajir West	12	12	12	100%	100%
<b>Kenya</b>		<b>232</b>	<b>305</b>	<b>294</b>	<b>76%</b>	<b>96%</b>

TB Patient record cards are essential tools that contain crucial information about the patient and informs the delivery of quality of care. Out of the 305 sampled records in the Facility TB registers, 76% had record cards available and 96% were notified in TIBU. Comparing the records from facility register and TIBU, all sub counties except Gatanga (91%), Kahuro (78%), and Dagoretti South (92%) were within the expected range.

In terms of availability of patient record cards, Wajir East, Wajir West and Mwatate sub counties were within the expected range. The remaining eleven sub counties under-utilized patient record cards which reflected poor documentation and was likely to have compromised delivery of quality TB care.

Some of the observed factors that could have led to under-utilization were attributed to:

- Facilities embracing EMRs as opposed to hard copy TB patient cards. In addition, some of the EMRs tools have not fully integrated the variables for recording TB services.
- Shortages of recording tools occasioned by distribution within the counties.
- HCWs attitude citing high workload.

**Table 5b: Sub-county registration numbers in Patient record cards and TB4 facility registers in comparison to TIBU data (case-based data)**

County	Subcounty	Number				Agreement	
		Matched Patient Record cards with TIBU	Total Record cards available	Matched TB4 registers with TIBU	Total available in TB4 registers	TIBU vs Record cards	TIBU vs TB4 registers
Kakamega	Butere	16	18	26	27	59%	96%
	Ikolomani	18	21	31	32	56%	97%
Kisii	Bobasi	18	20	22	23	78%	96%
	Bomachoge Borabu	11	15	15	17	65%	88%
Murang'a	Gatanga	7	31	13	35	20%	37%
	Kahuro	2	19	2	23	9%	9%
Nairobi	Dagoretti North		13	6	38	0%	16%
	Dagoretti South	10	22	24	26	38%	92%
Nandi	Aldai	11	13	12	14	79%	86%
	Chesumei	2	11	2	16	13%	13%
Taita Taveta	Mwatate	19	21	22	22	86%	100%
	Taveta	5	7	10	11	45%	91%
Wajir	Wajir East	5	9	9	9	56%	100%
	Wajir West	11	12	12	12	92%	100%
Total		<b>135</b>	232	<b>206</b>	305	44%	68%

Sub county registration number is a unique number assigned to a patient in each sub county to denote that they have been notified in the national surveillance system (TIBU). This number is automatically generated by the TIBU system upon patient notification. Out of the 232 record cards available, only 135 (44%) of the patient record cards had the sub county registration number correctly indicated; while in facility registers, the proportion was 68%. Six sub counties were within the acceptable range in documentation of sub county registration number between facility register and TIBU. These were Wajir West (100%), Wajir East (100%), Mwatate (100%), Bobasi (96%), Ikolomani (97%) and Butere (96%).

This clearly indicates that there might be omission and distortion of data during transcription. Gaps were also evident in the documentation when staff at the chest clinic proceeded on leave.

**Table 5c: Registration dates in TB4 facility registers in comparison to TIBU data (case-based data)**

County	Sub county	Numbers		Agreement
		Matched TB4 registers with TIBU	Total available in TB4 registers	TIBU vs TB4 registers
Kakamega	Butere	11	27	41%
	Ikolomani	20	32	63%
Kisii	Bobasi	20	23	87%
	Bomachoge Borabu	10	17	59%

Murang'a	Gatanga	26	35	74%
	Kahuro	14	23	61%
Nairobi	Dagoretti North	12	38	32%
	Dagoretti South	4	26	15%
Nandi	Aldai	12	14	86%
	Chesumei	10	16	63%
Taita Taveta	Mwatate	21	22	95%
	Taveta	5	11	45%
Wajir	Wajir East	4	9	44%
	Wajir West	9	12	75%
<b>Total</b>		<b>178</b>	<b>305</b>	<b>58%</b>

Date of registration is when the patient is notified in the national surveillance system (TIBU) and the same is transcribed to the facility register. This assists in establishing time taken to notification after treatment initiation. It is expected that the SCTLN notifies patients during the visits to the health facility. These dates must be consistent in both TIBU and facility register.

Out of the 305 sampled records, 178 records in facility register had the date of registration documented giving 58% matching of dates of registration between facility register and TIBU. Only Mwatate (95%) had their records matched within the acceptable range. The sub counties with the lowest match on the date of registration included Dagoretti South (15%), Dagoretti North (32%), Butere (41%), Wajir East (44%) and Taveta (45%).

This variation could be due to failure to document in the facility register after notification in TIBU or the HCW assigning the date of start of treatment in place of date of registration.

**Table 5d: Type of patient in Patient record cards and TIBU data in comparison to TB4 facility registers (case-based data)**

County	Sub county	Numbers				Agreement	
		Matched Patient Record cards with TB4 registers	Total Record cards available	Matched TIBU with TB4 registers	Total available in TB4	TB4 registers vs Record card	TB4 registers vs TIBU
Kakamega	Butere	4	18	23	27	15%	85%
	Ikolomani	1	21	21	32	3%	66%
Kisii	Bobasi		20	18	23	0%	78%
	Bomachoge Borabu	1	15	12	17	6%	71%
Murang'a	Gatanga		31	27	35	0%	77%
	Kahuro	1	19	14	23	4%	61%
Nairobi	Dagoretti North	3	13	26	38	8%	68%
	Dagoretti South	1	22	20	26	4%	77%
Nandi	Aldai	5	13	12	14	36%	86%
	Chesumei	7	11	15	16	44%	94%
Taita Taveta	Mwatate	3	21	18	22	14%	82%
	Taveta		7	10	11	0%	91%
Wajir	Wajir East		9	4	9	0%	44%
	Wajir West	1	12	9	12	8%	75%
<b>Total</b>		<b>27</b>	<b>232</b>	<b>229</b>	<b>305</b>	<b>9%</b>	<b>75%</b>

The overall performance in documentation of type of patient in TIBU in comparison to facility register in the sub counties visited was at 75%, below the acceptable range. Chusumei (94%), Taveta (91%) and Aldai 86% recorded the highest matches. All the other sub counties sampled showed high discrepancies in documentation on the type of patient between the facility register and TIBU.

Comparing the patient record cards with the facility register, performance was at 9% for the sampled sub counties which was below the targeted acceptable matching range (95-105%). The following sub counties recorded 0% i.e. Bobasi, Gatanga, Ikolomani, Taveta and Wajir East.

This is due to missing variable for recording the type of patient details in the patient record card, therefore there is need for revision of the current version of patient record cards to match the facility TB register and TIBU.

**Table 5e: Treatment start dates in Patient record cards and TIBU data in comparison to TB4 facility registers (case-based data)**

County	Sub county	Numbers				Agreement	
		Matched Patient Record cards with TB4 register	Total Record cards available	Matched TIBU with TB4 registers	Total available in TB4	TB4 registers vs Record card	TB4 registers vs TIBU
Kakamega	Butere	15	18	23	27	56%	85%
	Ikolomani	14	21	25	32	44%	78%
Kisii	Bobasi	14	20	19	23	61%	83%
	Bomachoge Borabu	14	15	15	17	82%	88%
Murang'a	Gatanga	22	31	29	35	63%	83%
	Kahuro	14	19	15	23	61%	65%
Nairobi	Dagoretti North	8	13	26	38	21%	68%
	Dagoretti South	13	22	15	26	50%	58%
Nandi	Aldai	12	13	13	14	86%	93%
	Chusumei	10	11	13	16	63%	81%
Taita Taveta	Mwatate	19	21	22	22	86%	100%
	Taveta	6	7	11	11	55%	100%
Wajir	Wajir East	5	9	7	9	56%	78%
	Wajir West	10	12	11	12	83%	92%
Total		176	232	244	305	58%	80%

In this assessment, 80% of the records with treatment start dates were correctly matched between the facility TB register and TIBU. The sub counties that were within the acceptable range were, Mwatate and Taveta at 100%.

The least scoring sub counties were Dagoretti South (58%), Kahuro (65%) and Dagoretti North (68%).

The concurrence between patient record cards and facility TB register was at 58% with none of the sampled sub counties attaining the acceptable range. The least scoring sub counties in this indicator were Dagoretti North (21%), Ikolomani (44%) and Dagoretti South (50%). These gaps could be attributed to transcription errors during notification.

**Table 5f: Gene Xpert results in Patient record cards and TIBU data in comparison to TB4 facility registers (case-based data)**

County	Sub county	Numbers				Agreement	
		Matched Patient Record cards with TB4 registers	Total Record cards available	Matched TIBU with TB4 registers	Available in facility register	TB4 registers vs Record cards	TB4 registers vs TIBU
Kakamega	Butere	13	18	24	27	48%	89%
	Ikolomani	20	21	30	32	63%	94%
Kisii	Bobasi	20	20	22	23	87%	96%
	Bomachoge Borabu	7	15	15	17	41%	88%
Murang'a	Gatanga	26	31	26	35	74%	74%
	Kahuro	17	19	14	23	74%	61%
Nairobi	Dagoretti North	11	13	33	38	29%	87%
	Dagoretti South	12	22	19	26	46%	73%
Nandi	Aldai	10	13	9	14	71%	64%
	Chesumei	9	11	14	16	56%	88%
Taita Taveta	Mwatate	16	21	17	22	73%	77%
	Taveta	6	7	7	11	55%	64%
Wajir	Wajir East	8	9	7	9	89%	78%
	Wajir West	12	12	12	12	100%	100%
<b>Total</b>		<b>187</b>	<b>232</b>	<b>249</b>	<b>305</b>	<b>61%</b>	<b>82%</b>

Out of the 305 TB records sampled from facility register, 249(82%) matched the GeneXpert results in TIBU.

The overall match was at 82% with Bobasi (96%) and Wajir West (100%) reporting within the acceptable range, while the least matched were Kahuro (61%), Taveta (64%) and Aldai (64%).

The concurrence between facility TB register and patient record cards was at 61%. Only Wajir West met the acceptable range at 100%. The least performing sub counties were Dagoretti North, Bomachoge Borabu, Dagoretti South and Butere at 29%, 41%, 46% and 48% respectively.

The discrepancies could be attributed to data transcription and knowledge gap of the HCWs especially on Gene xpert result documentation in the patient record card.

GeneXpert results guides initiation to TB treatment. The discrepancy of 13% could mean that clients were treated with inconsistent diagnostic results, which may have affected the quality of care provided.



**Table 5g: Month zero smear results in Patient record cards and TIBU data in comparison to TB4 facility registers (case-based data)**

County	Sub county	Numbers				Agreement	
		Matched Patient Record cards with TB4 registers	Total Record cards available	Matched TIBU with TB4 registers	Total available in TB4	TB4 registers vs Record cards	TB4 registers vs TIBU
Kakamega	Butere	15	18	17	27	56%	63%
	Ikolomani	18	21	21	32	56%	66%
Kisii	Bobasi	17	20	17	23	74%	74%
	Bomachoge Borabu	15	15	14	17	88%	82%
Murang'a	Gatanga	28	31	28	35	80%	80%
	Kahuro	16	19	12	23	70%	52%
Nairobi	Dagoretti North	11	13	13	38	29%	34%
	Dagoretti South	20	22	17	26	77%	65%
Nandi	Aldai	11	13	7	14	79%	50%
	Chesumei	11	11	10	16	69%	63%
Taita Taveta	Mwatate	16	21	17	22	73%	77%
	Taveta	7	7	5	11	64%	45%
Wajir	Wajir East	9	9	8	9	100%	89%
	Wajir West	12	12	12	12	100%	100%
Total		206	232	198	305	68%	65%

The findings showed an overall low match in documentation of month zero sputum smear results between facility register and TIBU (65%).

Dagoretti North (34%), Taveta (45%), Aldai (50%), Butere (62%) and Ikolomani (65%) sub counties had the least matches. Generally, most of the sub counties were below 70%, an indication of gaps in documentation of month zero smear results. Only Wajir West achieved 100% match.

The agreement in documentation of month zero smear between facility register and patient record cards was also low at 70%, an indication of gaps in correctly updating this variable in the two tools. This was reflected in most of the sub counties sampled. Only Wajir West and Wajir East had 100% match. Dagoretti North (29%), Butere (56%), Ikolomani (56%), Taveta (64%) and Chesumei (68%) sub counties were least matched.

Sputum smear results remain a key variable in TB patient management. The baseline sputum smear guides in patient classification (either bacteriological or clinical). This information remains critical in guiding contact management and subsequent patient follow up visits.

High levels of mismatch across recording and reporting tools points to possibilities of misleading information and suboptimal patient care during treatment.

**Table 5g: Month zero smear results date in Patient record cards and TIBU data in comparison to TB4 facility registers (case-based data)**

County	Sub county	Numbers				Agreement	
		Matched Patient Record cards with TB4 registers	Total Record cards available	Matched TIBU with TB4 registers	Total available in TB4	TB4 registers vs Record cards	TB4 registers vs TIBU
Kakamega	Butere	2	18	4	27	7%	15%
	Ikolomani	6	21	10	32	19%	31%
Kisii	Bobasi	6	20	10	23	26%	43%
	Bomachoge Borabu	3	15	4	17	18%	24%
Murang'a	Gatanga	19	31	21	35	54%	60%
	Kahuro	9	19	5	23	39%	22%
Nairobi	Dagoretti North	3	13	2	38	8%	5%
	Dagoretti South	4	22	2	26	15%	8%
Nandi	Aldai	4	13	5	14	29%	36%
	Chesumei		11	5	16	0%	31%
Taita Taveta	Mwatate	1	21	2	22	5%	9%
	Taveta	3	7	2	11	27%	18%
Wajir	Wajir East	7	9	2	9	78%	22%
	Wajir West	12	12	5	12	100%	42%
Total		79	232	79	305	26%	26%

Out of the 305 sampled records from the facility register, only 26% had the dates of month zero sputum smear results matching with TIBU. Comparing with patient record cards, 26% of the records were correctly matched with the facility registers with peak agreements of 100% in Wajir West.

Documentation of dates in which the sputum test is done is important as it enhances the quality of care the patient receives through timely sputum follow up tests.

The high discrepancies seen across the tools therefore points to gaps which include delayed (missed opportunities) DRTB surveillance and poor patient pack management.

Proper documentation of the same across the core documents also lays basis for assigning of proper outcomes at the end of treatment. While one sub county recorded acceptable levels of agreements, the importance of continuous mentorship cannot be underscored.

**Table 5g: Month Zero serial numbers in patient record cards and TIBU in comparison to TB4 facility registers (case-based data)**

County	Sub county	Numbers				Agreement	
		Matched Patient Record cards with TB4 registers	Total Record cards available	Matched TIBU with TB4 registers	Total available in TB4	TB4 registers vs Record cards	TB4 registers vs TIBU
Kakamega	Butere	2	18	4	27	7%	15%
	Ikolomani	3	21	10	32	9%	31%
Kisii	Bobasi	7	20	10	23	30%	43%
	Bomachoge Borabu	3	15	3	17	18%	18%
Murang'a	Gatanga	14	31	8	35	40%	23%
	Kahuro	9	19	5	23	39%	22%
Nairobi	Dagoretti North	2	13	1	38	5%	3%
	Dagoretti South	4	22	3	26	15%	12%
Nandi	Aldai	5	13	4	14	36%	29%
	Chesumei	1	11	4	16	6%	25%
Taita Taveta	Mwatate	2	21	2	22	9%	9%
	Taveta	4	7	4	11	36%	36%
Wajir	Wajir East	7	9	3	9	78%	33%
	Wajir West	12	12	7	12	100%	58%
<b>Total</b>		<b>75</b>	<b>232</b>	<b>68</b>	<b>305</b>	<b>25%</b>	<b>22%</b>

Out of the 305 sampled records from facility registers, 22% had the month zero smear results serial numbers matching with TIBU.

Comparing with patient record cards, 25% of the records were correctly matched with the facility registers with peak agreements of 100% witnessed in Wajir West.

Serial numbers of the sputum smear results provide proof of conducting sputum smears. It provides a basis for tracking the results across the recording tools which is critical for care of patients. Low matches therefore imply that there was inadequate laboratory-clinical interface in the facilities visited.

Serialization of smears help avoid mix-up during sample testing and act as evidence that the test was carried out, therefore, documentation of the same in the primary source documents provides a trail for verification.

From the assessment, it is clear that this variable is not duly updated probably because the health care workers do not understand its importance. Moving forward, the county and sub county teams should be encouraged to engage with the HCWs on the utility of all variables in the recording and reporting tools.

**Table 5g: Month 2 follow-up smear results in Patient record cards and TIBU data in comparison to TB4 facility registers (case-based data)**

County	Sub county	Numbers				Agreement	
		Matched Patient Record cards with TB4 registers	Total Record cards available	Matched TIBU with TB4 registers	Total available in TB4	TB4 registers vs Record cards	TB4 registers vs TIBU
Kakamega	Butere	14	18	25	27	52%	93%
	Ikolomani	15	21	30	32	47%	94%
Kisii	Bobasi	18	20	22	23	78%	96%
	Bomachoge Borabu	11	15	14	17	65%	82%
Murang'a	Gatanga	24	31	25	35	69%	71%
	Kahuro	12	19	17	23	52%	74%
Nairobi	Dagoretti North	11	13	38	38	29%	100%
	Dagoretti South	15	22	21	26	58%	81%
Nandi	Aldai	13	13	11	14	93%	79%
	Chesumei	9	11	14	16	56%	88%
Taita Taveta	Mwatate	15	21	17	22	68%	77%
	Taveta	5	7	9	11	45%	82%
Wajir	Wajir East	9	9	8	9	100%	89%
	Wajir West	9	12	11	12	75%	92%
<b>Total</b>		<b>180</b>	<b>232</b>	<b>262</b>	<b>305</b>	<b>59%</b>	<b>86%</b>

For month two smear results, 59% of the patient record cards were correctly matched with facility registers, this was a decline from the last DQA at 76%. Wajir East and Aldai sub counties had the highest match at 100% and 93% respectively; while Taveta and Dagoretti North had agreements at 45% and 29% respectively.

In TIBU, 86% of the records had concurrence with the facility registers with only Dagoretti North sub county achieving the recommended range.

Month 2 smears are a key pointer to optimum quality of care for TB patients as they guide the decision to transition a patient from intensive to continuous phase. Proper documentation of the same lays basis for adequate patient follow up and later assigning proper outcomes. Documentation on the patient record cards as opposed to facility registers is still lagging with Dagoretti North depicting a classic example.

Prospective supervisory visits should always emphasize the importance of documenting initial and follow up smear results on the patient record cards as a primary source document.

**Table 5g: Month 2 follow-up smear date in Patient record cards and TIBU data in comparison to TB4 facility registers (case-based data)**

County	Sub county	Numbers				Agreement	
		Matched Patient Record cards with TB4 registers	Total Record cards available	Matched TIBU with TB4 registers	Total available in TB4	TB4 registers vs Record cards	TB4 registers vs TIBU
Kakamega	Butere	2	18	5	27	7%	19%
	Ikolomani	7	21	14	32	22%	44%
Kisii	Bobasi	9	20	11	23	39%	48%
	Bomachoge Borabu	3	15	6	17	18%	35%
Murang'a	Gatanga	16	31	14	35	46%	40%
	Kahuro	5	19		23	22%	0%
Nairobi	Dagoretti North	3	13	6	38	8%	16%
	Dagoretti South	4	22	6	26	15%	23%
Nandi	Aldai	8	13	10	14	57%	71%
	Chesumei	4	11	6	16	25%	38%
Taita Taveta	Mwatate	5	21	6	22	23%	27%
	Taveta	1	7	1	11	9%	9%
Wajir	Wajir East	1	9		9	11%	0%
	Wajir West	6	12	7	12	50%	58%
<b>Total</b>		<b>74</b>	<b>232</b>	<b>92</b>	<b>305</b>	<b>24%</b>	<b>30%</b>

A review on documentation of the date when month two smear results were done shows that 24% of the patient record cards were correctly matched with facility register. Sub counties with the least concordance were Butere at (7%), Dagoretti North (8%) and Taveta (9%).

In TIBU, only 30% of the records had concurrence with the facility registers.

The date when smears were done help determine the turnaround time for results which is critical for prompt quality of care decisions and help flag out delays within the diagnostic pathway. From the assessment, it is clear that this variable is not duly updated probably because the health care workers do not appreciate its importance.

Moving forward, the county and sub county teams should be encouraged to engage with the HCWs on the utility of all variables in the recording and reporting tools.



**Table 5g: Treatment outcomes in Patient record cards and TIBU data in comparison to TB4 facility registers (case-based data)**

County	Sub county	Numbers				Agreement	
		Matched Patient Record cards with TB4 registers	Total Record cards available	Matched TIBU with TB4 registers	Total available in TB4	TB4 registers vs Record cards	TB4 registers vs TIBU
Kakamega	Butere	12	18	25	27	44%	93%
	Ikolomani	19	21	28	32	59%	88%
Kisii	Bobasi	19	20	21	23	83%	91%
	Bomachoge Borabu	8	15	16	17	47%	94%
Murang'a	Gatanga	23	31	30	35	66%	86%
	Kahuro	10	19	18	23	43%	78%
Nairobi	Dagoretti North	6	13	32	38	16%	84%
	Dagoretti South	8	22	22	26	31%	85%
Nandi	Aldai	4	13	13	14	29%	93%
	Chesumei	2	11	15	16	13%	94%
Taita Taveta	Mwatate	14	21	22	22	64%	100%
	Taveta	4	7	9	11	36%	82%
Wajir	Wajir East	8	9	8	9	89%	89%
	Wajir West	9	12	11	12	75%	92%
<b>Total</b>		<b>146</b>	<b>232</b>	<b>270</b>	<b>305</b>	<b>48%</b>	<b>89%</b>

In this indicator, TB treatment outcomes in Patient record cards and TIBU were compared with outcomes in Facility Registers on a case-by-case basis.

On average, 48% of patient record cards had treatment outcomes similarly recorded as in facility registers. This varied from as low as 16% in Dagoretti North sub-county to 89% in Wajir West. When compared with facility registers, 89% of outcomes in TIBU were similar. This varied from 78% in Kahuro to perfect agreement (100%) in Mwatate sub-county.

The lack of update in patient record cards may indicate either retrospective use of patient record cards (as opposed to it being the primary patient tool) or reduced oversight of its use by the SCTLCS. More emphasis is needed to ensure patient record cards remain the primary tool for care of patients (*and not registers*). SCTLCS should also ensure that treatment outcome data in TIBU, from which national planning is based on is updated.

**Table 5g: Treatment outcome dates in Patient record cards and TIBU data in comparison to TB4 facility registers (case-based data)**

County	Sub county	Numbers				Agreement	
		Matched Patient Record cards with TB4 registers	Total Record cards available	Matched TIBU with TB4 registers	Total available in TB4	TB4 registers vs Record cards	TB4 registers vs TIBU
Kakamega	Butere	11	18	23	27	41%	85%
	Ikolomani	18	21	26	32	56%	81%
Kisii	Bobasi	20	20	22	23	87%	96%
	Bomachoge Borabu	8	15	12	17	47%	71%
Murang'a	Gatanga	25	31	29	35	71%	83%
	Kahuro	12	19	17	23	52%	74%
Nairobi	Dagoretti North	4	13	27	38	11%	71%
	Dagoretti South	6	22	15	26	23%	58%
Nandi	Aldai	8	13	12	14	57%	86%
	Chesumei	2	11	15	16	13%	94%
Taita Taveta	Mwatate	16	21	22	22	73%	100%
	Taveta	5	7	10	11	45%	91%
Wajir	Wajir East	7	9	2	9	78%	22%
	Wajir West	9	12	4	12	75%	33%
<b>Total</b>		<b>151</b>	<b>232</b>	<b>236</b>	<b>305</b>	<b>50%</b>	<b>77%</b>

On agreement in the date of treatment outcomes, an average of 50% of patient record cards had dates correctly matched with the facility TB registers (range: 11-87%). This was higher when TIBU data was compared to facility TB registers (77%, range: 22-100%). Both agreements were less than optimum and more efforts need to be put by the facility and SCTLCs to ensure these dates are similar across the recording and reporting tools.

#### Median Time to notification

Median time to patient notification within facility register, TIBU and between facility register and TIBU				
Variable	n=number of records	Median time (days)	Confidence Interval	
			lower	upper
Time to registration within facility register	279	8	6	11
Time to registration within TIBU	293	13	11	15
Time to registration between facility register and TIBU	290	13	11	14

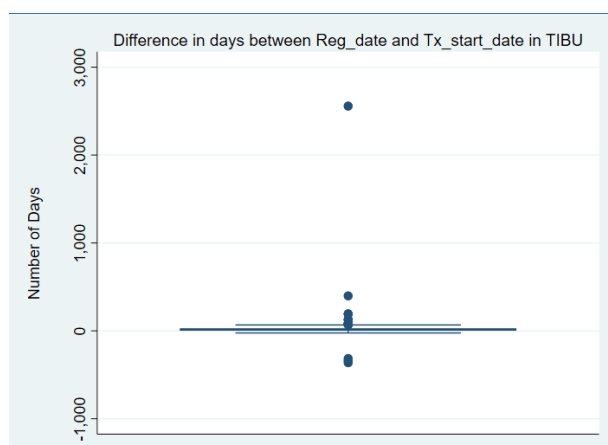
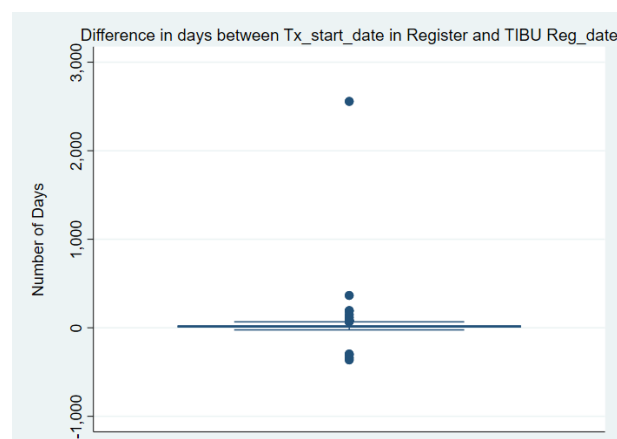
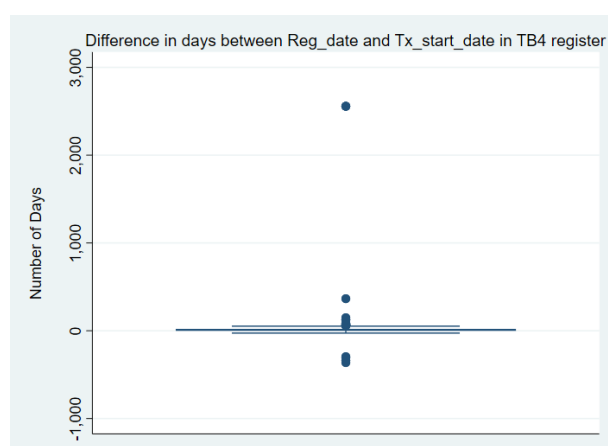
Median time to registration from the date when treatment was started within the facility register (TB4) was 8 days. This period was longer compared to the 6 days of the previous DQA (2019 report). In TIBU the median time was found to be 13 days. This was an improvement in the time to notification within TIBU compared to the previous DQA report which was 14 days. The previous

DQA was carried out at the backdrop of system data loss which could have possibly delayed the registration. Across the tools, comparison between facility register and TIBU showed that the median days was also 13 days with almost similar confidence level. This could be explained by the fact that registration in TIBU happens concurrently in facility register.

### Levels of agreement Using Kappa

Agreement between TB4 Register and TIBU			
Variable	Agreement	Kappa	Std. Err
Smear Month 0 Results	88.44%	0.803	0.0367
GeneXpert Results	37.41%	0.1833	0.0289
Smear Month 2 Results	89.12 %	0.836	0.0390
Type of Patient	89.11%	0.631	0.0411
Treatment Outcome	39.12%	0.2709	0.0187

Kappa score was calculated to assess the level of agreement between the variables collected in facility register and TIBU. There was an almost perfect level of agreement for smear results at month 0 (0.803) and smear results at month 2(0.836). For type of patient variable, the level of agreement was substantial at 0.631 kappa score. The level of agreement for gene expert results and treatment outcomes were at 0.1833 and 0.27 respectively. This could be a pointer of documentation challenges in TIBU and facility register where results are either missing or different in each of the data sources mentioned. Compared to the previous DQA, there is general decline in the level of agreement using kappa score method. The level of agreement for these variables in the previous DQA was at least substantial.



The box plots above demonstrate that in the recording and reporting tools, there were some patients that were found to have been notified before start of treatment which could be a documentation error in the facility or during data collection for DQA. Additionally, outliers were noted where patients took more than 2000 days to be notified. There were similar findings in TIBU for the period taken between the start of treatment and registration.

### 3.2: DR TB. RESULTS, DISCUSSION AND RECOMMENDATION

The analysis compared DR TB cases in three documents: log books, DR TB registers (the source/reference document) and TIBU for the period 2018 and 2019. Seven (50%) out of the sampled fourteen sub counties reported eighteen DR TB cases in 2018 and nine (64%) sub counties reported sixteen DR TB cases in 2019.

#### ALL FORMS DR TB

In 2018, the average level of agreement for all forms of DR TB between the patient log books and registers was 107% while the agreement between TIBU and DRTB register was 120%. There were more DR TB cases recorded in the log books (16) compared to those in the DR TB register (15). In 2019, the average level of agreement between the logbook and the DR TB register was 114% and 107% from the DR TB register to TIBU.

There was 100% agreement in the log book, register and TIBU in 4 sub counties in 2018 and in 6 sub counties in 2019 as shown in Table 1.

**Table 3.2a: ALL FORMS OF DR TB 2018 and 2019**

Sub County	2018			Agree- ment Log book vs DR TB reg	Agree- ment TIBU vs DR TB Reg	2019			Agree- ment Log book vs DR TB reg	Agree- ment TIBU vs DR TB Reg
	Log Book	Register	TIBU			Log Book	Register	TIBU		
Aldai	1	1	1	100%	100%	2	2	2	100%	100%
Bobasi						2	2	2	100%	100%
Butere						1	1	1	100%	100%
Chesumei						2	1	2	200%	200%
Dagoretti North	5	6	6	83%	100%	1	1	1	100%	100%
Dagoretti South	1	0	1	0%	0%					
Gatanga	1	0	2	0%	0%	1	1	1	100%	100%
Ikolomani						2	1	2	200%	200%
Kahuro	2	2	2	100%	100%	3	3	2	100%	67%
Mwatate	2	2	2	100%	100%					
Wajir East	4	4	4	100%	100%	2	2	2	100%	100%
<b>Grand Total</b>	<b>16</b>	<b>15</b>	<b>18</b>	<b>107%</b>	<b>120%</b>	<b>16</b>	<b>14</b>	<b>15</b>	<b>114%</b>	<b>107%</b>

Perfect agreement of 100% between the log books and the registers was documented in four of the sub counties, and five sub counties between the DR TB register and TIBU in 2018. In 2019, acceptable level of agreement between the logbook and the register was witnessed in seven sub counties whereas between the register and TIBU, this was in six sub counties.

**Discussion:** There was variance in the agreement of data across all the three data sources reviewed. This can be attributed to late registration of DR TB cases, especially when there is a stock out of data capture tools (logbooks and registers) in the health facilities.

### Aggregate RR TB case data

The average level of agreement for RR TB cases between the log books and the register was 100% and 114% in 2018 and 2019 respectively. The level of agreement between the register and TIBU was 144% and 129% in 2018 and 2019 respectively as shown in the table below:

**Table 3.2b. Aggregate forms of RR in 2018 and 2019**

Sub County	2018			Agree- ment Log book vs DR TB reg	Agree- ment TIBU vs DR TB Reg	2019			Agree- ment Log book vs DR TB reg	Agreement TIBU vs DR TB Reg
	Log Book	Register	TIBU			Log Book	Register	TIBU		
Aldai	0	1	1	0%	100%	0	0	0		
Butere						1	1	1	100%	100%
Chesumei						1	1	1	100%	100%
Dagoretti North	0	1	1	0%	100%	0	0	0		
Dagoretti South	1	0	1		0%					
Gatanga	0	0	2		0%	1	1	1	100%	100%
Ikolomani						1	1	2	100%	200%
Kahuro	2	1	2	50%	50%	2	1	2	50%	50%
Mwatate	2	2	2	100%	100%					
Wajir East	4	4	4	100%	100%	2	2	2	100%	100%
Grand Total	9	9	13	100%	144%	8	7	9	114%	129%

In 2018, two sub counties (Aldai, Dagoretti North) had RR cases documented in the register but no corresponding entries in the log books. In 2019, four sub counties (Wajir East, Butere, Chesumei, Gatanga) had 100% agreement for all the three documents (log book, Registers and TIBU). In 2018, 2 sub counties (Dagoretti South and Gatanga) had cases in TIBU that were not documented in the registers.

### Multi-drug Resistant TB

Of the sampled sub counties, only two had MDR cases notified (Chesumei and Dagoretti North) across the two years. Dagoretti North had a 100% agreement across all the three documents for both years. In Chesumei, the only patient notified in 2019 in TIBU was missing from the register as shown in the table 3 below:

**TABLE 3.2c. Aggregate MDR for 2018 and 2019**

Sub County	2018			Agreement Log book vs DR TB reg	Agreement TIBU vs DR TB Reg	2019			Agreement Log book vs DR TB reg	Agreement TIBU vs DR TB Reg
	Log Book	Register	TIBU			Log Book	Register	TIBU		
Chesumei	0	0	0	100%	100%	1	0	1	0%	0%
Dagoretti North	1	1	1	100%	100%	1	1	1	100%	100%
Grand Total	1	1	1	100%	100%	2	1	2	50%	50%



## DR TB OUTCOMES

### Cured outcome

Five out of the seven sub counties that notified DR TB patients had a treatment outcome of cured. Wajir East had 100% level of agreement between the log books, registers and TIBU in 2018. The average level of agreement between the DR TB register and the log book was 129%, that is, nine cases in the log book and seven in the register while the agreement of register and TIBU was 171% i.e. seven in register and twelve in TIBU.

Dagoretti South and Kahuro had a cured outcome documented in TIBU but neither in the register nor in the log books.

**TABLE 3.2d. Aggregate DR TB outcome of CURE 2018**

Sub County	2018			Agreement Log book vs DR TB reg	Agreement TIBU vs DR TB Reg
	Log Book	Register	TIBU		
Dagoretti North	5	4	5	80%	125%
Dagoretti South	0	0	1		
Kahuro	0	0	1		
Mwatate	1	0	2		
Wajir East	3	3	3	100%	100%
<b>Grand Total</b>	<b>9</b>	<b>7</b>	<b>12</b>	<b>129%</b>	<b>171%</b>

### Treatment completed outcome

Three sub counties (43%) out of the seven that notified DR TB patients had an outcome of treatment completed. Kahuro and Aldai had 100% level of agreement between the log books, registers and TIBU in 2018. Gatanga had two patients with a treatment completed outcome documented in TIBU but neither in the register nor log books.

The average level of agreement between the DR TB register and the log book was 100%, that is while the agreement of register and TIBU was 200%

**TABLE 3.2e. Aggregate DR TB outcome of Treatment Completed 2018**

Sub County	2018			Agreement Log Book vs DR TB register	Agreement TIBU vs DR TB register
	Log Book	Register	TIBU		
Aldai	1	1	1	100%	100%
Gatanga	0	0	2		
Kahuro	1	1	1	100%	100%
<b>Grand Total</b>	<b>2</b>	<b>2</b>	<b>4</b>	<b>100%</b>	<b>200%</b>

### Death outcome

Two (28%) sub counties out of the seven that notified DR TB patients had an outcome of death. Wajir East had 100% level of agreement between the log books, registers and TIBU in 2018. Dagoretti North had a patient with a death outcome documented in TIBU but neither in the register nor log books.

The average level of agreement between the DR TB register and the log book was 50%, while the agreement of register and TIBU was 100% as shown in the table overleaf:

**TABLE 3.2f. Aggregate DR TB outcome of Death 2018**

Sub County	2018			Agreement Log book vs DR TB reg	Agreement TIBU vs DR TB Reg
	Log Book	Register	TIBU		
Dagoretti North	0	1	1	0%	100%
Wajir East	1	1	1	100%	100%
<b>Grand Total</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>50%</b>	<b>100%</b>

### Case based DR TB data results and discussion

There were seventeen DR TB patient records reviewed across the three documents (log book, DR TB register and TIBU). The data quality review in this section used the patient registration number in TIBU, counter checked if it matched that in the log book and DR TB register.

### Patient Registration Number

There was a 100% match across the log book, DR TB registers and TIBU in four sub counties (Butere, Bobasi, Dagoretti and Aldai). The average agreement between the log books and DR TB registers was 63% where differences were noted in three sub counties (Ikolomani (50%), Gatanga (0%) and Wajir East (0%).

The average agreement between registration numbers in the DR TB registers and TIBU was 71%, with differences noted in Kahuro (33%), Chesumei (50%) and Wajir East (0%) as shown in the table below.

**Table 3.2g: Agreement between log book, DR TB register and TIBU**

Sub County	Numbers				Agreement	
	Total Log books	Log book VS DRTB Register	Total records in Register	DR TB Register Vs TIBU	Log book VS DRTB Register	DR TB Register Vs TIBU
Butere	1	1	1	1	100%	100%
Ikolomani	2	1	2	2	50%	100%
Bobasi	2	2	2	2	100%	100%
Gatanga	1		1	1	0%	100%
Kahuro	3	1	3	1	33%	33%
Dagoretti North	1	1	1	1	100%	100%
Aldai	3	3	3	3	100%	100%
Chesumei	1	1	2	1	100%	50%
Wajir East	2		2		0%	0%
<b>Kenya</b>	<b>16</b>	<b>10</b>	<b>17</b>	<b>12</b>	<b>63%</b>	<b>71%</b>

The difference in the agreement could be attributed to delayed support supervision visits by the TB coordinators to the facilities to update the DR TB records in the facility registers and notification in TIBU.

### Date of patient registration

There was a 50% match between the log book and the DR TB register, while TIBU and the register had 59% agreement (match). Complete agreement (100%) in all data tools was observed in Gatanga and Aldai sub counties.

Bobasi, Gatanga and Aldai had complete agreement between log books and DR TB registers while Butere, Kahuro and Chesumei had zero agreement.

Butere, Gatanga, Dagoretti and Aldai had complete agreement between DR TB register and TIBU, Ikolomani, Bobasi and Wajir East had 50% while Chesumei had the lowest matches as shown in the table below.

**Table 3.2h: Agreement in Date of registration in logbook, DR TB register and TIBU**

	Numbers				Agreement	
Sub County	Total Log books	Log book VS DRTB Register	Total records in Register	DR TB Register Vs TIBU	Log book VS DRTB Register	DR TB Register Vs TIBU
Butere	1		1	1	0%	100%
Ikolomani	2	1	2	1	50%	50%
Bobasi	2	2	2	1	100%	50%
Gatanga	1	1	1	1	100%	100%
Kahuro	3		3	1	0%	33%
Dagoretti North	1		1	1	0%	100%
Aldai	3	3	3	3	100%	100%
Chesumei	1		2		0%	0%
Wajir East	2	1	2	1	50%	50%
<b>Kenya</b>	<b>16</b>	<b>8</b>	<b>17</b>	<b>10</b>	<b>50%</b>	<b>59%</b>

### Treatment start date

A concurrence of 75% was noted in the log book and DRTB register while 65% matched the DR TB registers and TIBU. Five sub counties (Butere, Ikolomani, Bobasi, Dagoretti and Aldai) had a 100% agreement across the three documents, while four sub counties (Gatanga, Kahuro, Chesumei and Wajir East) had discrepancies as shown in table below

**Table 3.2i: Agreement in Date of start of treatment in logbook, DR TB register and TIBU**

	Numbers				Agreement	
Sub county	Total Log books	Log book VS DRTB Register	Total records in Register	DR TB Register Vs TIBU	Log book VS DRTB Register	DR TB Register Vs TIBU
Butere	1	1	1	1	100%	100%
Ikolomani	2	2	2	2	100%	100%
Bobasi	2	2	2	2	100%	100%
Gatanga	1		1		0%	0%
Kahuro	3	2	3		67%	0%
Dagoretti North	1	1	1	1	100%	100%
Aldai	3	3	3	3	100%	100%
Chesumei	1		2	1	0%	50%
Wajir East	2	1	2	1	50%	50%
<b>Kenya</b>	<b>16</b>	<b>12</b>	<b>17</b>	<b>11</b>	<b>75%</b>	<b>65%</b>

**Table 3.2j: Agreement in GeneXpert results in logbook, DR TB register and TIBU**

There was a 76% agreement between the DRTB log book and the register for gene Xpert results, while TIBU and the register had 71% agreement. Six sub counties had complete agreement at 100% across all data tools.

	Numbers				Agreement	
Sub county	Total Log books	Log book VS DRTB Register	Total records in Register	DR TB Register Vs TIBU	Log book VS DRTB Register	DR TB Register Vs TIBU
Butere	1	1	1	1	100%	100%
Ikolomani	2	1	2	1	50%	50%
Bobasi	2	2	2	2	100%	100%
Gatanga	1	1	1	1	100%	100%
Kahuro	3	1	3	1	33%	33%
Dagoretti North	1	1	1	1	100%	100%
Aldai	3	3	3	3	100%	100%
Chesumei	1	1	2		50%	0%
Wajir East	2	2	2	2	100%	100%
<b>Kenya</b>	<b>16</b>	<b>13</b>	<b>17</b>	<b>12</b>	<b>76%</b>	<b>71%</b>

**Table 3.2k: Agreement in Patient registration group in logbook, DR TB register and TIBU**

The agreement between the log book and the DRTB register was at 69% while TIBU and the DRTB register was 82%. Five (56%) sub counties had 100% agreement in all the data tools.

	Numbers				Agreement	
Sub county	Total Log books	Log book VS DRTB Register	Total records in Register	DR TB Register Vs TIBU	Log book VS DRTB Register	DR TB Register Vs TIBU
Butere	1	1	1	1	100%	100%
Ikolomani	2	2	2	2	100%	100%
Bobasi	2	2	2	2	100%	100%
Gatanga	1	1	1	1	100%	100%
Kahuro	3	1	3	2	33%	67%
Dagoretti North	1	1	1	1	100%	100%
Aldai	3	2	3	3	67%	100%
Chesumei	1		2		0%	0%
Wajir East	2	1	2	2	50%	100%
<b>Kenya</b>	<b>16</b>	<b>11</b>	<b>17</b>	<b>14</b>	<b>69%</b>	<b>82%</b>

**Table 3.2l: Agreement in Resistance Pattern in logbook, DR TB register and TIBU**

There was at 82% match between the DRTB log book and the register for the resistance pattern, while TIBU and the register had 76% agreement. An agreement of 100% was observed across all data tools in seven sub counties. Two sub counties were not within the acceptable range.

	Numbers				Agreement	
Sub County	Total Log books	Log book VS DRTB Register	Total records in Register	DR TB Register Vs TIBU	Log book VS DRTB Register	DR TB Register Vs TIBU
Butere	1	1	1	1	100%	100%
Ikolomani	2	2	2	2	100%	100%
Bobasi	2	2	2	2	100%	100%
Gatanga	1	1	1	1	100%	100%
Kahuro	3	2	3	1	67%	33%
Dagoretti North	1	1	1	1	100%	100%
Aldai	3	3	3	3	100%	100%
Chesumei	1		2		0%	0%
Wajir East	2	2	2	2	100%	100%
<b>Kenya</b>	<b>16</b>	<b>14</b>	<b>17</b>	<b>13</b>	<b>82%</b>	<b>76%</b>

**Table 3.2m: Agreement in Month 6 Culture in logbook, DR TB register and TIBU**

Carrying out Month 6 (M6) culture follow up investigation for TB patients is critical in monitoring the treatment progress of the DRTB patients and determination of interim treatment outcomes. All the nine sub counties with DRTB cases that were visited had a 76% match for Month 6 culture between the log book and the DRTB register. TIBU had a 65% match on the month 6 culture variable with the DRTB register.

	Numbers				Agreement	
Sub County	Total Log books	Log book VS DRTB Register	Total records in Register	DR TB Register Vs TIBU	Log book VS DRTB Register	DR TB Register Vs TIBU
Butere	1	1	1	1	100%	100%
Ikolomani	2	2	2	1	100%	50%
Bobasi	2	2	2	2	100%	100%
Gatanga	1	1	1	1	100%	100%
Kahuro	3	2	3	1	67%	33%
Dagoretti North	1	1	1		100%	0%
Aldai	3	1	3	2	33%	67%
Chesumei	1	1	2	1	50%	50%
Wajir East	2	2	2	2	100%	100%
<b>Kenya</b>	<b>16</b>	<b>13</b>	<b>17</b>	<b>11</b>	<b>76%</b>	<b>65%</b>

The difference in agreement for M6 in the three documents, could be attributed to delayed results being relayed back to the health facilities, and timely updating of the results in the respective patient record cards and in TIBU.

**Table 3.2n: Median time to patient Notification within DRTB**

Median time to patient Notification within DRTB Register, TIBU and between DRTB Register and TIBU				
Time to registration within DRTB Register	14	0	-5	3
Time to registration within TIBU	16	1	-5	11
Time to registration between Register and TIBU	14	0	-10	9



Median Time to notifying a DR TB patient was 14 and 16 days in the facility register and TIBU respectively. Comparing the two data sources, the median time was 14 days. The program recommends that DR TB patients are notified before start of treatment and this finding show that this recommendation is not fully adhered to.

**Table 3.20: Levels of agreement using Kappa**

Agreement between DRTB Register and Register and TIBU			
Variable	Agreement	Kappa	Std. Err
Gene xpert Results	87.50%	0.7460	0.2018
Type of Patient	75.00%	0.6257	0.1346
Resistance Pattern	87.50%	0.7949	0.1623
Treatment Outcome	25.00%	0.1967	0.0492
Month 6 Culture Result	62.50%	0.5826	0.0809

Kappa score was at least substantial for gene xpert results (0.7460), type of patient (0.6257) and resistant pattern (0.7949). This indicates consistency in documentation in both TIBU and DR TB register. Treatment outcomes level of agreement was low (0.1967) an indication of discrepancies in the assigned outcomes between TIBU and the register. In general, the level of agreement for the selected variables was below the accepted range. There is need to strengthen the quality of DR TB data from the facility to the electronic system. This could point to the need to simplify the guidelines for DR TB recording in the long term.

### 3.3: Aggregate IPT Data

Data for children under 5 years contacts of bacteriologically confirmed pulmonary TB patients who were initiated on IPT for the years 2018 and 2019 was collected.

Overall levels of agreement of aggregate IPT data between register and TIBU for 2018 and 2019 were 80% and 89%, respectively. This shows an improvement of 9% between the two years.

While 12 (86%) of the sub-counties had their cases in both IPT register and TIBU, two sub-counties (Butere and Taveta), representing 14%, had no case in both IPT register and TIBU for 2018 & 2019. One sub-county recorded 100% agreement in 2018 while in 2019 we had three sub-counties with perfect agreement.

**Table 3.3a: Aggregate levels of agreement of IPT data between registers and TIBU in 2018 and 2019**

County	Subcounty	2018		2019		Agreement (TIBU vs Reg) -2018	Agreement (TIBU vs Reg) - 2019
		Register	TIBU	Register	TIBU		
Kakamega	Ikolomani	36	35	37	34	97%	92%
Kakamega county		36	35	37	34	97%	92%
Kisii	Bobasi	9	4	9	9	44%	100%
	Bomachoge Borabu	32	39	26	23	122%	88%
Kisii county		41	43	35	32	105%	91%
Murang'a	Gatanga	17	13	31	27	76%	87%
	Kahuro	11	9	17	10	82%	59%

<b>Murang'a county</b>		<b>28</b>	<b>22</b>	<b>48</b>	<b>37</b>	<b>79%</b>	<b>77%</b>
Nairobi	Dagoretti North	44	29	67	62	66%	93%
	Dagoretti South	15	21	19	21	140%	111%
<b>Nairobi county</b>		<b>59</b>	<b>50</b>	<b>86</b>	<b>83</b>	<b>85%</b>	<b>97%</b>
Nandi	Aldai	19	8	23	19	42%	83%
	Chesumei	33	26	12	12	79%	100%
<b>Nandi county</b>		<b>52</b>	<b>34</b>	<b>35</b>	<b>31</b>	<b>65%</b>	<b>89%</b>
Taita Taveta	Mwatate	19	5	6	5	26%	83%
<b>Taita Taveta county</b>		<b>19</b>	<b>5</b>	<b>6</b>	<b>5</b>	<b>26%</b>	<b>83%</b>
Wajir	Wajir East	28	19	42	42	68%	100%
	Wajir West	11	11	19	10	100%	53%
<b>Wajir county</b>		<b>39</b>	<b>30</b>	<b>61</b>	<b>52</b>	<b>77%</b>	<b>85%</b>
<b>Grand Total</b>		<b>274</b>	<b>219</b>	<b>308</b>	<b>274</b>	<b>80%</b>	<b>89%</b>

The overall level of agreement of TIBU data when compared with IPT registers for the year 2018 was at 80%. This implies there were more records in the IPT registers than those notified in TIBU. Only one sub county had a perfect agreement. Generally, 8 sub-counties recorded below the acceptable range while Ikolomani (97%) and Wajir West (100%) sub-counties reporting within the acceptable range. Bomachoge Borabu (122%) and Dagoretti South (140%) sub-counties reported more cases as shown in Table X1.

For 2019, the overall level of agreement of TIBU data when compared to IPT registers for the year 2019 was at 89%. This was a 9% improvement when compared to 2018 (80%).

Three sub-counties had a perfect agreement (Bobasi, Chesumei and Wajir East), 8 sub-counties reported less cases while Dagoretti South sub-county reported more cases in TIBU than facility IPT register as per (Table X1)

### Released from IPT Treatment for 2018 cohort

The overall level of agreement of TIBU data with IPT registers for clients initiated on IPT in 2018 and were released from treatment was 111%. This shows records in TIBU are more updated than the facility registers.

Among the twelve sub-counties that had IPT clients, eleven reported having an outcome of released from treatment from both the register and TIBU. One sub-county (Kahuro) had a perfect agreement of 100%. Four sub-counties; Ikolomani [27%], Aldai [73%], Wajir East [79%] & Wajir West [64%] had less clients assigned an outcome in TIBU while six sub counties Bomachoge Borabu [144%], Gatanga [163%], Dagoretti North [128%], Dagoretti South [233%], Chesumei [126%] & Mwatate [167%] had more clients with outcomes in TIBU than facility IPT register.

**Table 3.3b: Aggregate level of agreement between TIBU and facility registers for children <5 years of age initiated on IPT in 2018 and Released from Treatment**

County	Subcounty	IPT Register	TIBU	Agreement IPT Reg vs TIBU
Kakamega	Butere	0	0	
	Ikolomani	22	6	27%
<b>Kakamega county</b>		<b>22</b>	<b>6</b>	<b>27%</b>

Kisii	Bobasi	0	4	
	Bomachoge Borabu	25	36	144%
<b>Kisii county</b>		<b>25</b>	<b>40</b>	<b>160%</b>
Murang'a	Gatanga	8	13	163%
	Kahuro	9	9	100%
<b>Murang'a county</b>		<b>17</b>	<b>22</b>	<b>129%</b>
Nairobi	Dagoretti North	25	32	128%
	Dagoretti South	9	21	233%
<b>Nairobi county</b>		<b>34</b>	<b>53</b>	<b>156%</b>
Nandi	Aldai	11	8	73%
	Chesumei	19	24	126%
<b>Nandi county</b>		<b>30</b>	<b>32</b>	<b>107%</b>
Taita Taveta	Mwatate	3	5	167%
	Taveta	0	0	
<b>Taita Taveta county</b>		<b>3</b>	<b>5</b>	<b>167%</b>
Wajir	Wajir East	24	19	79%
	Wajir West	11	7	64%
<b>Wajir county</b>		<b>35</b>	<b>26</b>	<b>74%</b>
<b>Grand county</b>		<b>166</b>	<b>184</b>	<b>111%</b>

**Note:** There were no recorded deaths among children on IPT in both the facility IPT registers and TIBU for the year 2018.

### 3.4: Leprosy findings for DQA 2018 and 2019

Leprosy is a chronic bacterial disease that mainly affects the nerves. Kenya was able to declare the disease as eliminated in the year 1989. However, there are still pockets of leprosy in some Kenyan counties where physical disability persists, mainly due to late diagnosis. To be able to curb this disease, control measures must be intensified, especially in the counties reporting more cases. Given the limited resources, it's therefore paramount that high risk counties be initially targeted for control, with a focus on early diagnosis. <https://doi.org/10.1371/journal.pntd.0007329>

This DQA collected Leprosy data for the periods 2018 and 2019. Out of the 14 sub-counties visited for the DQA exercise, only one sub-county had notified a leprosy patient. This patient was notified in 2019 at Shiraha Health Centre, Butere sub-county in Kakamega county. The patient was classified as Multi-Bacillary (MB) in TIBU. The patient record was also available in the facility register.

### 3.5: Availability of DS TB recording and reporting tools

Availability of Reporting tools in the sampled facilities (N = 178)	
TB5 Cards (Patient Record cards)	167 (94%)
TB4 (TB Facility Registers)	171 (96%)
TB3 Cards (Appointment cards)	162 (91%)
Sputum Request forms	163 (92%)
Commodity reporting tools	144 (81.3%)

Most facilities visited (over 80%), reported availability of tools with commodity reporting tools giving the lowest rate of availability. Eleven (6%) of the facilities visited lacked patient record cards which is an improvement from 11% noted during the 2019 DQA. Seven (3.4%) of the facilities lacked the TB facility Register which represents an increase from 2% noted in the 2019 DQA report. The patient record card remains the primary document for recording while the TB register provides the facility data cascade for TB notification. An improvement in availability of patient record cards may represent an increase in use by HCWs, while the drop in the availability of the TB register could represent inconsistent supply from the program and/or distribution delays within the county.

Sixteen (9%) of the facilities visited lacked appointment cards hence management of clinic appointments by the patients could be a challenge. While there is a small improvement from the 2019 DQA findings that showed 12% of the facilities visited lacked the appointment cards, this still possess a challenge especially in management of transfers (both TOs and TIs).

The findings also show an improvement in availability of sputum request forms from 80% in 2019 to 92% in 2020. The program is still required to strengthen this area to 100% to ensure all diagnostic tests are documented. Commodity reporting tools' availability also increased from 76% to 81.3% in 2020. This should also be strengthened to 100% to enhance accountability in commodity management within the facilities

#### Versions of tools in use (N = 178)

Year / version	TB5	TB4	TB3	Sputum request form	Commodity reporting tool
2011			1		
2014		1			
2015			1		6
2016	61	55	70	9	
2017		6	7	20	41
2018				10	
Version 1				19	
Version 2				1	

The program tools for recording and reporting have been improved over time to enhance precision in data recording. Majority of the recording and reporting had final versions released by the program in 2016. In the 2019 DQA analysis, it was noted that 79% of the facilities visited last year were using the updated version of facility registers and patient record cards. The current findings reflect a significant drop in the use of updated versions with only 34% and 31% of the facilities visited using the correct version of the patient record cards and TB facility registers respectively.

The program, as was recommended during the 2019 DQA report, should carry out an inventory of the recording and reporting tools and consequently do a mop up where applicable. Procedures for archiving of data, as detailed in the DQI plan, will help facilities manage data in transitioning from the old version to the updated tools.

Facilities without TB registers					
No	Facility		No	Facility	
1	Gatanga Dispensary		5	Melchezedek Hospital	
2	Chandaria Health Centre		6	Orthodox Dispensary	
3	Fremo Medical Centre		7	Bura Mission Clinic	
4	Kabiro Medical Clinic				

Facilities without Record cards			
No	Facility		No Facility
1	Gatanga Dispensary		7 Nairobi Womens Hospital
2	AAR GWH Health Care Ltd		8 Fremo Medical Centre
3	Dr Muhindi Clinic Westlands		9 Kabiro Medical Clinic
4	Liverpool VCT		10 Orthodox Dispensary
5	Menelik Chest Clinic		11 Bura Mission Clinic
6	Nairobi Hospital		

Facilities without Appointment cards			
No	Facility	No	Facility
1	Kenyerere Dispensary Sameta	9	Liverpool VCT
2	Nyamagwa Health Centre	10	Nairobi Hospital
3	Rusinga Dispensary	11	Nairobi Womens Hospital
4	Kenya Medical Centre Kenya	12	Fremo Medical Centre
5	Gatanga Dispensary	13	Kabiro Medical Clinic
6	Karangi Dispensary	14	Orthodox Dispensary
7	AAR GWH Health Care Ltd	15	Bura Mission Clinic
8	Dr Muhindi Clinic Westlands	16	Mbagha

Facilities without Sputum request forms			
No	Facility	No	Facility
1	Gatanga Dispensary	9	Nairobi Womens Hospital
2	Giathanini Dispensary	10	National Spinal Injury Hospital
3	Gituamba Aipca Dispensary	11	Chandaria Health Centre
4	AAR GWH Health Care Ltd	12	Kabiro Medical Clinic
5	Dr Muhindi Clinic Westlands	13	Mid Hill Medical Clinic
6	Liverpool VCT	14	Orthodox Dispensary
7	Menelik Chest Clinic	15	Bura Mission Clinic
8	Nairobi Hospital		

Facilities without Commodity reporting tools			
No	Facility	No	Facility
1	Kilingili Health Centre	18	Nairobi Womens Hospital
2	Shikumu Dispensary	19	Nairobi Womens Hospital Adams
3	Lenmek Hospital	20	National Spinal Injury Hospital
4	Igorera Medical Clinic	21	University of Nairobi Dispensary
5	Itembu Dispensary	22	Fremo Medical Centre
6	Kenyena Medical Centre	23	Kabiro Medical Clinic
7	Gatanga Dispensary	24	Mary Mission
8	Gatunyu Dispensary	25	Mid Hill Medical Clinic
9	Karangi Dispensary	26	Orthodox Dispensary
10	Wanyaga Community Dispensary	27	Samawati Medical Clinic
11	Kiria Health Centre	28	Kaptumek Dispensary
12	AAR GWH Health Care Ltd	29	Chepterit Mission Health Centre
13	Dr Muhindi Clinic Westlands	30	Itigo Dispensary
14	Liverpool VCT	31	Kapkibimbir Dispensary
15	Medanta Africare	32	Sironoi GOK Dispensary
16	Menelik Chest Clinic	33	Tarbaj Health Centre
17	Nairobi Hospital		





# CHAPTER FOUR

## CONCLUSION & RECOMMENDATIONS

The overall level of data agreement across the recording and reporting tool was below the expectation. There were variations in level of agreement among specific variables. Treatment outcomes in TIBU for DSTB were likely to be similar to those recorded in TB facility registers than those in-patient record cards. For DR TB, there was a tendency to notify cases in TIBU as compared to log books and facility registers as was also observed in the previous DQA findings (2019). The current recommended practice of notifying DRTB patients before start of treatment is yet to be optimally adhered to at the facility level. Data on TB preventive therapy showed an improvement in the level of agreement in comparison to findings in the previous DQA reports. However, the performance varied across the sub counties.

### Cross cutting recommendations

#	Recommendation	Level	Priority	Responsible Person(s)
1	The program should review and update the current version of tools to enhance uniformity in data capture	National	High	DNTLD – P & supporting partners
2	The program and supporting partners should sensitize HCW on use of new tools before roll out	National, County and Sub County	High	DNTLD – P, supporting partners and CTLCs
3	Counties should institute mechanisms to carry out sub-national DQA	National, County and Sub County	Medium	DNTLD – P, supporting partners and CTLCs
4	County Directors of Health should take lead in tracking TB indicators through random data checks at the facility by strengthening supervision and coordination at the county and sub county level.	County	High	DNTLD – P, CTLCs and CDHs
5	Standardization and simplification of DRTB reporting	National	High	DNTLD – P & supporting partners
6	Develop and share policy guide on documentation of TPT data in the contact management register	National	High	DNTLD – P

## DR TB

#	Recommendation	Level	Priority	Responsible person(s)
1	Mentorship, OJT and clinical supervisions during the monthly visits to ensure all recording tools are available and well filled.	County, Sub County, Facility (Chest clinic)	High	CTLC, SCTLC
2	Cross check data while updating these records to minimize transcription errors.	County, Sub County, Facility (Chest clinic)	High	CTLC, SCTLC

## DS TB

#	Recommendation	Level	Priority	Responsible Person(s)
1	Technical assistance on data management (recording and reporting) should frequently be done	National	High	DNTLD-P
2	Inclusion of best practices and lessons learnt documentation in future DQA tools	National	High	DNTLD-P
3	Ensure that all the deaths are properly recorded in all reporting tools and mortality audit conducted.	County, Sub County, Facility (Chest clinic)	High	CTLC, SCTLC
4	Sustain the engagements with County Health Management and Health Facility administration to integrate components of the TB recording and reporting as they embrace the EMR	National, County, Sub County	Medium	DNTLD-P, CTLC, SCTLC

# ANNEXES

## Annex 1: List of contributors

No	Name	Organization
1	Dr. Elizabeth Onyango	DNTLD-P
2	Abdullahi Omar	DNTLD-P
3	Adano Godana	DNTLD-P
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5	Caroline Asin	DNTLD-P
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9	Jaqueline Kisia	DNTLD-P
10	Joyce Kiarie	DNTLD-P
11	Martin Githiomi	DNTLD-P
12	Philip Owiti	DNTLD-P
13	Richard Kiplimo	DNTLD-P
14	Timothy Kandie	DNTLD-P
15	Mbetera Felix	DNTLD-P
16	Kennedy Muimi	TBARC II
17	Patrick Angala	TBARC II
18	Stella Omulo	TBARC II
19	Wandia Ikua	TBARC II
20	Wandia Mutura	TBARC II

## Annex 2: List of health facilities

No	Subcounty	Health Facility	No	Subcounty	Health Facility
1	Butere	Butere District Hospital	90	Dagoretti North	Riruta Health Centre
2	Butere	Butere Iranda Health Centre	91	Dagoretti North	Sokoni Arcade VCT
3	Butere	Imanga Health Centre	92	Dagoretti North	University of Nairobi Dispensary
4	Butere	Lukoye Health Centre	93	Dagoretti South	Al Gadhir Clinic



5	Butere	Mabole Health Centre	94	Dagoretti South	Bodaki Medical Clinic
6	Butere	Manyala Sub District Hospital	95	Dagoretti South	Chandaria Health Centre
7	Butere	Shikunga Health Centre	96	Dagoretti South	Fremo Medical Centre
8	Butere	Shimkoko Dispensary	97	Dagoretti South	Kabiro Medical Clinic
9	Butere	Shiraha Health Centre	98	Dagoretti South	Kivuli Dispensary
10	Butere	Shisaba Dispensary	99	Dagoretti South	Lea Toto Kawangware
11	Butere	Shitsitswi Health Centre	100	Dagoretti South	Mary Mission
12	Ikolomani	Eregi Mission Health Centre	101	Dagoretti South	Melchezedek Hospital
13	Ikolomani	Iguhu District Hospital	102	Dagoretti South	Mid Hill Medical Clinic
14	Ikolomani	Imalaba Dispensary	103	Dagoretti South	Mutuini Sub District Hospital
15	Ikolomani	Imulama Dispensary	104	Dagoretti South	Orthodox Dispensary
16	Ikolomani	Kilingili Health Centre	105	Dagoretti South	Ray of Hope Health Centre
17	Ikolomani	Savane Dispensary	106	Dagoretti South	Samawati Medical Clinic
18	Ikolomani	Shibwe Sub District Hospital	107	Dagoretti South	St Joseph's Dispensary Dagoretti
19	Ikolomani	Shihalia Dispensary	108	Dagoretti South	Swop Kawangware
20	Ikolomani	Shikumu Dispensary	109	Dagoretti South	Waithaka Health Centre
21	Ikolomani	Shiseso Health Centre	110	Dagoretti South	Wema Nursing Home
22	Ikolomani	St Pius Musoli Health Centre	111	Aldai	Chepkongony Dispensary
23	Bobasi	Borangi Health Centre	112	Aldai	Cheptingwich Dispensary
24	Bobasi	Gesabakwa Dispensary	113	Aldai	Kaboi Dispensary
25	Bobasi	Gesure Dispensary Gucha	114	Aldai	Kapkeben Dispensary
26	Bobasi	Kenyambi Dispensary	115	Aldai	Kapkolei Dispensary
27	Bobasi	Kenyerere Dispensary Sameta	116	Aldai	Kapsaos Dispensary

28	Bobasi	Kiobegi Dispensary Nyamache	117	Aldai	Kaptumek Dispensary
29	Bobasi	Kionyo Dispensary Gucha	118	Aldai	Kaptumo Sub District Hospital
30	Bobasi	Lenmek Hospital	119	Aldai	Kemeloi Health Centre
31	Bobasi	Motonto Dispensary	120	Aldai	Kibwareng Health Centre
32	Bobasi	Nyacheki Sub District Hospital	121	Aldai	Kobujoi Mission Health Centre
33	Bobasi	Nyachogochogo Dispensary	122	Aldai	Koyo Health Centre
34	Bobasi	Nyagiki Dispensary	123	Aldai	Serem Health Centre Nandi South
35	Bobasi	Nyakegogi Dispensary	124	Chesumei	Biribiriet Dispensary
36	Bobasi	Nyamache Sub District Hospital	125	Chesumei	Chemundu Dispensary
37	Bobasi	Nyamagwa Health Centre	126	Chesumei	Chemuswo Dispensary
38	Bobasi	Nyansakia Health Centre	127	Chesumei	Chepterit Mission Health Centre
39	Bobasi	Omosaria Dispensary	128	Chesumei	Itigo Dispensary
40	Bobasi	Ritumbe Health Centre	129	Chesumei	Kapkibimbir Dispensary
41	Bobasi	Rusinga Dispensary	130	Chesumei	Kapsisiywo Dispensary
42	Bomachoge Borabu	Eberege Dispensary	131	Chesumei	Kaptel Dispensary
43	Bomachoge Borabu	Igorera Medical Clinic	132	Chesumei	Kimondi Forest Dispensary
44	Bomachoge Borabu	Itembu Dispensary	133	Chesumei	Kingwal Dispensary
45	Bomachoge Borabu	Kenyanya District Hospital	134	Chesumei	Kokwet Dispensary
46	Bomachoge Borabu	Kenyanya Medical Centre Kenyanya	135	Chesumei	Kombe Dispensary
47	Bomachoge Borabu	Kenyanya Medical Clinic Kenyanya	136	Chesumei	Lelmokwo Dispensary
48	Bomachoge Borabu	Magen Dispensary	137	Chesumei	Mogoget Dispensary
49	Bomachoge Borabu	Magenche Dispensary	138	Chesumei	Mosoriot Rural Health Training Centre
50	Bomachoge Borabu	Omobera Dispensary	139	Chesumei	Ngechek Dispensary



51	Bomachoge Borabu	Riokindo Health Centre	140	Chesumei	Sironoi GOK Dispensary
52	Gatanga	Assumption of Mary Dispensary	141	Mwatate	Bura Health Centre (Taita Taveta)
53	Gatanga	Gatanga Dispensary	142	Mwatate	Bura Mission Clinic
54	Gatanga	Gatunyu Dispensary	143	Mwatate	Dawson Mwanyumba Dispensary
55	Gatanga	Gatura Health Centre	144	Mwatate	Dembwa Dispensary
56	Gatanga	Giathanini Dispensary	145	Mwatate	Kiangachinyi Dispensary
57	Gatanga	Gatuto Dispensary	146	Mwatate	Kighombo Dispensary
58	Gatanga	Gitiri Community Dispensary	147	Mwatate	Kwa Mnegwa Dispensary
59	Gatanga	Gituamba Aipca Dispensary	148	Mwatate	Maktau Dispensary
60	Gatanga	Ithanga Dispensary	149	Mwatate	Manoa Dispensary
61	Gatanga	Karangi Dispensary	150	Mwatate	Mbagha
62	Gatanga	Kigoro Dispensary	151	Mwatate	Modambogho Dispensary
63	Gatanga	Kihumbu Ini Community Dispensary	152	Mwatate	Mpinzinyi Health Centre
64	Gatanga	Kirwara Sub District	153	Mwatate	Mrughua Dispensary
65	Gatanga	Kiunyu Dispensary	154	Mwatate	Msau Dispensary
66	Gatanga	Mitumbiri Dispensary	155	Mwatate	Mwambirwa Dispensary
67	Gatanga	Mukarara Community Dispensary	156	Mwatate	Mwashuma Dispensary CDF
68	Gatanga	Mukurwe Dispensary	157	Mwatate	Mwatate Sub District Hospital
69	Gatanga	Ndakaini Dispensary	158	Mwatate	Sagaighu Dispensary
70	Gatanga	Ndunyu Chege Dispensary	159	Mwatate	Shelemba
71	Gatanga	Ngelelya Dispensary	160	Taveta	Challa Dispensary
72	Gatanga	Wanyaga Community Dispensary	161	Taveta	Chumvini
73	Kahuro	Gatheru Dispensary	162	Taveta	Divine Mercy Eldoro Catholic Dispensary

74	Kahuro	Gitaro Dispensary	163	Taveta	Kimorigo Dispensary
75	Kahuro	Jamii Medical Clinic Murang'a North	164	Taveta	Kitobo Dispensary Taveta
76	Kahuro	Kiria Health Centre	165	Taveta	Kiwalwa Dispensary
77	Kahuro	Kirogo Health Centre	166	Taveta	Mahandakini Dispensary
78	Kahuro	Muriranjias Sub District Hospital	167	Taveta	Mata Dispensary Taveta
79	Kahuro	Wanjengi Dispensary	168	Taveta	Ndilidau Dispensary Jipe
80	Dagoretti North	AAR GWH Health Care Ltd	169	Taveta	Njukini Health Centre
81	Dagoretti North	Coptic Hospital Ngong Road	170	Taveta	Rekeke Model Health Centre
82	Dagoretti North	Dr Muhindi Clinic Westlands	171	Taveta	Taveta District Hospital
83	Dagoretti North	Liverpool VCT	172	Wajir East	Tarbaj Health Centre
84	Dagoretti North	Medanta Africare	173	Wajir East	Wajir Tb Manyatta Sub District Hospital
85	Dagoretti North	Menelik Chest Clinic	174	Wajir West	Ademasajida Dispensary
86	Dagoretti North	Nairobi Hospital	175	Wajir West	Eldas Health Centre
87	Dagoretti North	Nairobi Womens Hospital	176	Wajir West	Griftu District Hospital
88	Dagoretti North	Nairobi Womens Hospital Adams	177	Wajir West	Hadado Health Centre
89	Dagoretti North	National Spinal Injury Hospital	178	Wajir West	Lagboqol Dispensary

### Annex 3: Levels of agreement for aggregated data for All forms of TB in Patient record cards and TIBU data in comparison to TB4 facility registers

County	Sub Counties	2018			Agreement (TB5 Cards vs TB4 Reg)	Agreement (TIBU vs TB4 Reg)	2019			Agreement (TB5 Cards vs TB4 Reg)	Agreement (TIBU vs TB4 Reg)	Average (2018/2019)	
		TB5 Cards	TB4 Reg	TIBU			TB5 Cards	TB4 Reg	TIBU			Agreement (TB5 cards Vs TB4 Reg)	Agreement (TIBU vs TB4 Reg)

Kakamega	Butere	73	168	156	43%	93%	91	185	164	49%	89%	46%	91%
	Ikolomani	128	222	199	58%	90%	169	257	227	66%	88%	62%	89%
<b>Kakamega County</b>		<b>201</b>	<b>390</b>	<b>355</b>	<b>52%</b>	<b>91%</b>	<b>260</b>	<b>442</b>	<b>391</b>	<b>59%</b>	<b>88%</b>	<b>55%</b>	<b>90%</b>
Kisii	Bobasi	129	156	148	83%	95%	148	165	156	90%	95%	86%	95%
	Boma-choge Borabu	134	144	140	93%	97%	108	136	123	79%	90%	86%	94%
<b>Kisii County</b>		<b>263</b>	<b>300</b>	<b>288</b>	<b>88%</b>	<b>96%</b>	<b>256</b>	<b>301</b>	<b>279</b>	<b>85%</b>	<b>93%</b>	<b>86%</b>	<b>94%</b>
Murang'a	Gatanga	270	318	285	85%	90%	289	282	242	102%	86%	94%	88%
	Kahuro	185	225	216	82%	96%	176	183	187	96%	102%	89%	99%
<b>Murang'a County</b>		<b>455</b>	<b>543</b>	<b>501</b>	<b>84%</b>	<b>92%</b>	<b>465</b>	<b>465</b>	<b>429</b>	<b>100%</b>	<b>92%</b>	<b>92%</b>	<b>92%</b>
Nairobi	Dagoretti North	314	858	838	37%	98%	425	812	818	52%	101%	44%	99%
	Dagoretti South	188	284	279	66%	98%	265	298	278	89%	93%	78%	96%
<b>Nairobi County</b>		<b>502</b>	<b>1142</b>	<b>1117</b>	<b>44%</b>	<b>98%</b>	<b>690</b>	<b>1110</b>	<b>1096</b>	<b>62%</b>	<b>99%</b>	<b>53%</b>	<b>98%</b>
Nandi	Aldai	93	90	119	103%	132%	70	74	63	95%	85%	99%	109%
	Chesumei	102	148	115	69%	78%	78	138	102	57%	74%	63%	76%
<b>Nandi County</b>		<b>195</b>	<b>238</b>	<b>234</b>	<b>82%</b>	<b>98%</b>	<b>148</b>	<b>212</b>	<b>165</b>	<b>70%</b>	<b>78%</b>	<b>76%</b>	<b>88%</b>
Taita Taveta	Mwatate	111	145	117	77%	81%	83	95	70	87%	74%	82%	77%
	Taveta	111	167	151	66%	90%	109	118	106	92%	90%	79%	90%
<b>Taita Taveta County</b>		<b>222</b>	<b>312</b>	<b>268</b>	<b>71%</b>	<b>86%</b>	<b>192</b>	<b>213</b>	<b>176</b>	<b>90%</b>	<b>83%</b>	<b>81%</b>	<b>84%</b>
Wajir	Wajir East	465	490	486	95%	99%	360	393	386	92%	98%	93%	99%
	Wajir West	63	74	69	85%	93%	68	70	65	97%	93%	91%	93%
<b>Wajir County</b>		<b>528</b>	<b>564</b>	<b>555</b>	<b>94%</b>	<b>98%</b>	<b>428</b>	<b>463</b>	<b>451</b>	<b>92%</b>	<b>97%</b>	<b>93%</b>	<b>98%</b>
<b>Kenya</b>		<b>2366</b>	<b>3489</b>	<b>3318</b>	<b>68%</b>	<b>95%</b>	<b>2439</b>	<b>3206</b>	<b>2987</b>	<b>76%</b>	<b>93%</b>	<b>72%</b>	<b>94%</b>



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