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**MINISTRY OF HEALTH**  
**NATIONAL TUBERCULOSIS, LEPROSY AND**  
**LUNG DISEASE UNIT**

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**DATA QUALITY AUDIT REPORT**

**JUNE- JULY 2013**

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## List of Abbreviations

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DOTS	- Direct Observed Therapy
CPT	-Cotrimoxazole Preventive Therapy
ARV	- Antiretroviral
HCW	- Health Care Workers
HIV	- Human Immunodeficiency Virus
TB	- Tuberculosis
MDR-TB	- Multi-drug resistant tuberculosis
ART	- Antiretroviral Therapy
NGO	- Non Governmental Organization
MOH	- Ministry of Health
PTB	- pulmonary tuberculosis
PMTCT	- Prevention of Mother to Child Transmission
GFATM	- Global Fund to Fight AIDS, Tuberculosis and Malaria
OSDV	-Onsite Data verification
MDGs	- Millennium Development goals
M and E	- Monitoring and Evaluation
PTB+	-Pulmonary Tuberculosis smear positive
PTB-	-Pulmonary Tuberculosis Smear negative
KEMRI	-Kenya medical Research Institute
CDC	-Centre for Disease Control

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## Abstract

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TB data recording and reporting presents technical and management challenges at all levels of the surveillance systems and this may compromise the integrity of the data. These challenges include large amount of data, large number of indicators, time constraints and sometimes training limitations. The integrity of this system calls for the need for assurance of accuracy, reliability, precision, completeness and timeliness of the data captured and transmitted. Routine data quality audits are a process that is always included in a good TB surveillance system. The National TB program in Kenya maintains a TB surveillance system and it last conducted a country-wide data quality audit (DQA) in 2010. This necessitated conducting another DQA in 2013 to determine more recent quality of data. A retrospective cross section survey was conducted in June –July 2013 to assess the quality of TB surveillance data reported through the Kenya national TB surveillance system. The survey was conducted in a country representative sample that included all the TB control regions. Data was extracted for the period January to June 2012 from 3 reporting and recording tools used at the service delivery points. This included; the patient record card, the facility treatment register and the district register. The facility treatment register was used as the reference tool for comparison between the other tools. Levels of agreement were measured using the kappa scores for completeness and consistency, while accuracy was measured by acceptable proportions of concordance with (100 ±5) % considered as acceptable. A total 215 service delivery points were visited. There were acceptable concordance rates ranging from 97% to 102% for reporting between the facility register and the district register for case notification. However there were poor concordance rates as low as 14% between the patient record card and the district register for TB case notification. The use of the patient record cards was observed to be sub-optimal. The BMI variable was the most incompletely reported. Support supervision at both regional and national levels should be strengthened by incorporating OSDV as part of the tasks to be undertaken routinely, provide documented feedback to facilities on data issues, provide on job training on BMI calculation. The importance of recording on the patient record card should be emphasized at all the levels of TB control.

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## **1.0 INTRODUCTION**

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### **1.1 Background information**

Tuberculosis (TB) remains a major health problem globally. It is ranked second leading cause of death among infectious diseases after HIV/AIDSs. There were an estimated 9 million new cases reported in 2011 and 1.4 million deaths (WHO report 2012). Various strategies have been adapted worldwide to fight the disease including DOTs with an aim of reversing the TB trends and as per the MDGs/ Stop Tb strategy, the prevalence and death rates should have been halved by 2015. There is a general decline in the global TB trends (WHO report 2012) which suggests that these targets could be achieved globally by 2015. However there are countries including Kenya that have shown significant decline in number of TB cases (all forms) and new smear positive cases detected and notified to the national program but may not achieve the MDG/Stop TB strategy targets by 2015 because of other attended challenges that include emergence of drug resistant TB (MDR TB), high HIV prevalence and relatively high poverty.

According the WHO TB report 2012, Kenya had a mortality rate of 22 per 100,000, prevalence of 291 per 100,000, treatment success rate of new smear positive was 87%, HIV positivity rate of 39%, and case detection for all forms of TB at 81%.

### **1.2 Data Quality Audit**

Data quality Audit (DQA) is the scientific and statistical evaluation of data to determine if data obtained from environmental data operations are of the right type, quality, and quantity to support their intended use.



### **1.3 Kenya national Tuberculosis Recording & Reporting system**

*TB is a notifiable disease under the Public Health Act Cap 242 and therefore all TB Cases (diagnosed by the public or private sector) must be notified to the Ministry of Health through National TB control program.*

The Kenya national TB treatment guidelines of 2013, states that all patients diagnosed in health care facilities implementing the DOTS must be registered at the start of treatment. The TB patients are *line listed* in TB treatment facility register which is maintained at each health facility where tuberculosis treatment provided. These patients are then registered by district TB and leprosy coordinator (DTLC) into one combined district register and in which patient is given unique district registration number. The register takes the form of either manual system or an electronic TB register. The district register forms the basis of notifying the country of diagnosed and registered TB patients every calendar year.

The DLTLTD runs and maintains national TB surveillance system in which all TB cases diagnosed are line-listed and notified. Patient diagnosis and treatment is undertaken in service delivery points. The service delivery points cut across different levels from dispensary to national referral hospitals and under different ownership namely private, faith based and public sector. There were a total of 2,996 TB treatment sites and 1,907 diagnostic sites which make up 256 TB reporting zones. These TB control zones were managed by a higher level composed of 12 TB regions which were reporting to the National level.

Currently data is collected at service delivery points using paper based system. At the district and provincial level, both paper based and electronic system is used. At the district level, data is synchronized into a customized access database which allows the district to generate reports that will inform actions at lower levels. The access database is then sent to the provinces where these is consolidated and analyzed to generate summaries and reports. These databases at the provincial level are submitted electronically to the national level for country collation and analysis.

To ensure quality and continuous improvement the programme has put in place data quality assurance mechanisms that include; quarterly review meetings, annual data review meetings and routine supportive supervision at the service delivery points. Quarterly review meetings are held at the regional level and they bring together TB control zones within the region, while biannual data review meetings are held nationally bringing the regions together.

There are three (3) key R&R tools available for use at service delivery point

**TB Patient Record Card:** The Patient Record Card is focussed more on the clinical aspects of patient management. The Patient Record Card is a very valuable source of information for operational/clinical research on TB management. Every patient diagnosed and started on treatment is recorded in the patient record card.

**TB Treatment Facility Register:** The TB Treatment Register is maintained at each health facility where tuberculosis treatment is provided. All TB patients in the service delivery point are line listed by the clinician. The Tuberculosis Treatment Unit/facility Register is a very important monitoring & evaluation tools of the DLTLD. Maintenance of this register is the task of the health worker(s) who are responsible for the TB clinic. Every patient receiving tuberculosis treatment at the health facility must be recorded in this register. The register contains most of the information also found in the TB Patient Record Card and therefore should be consistent with the latter. It must be updated immediately after a patient attends the clinic for drug collection or when additional information becomes available like sputum examination results, HIV test results etc.

**TB Treatment District Register:** This register that contains line list all patients in a given TB control zone (district). This information is generated from TB facility register with cross reference with patient record card. This register is normally updated by the District TB and Leprosy Coordinator and contains information on all the patients in the district/zone. The district was phased into electronic (TIBU) system in 2012.

## **1.4 Problem Statement**

Routine TB surveillance systems are built around tracking and monitoring of TB disease from service delivery points and their notification to the national control program. This involves recording/line listing of patients in standard recording tools and reporting of the registered cases to the national authority.

TB data recording and reporting presents technical and management challenges at all levels of the surveillance systems and this may compromise the integrity of the data. These challenges include large amount of data, large number of indicators, time constraints and sometimes training limitations. There are multiple data collection tools which sometimes are overwhelming due to the shortage of HCW and this may result to incomplete and inappropriate recording.

The integrity of this system calls for the need for assurance of accuracy, reliability, precision, completeness and timeliness of the data captured and transmitted. There is need for routine data quality audits in a good TB surveillance system.

## **1.5 Justification**

The mandate of the National TB program in Kenya is to coordinate the control of TB in the country. The TB surveillance system provides the framework for measuring the performance of TB control activities in addressing the burden of TB disease. There are targets and milestones set for the country which are in line with the global and national health targets as per the millennium development goals (MDGs) and the national vision 2030.

The national program has put a lot of investments in strengthening the routine TB surveillance system. At the service delivery point where recording is undertaken, the investments include supply of recording and reporting tools, training of health providers, routine support supervision and on the job trainings. At the other reporting levels, there has been a conscious shift from paper based system to electronic system since 2011. Capacity building of the focal officers has been undertaken; they have been offered necessary support from the regional and national level.

Data quality audit in routine settings assures government and all stakeholders that the data provided is of good quality. This routine DQA provides trends over time on performance of the TB surveillance system. It identifies weaknesses and strengths in the surveillance system and provides an opportunity to mitigate the observed challenges.

The guidelines provide that routine DQA should be done biennially. However, the country conducted DQA in 2010 and another DQA was long overdue. To address this gap, the program has recently done data quality assessment limited only to a few reporting units (OSDVs done in some districts in Coast, Western, Rift valley and Nairobi). Even though these assessments noted minimal discrepancies in the reported data, there were elements of data reporting and recording that needed to be addressed like addition errors, incomplete data recording tools, training and operational challenges.

## **1.6 Objectives**

### **1.6.1 Broad Objective**

1. To assess the quality of TB surveillance data reported through the Kenya national TB surveillance system.

### **1.6.2 Specific Objectives**

1. To assess the accuracy of TB data at all recording and reporting levels.
2. To evaluate the completeness and consistency of TB data across all recording and reporting levels.
3. Identify strengths and weaknesses of the management of the TB surveillance system at all recording and reporting levels.

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## **2.0 Methodology**

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### **2.1 Conceptual framework**

Data quality can be approached in 5 different dimensions:

1. Accuracy – data measures what they are intended to measure and measures are not biased to users
2. Completeness - all inclusive and not partial
3. Timeliness – up-to-date and available on time
4. Availability – data collection system has the necessary documents and details, including a written procedure
5. Integrity/Spot check – no deliberate bias or manipulation

In this context, this DQA looks at, accuracy, completeness and consistency of the Kenya TB surveillance data. The methodology borrows from the WHO recommended RDQA tool. Due to time and financial constraints, all districts could not participate in DQA therefore a representative sample was chosen.

### **2.2 Study design**

This was a retrospective cross-sectional study carried out in selected districts of all 12 TB control regions in the country between June 2013 and July 2013 for 15 days. Quantitative comparison was done on recounted data to report data on the facility register and the district register targeting the population of patients registered in 2012.

Interviews were conducted on TB clinic staff at the time of the audit. The district and region coordinator of the selected districts and regions were also interviewed.

### **2.3 Implementation steps**

#### **2.3.1 Determining the purpose of the DQA**

The national M&E framework provides for routine data quality audit to be undertaken biennially. The M&E technical working group which brings together key stake holders in TB control directed the process. The main purpose of the DQA is to carry out an assessment of the TB surveillance system, focusing on 2 key dimensions of quality namely; accuracy, completeness and consistency.

#### **2.3.2 Selection of the level and sites to be included**

This DQA looks at 3 levels of TB surveillance system namely:

1. Service delivery points (facility)
2. District level
3. Regional level

### **2.3.3 Identification of indicators**

For data accuracy, completeness and consistency the following key priority performance indicators were selected:

- a. Total cases notified (all forms and smear positive)
- b. HIV testing
- c. CPT uptake
- d. ARV uptake
- e. Treatment outcomes.

For completeness and consistency, we compared variables in the different data collection tools: date of registration, date of treatment started, registration number, sex, age, disease site, HIV test, HIV test date, CPT and CPT date, ARV and ARV date, patient type, treatment outcome and treatment outcome date.

1. Conducting site visits; the site visits were conducted between the months of June to July 2013.

### **2.3.4 Questionnaire preparation**

Structured customized questionnaires were used to collect the data for quality assessment.

The tool was customized from the WHO RDQA tools to fit the Kenyan situation. The DQA was carried out using 3 forms namely:

1. Data collection form 1: This form was used to review the facility TB registers, treatment card and district register
2. Data collection form 2: This form was used for validation of TB registers (Facility, District and TIBU) and review of patient TB treatment cards
3. Data collection form 7: Facility Level Questionnaire; This form was used to interview Questions for TB Facility Staff

A pilot study was conducted in one region to test the reliability and validity of the various variables selected.

### **2.3.5 Training**

A one day meeting was held to sensitize the research assistants on the data collection tool, obtaining consent from the facility in charges and the sites to be visited.

## **2.4 Sampling method**

The country currently has 12 TB control regions. All the 12 regions were considered for the RDQA. In each region, 2 districts/TB control zone were randomly selected. In the selected TB control zones all the TB treatment sites were enumerated.

At the facility, 10 patient records were selected using the simple random sampling method. In facilities where there were 10 or less patients for the period considered, all patient records were included in the survey. These patient records were then matched with similar records in the treatment facility register, patient record card, district register /electronic reporting system (TIBU). Patient data was extracted for the period January 2012 to June 2012.

## **2.5 Inclusion criteria**

All the patients recorded in the following tools were included for the period Jan-June 2012 registered cases:

1. TB treatment facility registers.
2. Tb district register
3. Patient treatment cards
4. TIBU.

## **2.6 Exclusion Criteria**

1. All the cases transferred in.
2. All TB patients registered outside of the periods outlined above were excluded from the sampling frame.

## **2.7 Data collection and supervision**

Four teams were composed to visit various regions with each team assigned a supervisor. The teams were drawn from the TB programme, HMIS, KEMRI and CDC. The data collection exercise was conducted for three weeks.

## **2.8 Ethical consideration**

The data quality audit was conducted with the utmost adherence to the ethical standards of the country. While the audit teams required access to personal information for the purposes of recounting and cross-checking reported results, under no circumstances was any personal information disclosed in relation to the conduct of the audit or the reporting of findings and recommendations.

## 2.9 Data management and analysis

Double data entry was done by trained data clerks using access. Thereafter data cleaning and validation was conducted before analysis. SPSS and excel were utilized to describe the accuracy, completeness and consistency of the data. Accuracy was assessed by using the facility treatment register as the reference for comparison with the district register or the patient record card, any agreements between 95% - 105% (ref for surveillance reporting) was considered acceptable. Kappa score was used to measure consistency and completeness of the data. The following kappa interpretation score was used (ref);

<b>Kappa</b>	<b>Agreement</b>
<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
0.81-0.99	Almost perfect agreement



### 3.0 Results and Discussions

**Table 3. 1: The level of accuracy between Facility Treatment Register against the Patient Record Card and the District Register on Total Registered Patients**

Province	District	Facility Register	Treatment Record Cards	District Register	Level of Accuracy of Patient Record card (%)	Level of Accuracy of District Register (%)
Coast Province	Mombasa	308	197	302	64	98.1
	Wundanyi	57	3	65	5.3	114
	<b>Coast Total</b>	<b>365</b>	<b>200</b>	<b>367</b>	<b>54.8</b>	<b>100.5</b>
Central Province	Gatundu	259	168	262	64.9	101.2
	Nyandarua North	147	104	113	70.7	76.9
	<b>Central Total</b>	<b>406</b>	<b>272</b>	<b>375</b>	<b>67</b>	<b>92.4</b>
Rift Valley South Province	Kajiado Central	148	123	143	83.1	96.6
	Rongai	61	21	47	34.4	77
	<b>RVS Total</b>	<b>209</b>	<b>144</b>	<b>190</b>	<b>68.9</b>	<b>90.9</b>
Rift Valley North Province	Baringo	64	19	59	29.7	92.2
	Kwanza	146	10	128	6.8	87.7
	<b>RVN Total</b>	<b>210</b>	<b>29</b>	<b>187</b>	<b>13.8</b>	<b>89</b>
Nairobi North Province	Dagorreti R	211	159	208	75.4	98.6
	Kasarani H	387	284	377	73.4	97.4
	<b>NBIN Total</b>	<b>598</b>	<b>443</b>	<b>585</b>	<b>74.1</b>	<b>97.8</b>
Nairobi South Province	Embakasi H	569	329	634	57.8	111.4
	Kamukunji L	229	122	227	53.3	99.1
	<b>NBIS Total</b>	<b>798</b>	<b>451</b>	<b>861</b>	<b>56.5</b>	<b>107.9</b>
Nyanza North Province	Ndhiwa	167	0	163	0	97.6
	Rarieda	221	130	213	58.8	96.4
	<b>NYN Total</b>	<b>388</b>	<b>130</b>	<b>376</b>	<b>33.5</b>	<b>96.9</b>
Nyanza South Province	Nyatike	226	59	226	26.1	100
	Rongo	360	82	371	22.8	103.1
	<b>NYS Total</b>	<b>586</b>	<b>141</b>	<b>597</b>	<b>24.1</b>	<b>101.9</b>
Eastern South Province	Kathiani	105	89	23	84.8	21.9
	Lower Yatta	33	5	38	15.2	115.2
	Kitui West	175	90	165	51.4	94.3
	<b>EAS Total</b>	<b>313</b>	<b>184</b>	<b>226</b>	<b>58.8</b>	<b>72.2</b>
Eastern North Province	Garbatula	81	27	43	33.3	53.1
	Tigania West	151	54	146	35.8	96.7
	<b>EAN Total</b>	<b>232</b>	<b>81</b>	<b>189</b>	<b>34.9</b>	<b>81.5</b>
North Eastern Province	Fafi	11	6	11	54.5	100
	Wajir West	44	22	43	50	97.7
	Habaswein Wajir South	1	0	1	0	100
	Wajir	5	0	5	0	100
	<b>NEP Total</b>	<b>55</b>	<b>28</b>	<b>54</b>	<b>50.9</b>	<b>98.2</b>
Western Province	Teso South	96	57	79	59.4	82.3
	Matungu	80	53	77	66.3	96.3
	<b>WES Total</b>	<b>176</b>	<b>110</b>	<b>156</b>	<b>62.5</b>	<b>88.6</b>
<b>Kenya Total</b>	<b>Kenya Total</b>	<b>4336</b>	<b>2213</b>	<b>4163</b>	<b>51</b>	<b>96</b>

Data was collected from a representative sample from all the TB control regions for the period Jan – June 2012. A total of 215 (7%) service delivery points were visited out of the 2996 TB treatment sites in the country. The assessment compared the national notification of TB by the districts against the registered at the service delivery points. During this time period there were a total of 230 TB control zones (districts) and 12 TB control regions.

### **3.1 Results in accuracy**

Accuracy an attribute of data quality was assessed using selected key program indicators namely total TB case notification, HIV testing for TB patients, CPT and ART uptake of TB/HIV co – infected patients.

Overall in the country there was 96% level of agreement between the facility register and the district register in terms of cases notified as shown in table 3.1. This is acceptable level of performance which indicates a good performance of the TB surveillance system in Kenya. Regional variation was noted with 3 provinces performing within acceptable level of agreement and 6 provinces performed below the cut off level of 95% agreement. These regions were Central, Rift valley south and north, eastern south and north and western. Of concern, 2 TB control zones Kathiani (21.2%) and Garbatulla (53.3%) had very low agreement of TB notified cases in comparison with the treatment facility register. Coast, Nairobi south and Nyanza south reported more patients than what is in the facility register which is slightly over 100%. Nairobi south had 107.9% level of agreement which is an unacceptable performance.

The level of agreement between the facility register and the TB patient record was dismal with an overall performance of 51%. There is poor use of patient record card which is a critical tool in patient management. Some control zones (Ndhiwa, Habasweini, Wajir) were not using patient cards. Possible reasons for this include; erratic supply of the tool, poor enforcement by the supervisors and the clinicians do not see the use since they feel the facility register is adequate hence double work.

**Table 3. 2: The level of accuracy between Facility Treatment Register against the Patient Record Card and the District Register on ARV uptake**

Province	District	Facility Register	Treatment Record Cards	District Register	Level of Accuracy of Patient Record card (%)	Level of Accuracy of District Register (%)
Coast Province	Mombasa	72	50	72	69.4	100
	Wundanyi	17	0	20	0	117.6
	Coast Total	89	50	92	56.2	103.4
Central Province	Gatundu	70	29	65	41.4	92.9
	Nyandarua North	41	10	29	24.4	70.7
	Central Total	111	39	94	35.1	84.7
Rift Valley South Province	Kajiado Central	142	95	126	66.9	88.7
	Rongai	3	0	4	0	133.3
	RVS Total	145	95	130	65.5	89.7
Rift Valley North Province	Baringo	10	2	12	20	120
	Kwanza	26	0	18	0	69.2
	RVN Total	36	2	30	5.6	83.3
Nairobi North Province	Dagorreti R	70	64	70	91.4	100
	Kasarani H	130	95	130	73.1	100
	NBIN Total	200	159	200	79.5	100
Nairobi South Province	Embakasi H	142	19	94	13.4	66.2
	Kamukunji L	6	1	6	16.7	100
	NBIS Total	148	20	100	13.5	67.6
Nyanza North Province	Ndhiwa	94	0	76	0	80.9
	Rarieda	151	42	140	27.8	92.7
	NYN Total	245	42	216	17.1	88.2
Nyanza South Province	Nyatike	129	34	131	26.4	101.6
	Rongo	212	15	195	7.1	92
	NYS Total	341	49	326	14.4	95.6
Eastern South Province	Kathiani	22	8	6	36.4	27.3
	Lower Yatta	14	3	16	21.4	114.3
	Kitui West	38	5	41	13.2	107.9
	EAS Total	74	16	63	21.6	85.1
Eastern North Province	Garbatula	15	2	3	13.3	20
	Tigania West	22	1	21	4.5	95.5
	EAN Total	37	3	24	8.1	64.9
*North Eastern Province	Fafi	0	0	0	100	100
	Wajir West	0	0	0	100	100
	Habaswein Wajir South	0	0	0	100	100
	Wajir	0	0	0	100	100
	NEP Total	0	0	0	100	100
Western Province	Teso South	28	5	20	17.9	71.4
	Matungu	23	7	28	30.4	121.7
	WES Total	51	12	48	23.5	94.1
<b>Kenya Total</b>	<b>Kenya Total</b>	<b>1477</b>	<b>487</b>	<b>1323</b>	<b>33</b>	<b>89.6</b>

\*There were no HIV positive patients reported in this region, thus no actual data for comparison.

Nationally, there was 89.6% level of agreement between the facility register and the district register in terms of ARV uptake as shown in table 3.2. This denotes an under reporting of TB cases on ARV to the national program.

Three provinces (Coast, Nairobi North, Nyanza South) performing within acceptable level of agreement and 9 provinces performed below the cut off level of 95% level of agreement. Nairobi south(68%) and Eastern North (65%) had low levels of agreement .

The level of agreement between the facility register and the TB patient record was dismal with an overall performance of 33% for the whole country. Poor use of the patient record card was noted.

**Table 3. 3: The level of accuracy between Facility Treatment Register against the Patient Record Card and the District Register on CPT uptake**

Province	District	Facility Register	Treatment Record Cards	District Register	Level of Accuracy of Patient Record card (%)	Level of Accuracy of District Register (%)
Coast Province	Mombasa	72	50	72	69.4	100
	Wundanyi	17	0	22	0	129.4
	Coast Total	89	50	94	56.2	105.6
Central Province	Gatundu	77	32	67	41.6	87
	Nyandarua North	53	20	35	37.7	66
	Central Total	130	52	102	40	78.5
Rift Valley South Province	Kajiado Central	29	7	23	24.1	79.3
	Rongai	5	0	6	0	120
	RVS Total	34	7	29	20.6	85.3
Rift Valley North Province	Baringo	12	3	14	25	116.7
	Kwanza	50	0	39	0	78
	RVN Total	62	3	53	4.8	85.5
Nairobi North Province	Dagorreti R	70	64	70	91.4	100
	Kasarani H	131	96	131	73.3	100
	NBIN Total	201	160	201	79.6	100
Nairobi South Province	Embakasi H	164	41	169	25	103
	Kamukunji L	19	3	17	15.8	89.5
	NBIS Total	183	44	186	24	101.6
Nyanza North Province	Ndhiwa	119	0	107	0	89.9
	Rarieda	154	64	145	41.6	94.2
	NYN Total	273	64	252	23.4	92.3
Nyanza South Province	Nyatike	144	34	136	23.6	94.4
	Rongo	251	25	226	10	90
	NYS Total	395	59	362	14.9	91.6
Eastern South Province	Kathiani	30	17	7	56.7	23.3
	Lower Yatta	13	3	16	23.1	123.1
	Kitui West	39	7	39	17.9	100
	EAS Total	82	27	62	32.9	75.6
Eastern North Province	Garbatula	18	3	4	16.7	22.2
	Tigania West	27	4	23	14.8	85.2
	EAN Total	45	7	27	15.6	60
North Eastern Province	Fafi	1	0	1	100	100
	Wajir West	0	0	0	100	100
	Habaswein Wajir South	0	0	0	100	100
	Wajir	0	0	0	100	100
	NEP Total	1	0	1	100	100
Western Province	Teso South	31	13	23	41.9	74.2
	Matungu	26	19	27	73.1	103.8
	WES Total	57	32	50	56.1	87.7
<b>Kenya Total</b>	<b>Kenya Total</b>	<b>1552</b>	<b>505</b>	<b>1419</b>	<b>32.5</b>	<b>91.4</b>

Nationally, there was 91.4% level of agreement between the facility register and the district register in terms of CPT uptake as shown in table 3.3. This denotes an under reporting of TB cases on CPT to the national program.

Four provinces, Coast (105.6%), Nairobi North (100%), Nairobi South (101.6%), North Eastern (100%) performed within acceptable level of agreement. Eight provinces performed below the cut off level of 95% level of agreement with the lowest levels from Eastern South (76%) and Eastern North (60%).

There was very low level of agreement between the facility register and the TB patient record with an overall performance of 32.5%.

**Table 3. 4: The level of accuracy between Facility Treatment Register against the Patient Record Card and the District Register on Total Patients tested for HIV**

Province	District	Facility Register	Treatment Record Cards	District Register	Level of Accuracy of Patient Record card (%)	Level of Accuracy of District Register (%)
Coast Province	Mombasa	263	192	259	73	98.5
	Wundanyi	48	2	59	4.2	122.9
	Coast Total	311	194	318	62.4	102.3
Central Province	Gatundu	257	131	226	51	87.9
	Nyandarua North	146	65	111	44.5	76
	Central Total	403	196	337	48.6	83.6
Rift Valley South Province	Kajiado Central	142	95	126	66.9	88.7
	Rongai	15	0	17	0	113.3
	RVS Total	157	95	143	60.5	91.1
Rift Valley North Province	Baringo	60	12	55	20	91.7
	Kwanza	145	5	121	3.4	83.4
	RVN Total	205	17	176	8.3	85.9
Nairobi North Province	Dagorreti R	205	128	202	62.4	98.5
	Kasarani H	360	252	354	70	98.3
	NBIN Total	565	380	556	67.3	98.4
Nairobi South Province	Embakasi H	544	233	531	42.8	97.6
	Kamukunji L	197	80	147	40.6	74.6
	NBIS Total	741	313	678	42.2	91.5
Nyanza North Province	Ndhiwa	158	0	161	0	101.9
	Rarieda	220	100	204	45.5	92.7
	NYN Total	378	100	365	26.5	96.6
Nyanza South Province	Nyatike	224	55	226	24.6	100.9
	Rongo	375	47	216	12.5	57.6
	NYS Total	599	102	442	17	73.8
Eastern South Province	Kathiani	103	72	23	69.9	22.3
	Lower Yatta	32	5	36	15.6	112.5
	Kitui West	171	58	157	33.9	91.8
	EAS Total	306	135	216	44.1	70.6
Eastern North Province	Garbatula	81	26	43	32.1	53.1
	Tigania West	137	41	144	29.9	105.1
	EAN Total	218	67	187	30.7	85.8
North Eastern Province	Fafi	5	7	10	140	200
	Wajir West	42	21	42	50	100
	Habaswein Wajir South	1	0	1	0	100
	Wajir	4	0	4	0	100
	NEP Total	47	28	52	59.6	110.6
Western Province	Teso South	92	46	71	50	77.2
	Matungu	77	52	76	67.5	98.7
	WES Total	169	98	147	58	87
<b>Kenya Total</b>	<b>Kenya Total</b>	<b>4099</b>	<b>1725</b>	<b>3617</b>	<b>42.1</b>	<b>88.2</b>

Nationally, there was 88.2% level of agreement between the facility register and the district register in terms of number tested for HIV as shown in table 3.4. This denotes an under reporting of TB cases tested for HIV to the national program.

Three provinces; Coast (102.3%), Nairobi North (98.4%), Nyanza North (96.6%) performed within acceptable level of agreement and 9 provinces performed below the cut off level of 95% level of agreement with the lowest level from Nyanza South (73.8%) and Eastern South (70.6%). There was very low level of agreement between the facility register and the TB patient record with an overall performance of 42.1%.



**Table 3. 5: The level of accuracy between Facility Treatment Register against the Patient Record Card and the District Register on TB patients with BMI recordings**

Province	District	Facility Register	Treatment Record Cards	District Register	Level of Accuracy of Patient Record card (%)	Level of Accuracy of District Register (%)
Coast Province	Mombasa	258	183	256	70.9	99.2
	Wundanyi	36	6	41	16.7	113.9
	Coast Total	294	189	297	64.3	101
Central Province	Gatundu	216	16	189	7.4	87.5
	Nyandarua North	110	23	89	20.9	80.9
	Central Total	326	39	278	12	85.3
Rift Valley South Province	Kajiado Central	126	86	141	68.3	111.9
	Rongai	10	0	5	0	50
	RVS Total	136	86	146	63.2	107.4
Rift Valley North Province	Baringo	33	1	54	3	163.6
	Kwanza	88	0	53	0	60.2
	RVN Total	121	1	107	0.8	88.4
Nairobi North Province	Dagorreti R	118	111	111	94.1	94.1
	Kasarani H	258	215	258	83.3	100
	NBIN Total	376	326	369	86.7	98.1
Nairobi South Province	Embakasi H	264	0	339	0	128.4
	Kamukunji L	14	0	14	0	100
	NBIS Total	278	0	353	0	127
Nyanza North Province	Ndhiwa	65	0	50	0	76.9
	Rarieda	211	0	179	0	84.8
	NYN Total	276	0	229	0	83
Nyanza South Province	Nyatike	166	39	134	23.5	80.7
	Rongo	268	5	218	1.9	81.3
	NYS Total	434	44	352	10.1	81.1
Eastern South Province	Kathiani	84	62	11	73.8	13.1
	Lower Yatta	29	0	30	0	103.4
	Kitui West	115	24	138	20.9	120
	EAS Total	228	86	179	37.7	78.5
Eastern North Province	Garbatula	75	6	41	8	54.7
	Tigania West	24	0	32	0	133.3
	EAN Total	99	6	73	6.1	73.7
North Eastern Province	Fafi	7	7	7	100	100
	Wajir West	37	14	33	37.8	89.2
	Habaswein Wajir South	0	0	0	0	0
	Wajir	4	0	4	0	100
	NEP Total	44	21	40	47.7	90.9
Western Province	Teso South	50	7	50	14	100
	Matungu	51	38	70	74.5	137.3
	WES Total	101	45	120	44.6	118.8
Kenya Total	Kenya Total	2713	843	2543	31.1	93.7

It was observed that at some facilities the variables used for calculating BMI (weight and height) were not utilized to determine this indicator, while the electronic system automatically used these variables to calculate the BMI. Therefore it would appear the zones are over-reporting (>100%) yet the facility register did not have these values.

Overall, there was 93.7% level of agreement between the facility register and the district register in terms of number of cases on nutritional assessment as shown in table above. This signify an under reporting of TB cases on nutritional assessment to the national program.

There was very low level of agreement between the facility register and the TB patient record with an overall performance of 31.1%.

**Table 3. 6: The level of accuracy between Facility Treatment Register against the Patient Record Card and the District Register on PTB retreatment case notification**

Province	District	Facility Register	Treatment Record Cards	District Register	Level of Accuracy of Patient Record card (%)	Level of Accuracy of District Register (%)
Coast Province	Mombasa	36	25	36	69.4	100
	Wundanyi	6	0	7	0	116.7
	Coast Total	42	25	43	59.5	102.4
Central Province	Gatundu	26	13	20	50	76.9
	Nyandarua North	20	7	12	35	60
	Central Total	46	20	32	43.5	69.6
Rift Valley South Province	Kajiado Central	9	8	10	88.9	111.1
	Rongai	4	0	3	0	75
	RVS Total	13	8	13	61.5	100
Rift Valley North Province	Baringo	6	1	5	16.7	83.3
	Kwanza	20	1	18	5	90
	RVN Total	26	2	23	7.7	88.5
Nairobi North Province	Dagorreti R	27	27	27	100	100
	Kasarani H	54	47	54	87	100
	NBIN Total	81	74	81	91.4	100
Nairobi South Province	Embakasi H	64	15	62	23.4	96.9
	Kamukunji L	29	3	26	10.3	89.7
	NBIS Total	93	18	88	19.4	94.6
Nyanza North Province	Ndhiwa	11	0	12	0	109.1
	Rarieda	40	23	36	57.5	90
	NYN Total	51	23	48	45.1	94.1
Nyanza South Province	Nyatike	30	5	27	16.7	90
	Rongo	23	9	20	39.1	87
	NYS Total	53	14	47	26.4	88.7
Eastern South Province	Kathiani	6	8	0	133.3	0
	Lower Yatta	4	0	0	0	0
	Kitui West	7	6	1	85.7	14.3
	EAS Total	17	14	1	82.4	5.9
Eastern North Province	Garbatula	4	0	1	0	25
	Tigania West	11	2	10	18.2	90.9
	EAN Total	15	2	11	13.3	73.3
North Eastern Province	Fafi	0	0	0	100	100
	Wajir West	0	0	0	100	100
	Habaswein Wajir South	0	0	0	100	100
	Wajir	0	0	0	100	100
	NEP Total	0	0	0	100	100
Western Province	Teso South	12	10	9	83.3	75
	Matungu	7	4	5	57.1	71.4
	WES Total	19	14	14	73.7	73.7
Kenya Total	Kenya Total	456	214	401	46.9	87.9

This indicator showed 87.9% level of agreement between the facility register and the district register in terms of PTB retreatment cases. This indicated an under reporting to the national program.

While North Eastern did not report any case within the period, Coast, Rift Valley south and Nairobi North provinces performed within acceptable level of agreement and the other provinces (7) performed below the cut off level of 95% level of agreement.

There was a below average level of agreement between the facility register and the TB patient record with an overall performance of 46.9%.

**Table 3. 7: The level of accuracy between Facility Treatment Register against the Patient Record Card and the District Register on pulmonary TB cases notified**

Province	District	Facility Register	Treatment Record Cards	District Register	Level of Accuracy of Patient Record card (%)	Level of Accuracy of District Register (%)
Coast Province	Mombasa	224	110	222	49.1	99.1
	Wundanyi	42	1	51	2.4	121.4
	Central Total	266	111	273	41.7	102.6
Central Province	Gatundu	238	145	210	60.9	88.2
	Nyandarua North	133	64	101	48.1	75.9
	Central Total	371	209	311	56.3	83.8
Rift Valley South Province	Kajiado Central	127	91	133	71.7	104.7
	Rongai	45	16	28	35.6	62.2
	RVS Total	172	107	161	62.2	93.6
Rift Valley North Province	Baringo	50	9	46	18	92
	Kwanza	121	9	96	7.4	79.3
	RVN Total	171	18	142	10.5	83
Nairobi North Province	Dagorreti R	139	94	137	67.6	98.6
	Kasarani H	298	195	296	65.4	99.3
	NBIN Total	437	289	433	66.1	99.1
Nairobi South Province	Embakasi H	464	212	489	45.7	105.4
	Kamukunji L	130	60	101	46.2	77.7
	NBIS Total	594	272	590	45.8	99.3
Nyanza North Province	Ndhiwa	113	0	104	0	92
	Rarieda	162	68	152	42	93.8
	NYN Total	275	68	256	24.7	93.1
Nyanza South Province	Nyatike	152	34	168	22.4	110.5
	Rongo	279	44	272	15.8	97.5
	NYS Total	431	78	440	18.1	102.1
Eastern South Province	Kathiani	95	72	86	75.8	90.5
	Lower Yatta	26	3	31	11.5	119.2
	Kitui West	139	51	125	36.7	89.9
	EAS Total	260	126	242	48.5	93.1
Eastern North Province	Garbatula	35	13	43	37.1	122.9
	Tigania West	129	37	134	28.7	103.9
	EAN Total	164	50	177	30.5	107.9
North Eastern Province	Fafi	3	2	3	66.7	100
	Wajir West	26	18	26	69.2	100
	Habaswein Wajir South	0	0	0	0	0
	Wajir	4	0	4	0	100
	NEP Total	29	20	29	69	100
Western Province	Teso South	65	31	60	47.7	92.3
	Matungu	49	11	33	22.4	67.3
	WES Total	114	42	93	36.8	81.6
<b>Kenya Total</b>	<b>Kenya Total</b>	<b>3284</b>	<b>1390</b>	<b>3147</b>	<b>42.3</b>	<b>95.8</b>

Overall, there was 95.8% level of agreement between the facility register and the district register in terms of number of PTB cases as shown in table 3.7 above, which is within the acceptable level of agreement.

Coast, Nairobi North, North Eastern, Nairobi North and Nyanza South provinces performed within acceptable level of agreement. One province over reported while six provinces performed below the cut off level of 95% level of agreement.

There was very low level of agreement between the facility register and the TB patient record with an overall performance of 42.3%.

### 3.2 Results in completeness and consistency

The following data was analyzed using the Kappa score statistic to assess the level of agreement between the Facility register, Treatment cards and District register. A number of variables were selected from the facility register which were then used to compare consistency within various data sources.

For these analyses we used Altman’s Kappa benchmark scales for interpretation. Results from selected variables are presented below.

**Table 3. 8: Kappa Scores for Facility Register versus District Register**

Measures of agreement of the various variables between facility register and district register (n=1568)				
Variables	Kappa Value	Asymp. Std. Error <sup>a</sup>	Approx. T <sup>b</sup>	Approx. Sig.
Sex	0.816	0.013	43.075	0.000
Age	0.821	0.010	238.168	0.000
Patient Type	0.699	0.020	38.322	0.000
Treatment Outcome	0.527	0.016	39.651	0.000
Disease Site	0.746	0.017	39.721	0.000

The level of agreement for age and sex between facility register and district register were 0.821 and 0.816 respectively which was interpreted as almost perfect agreement. Patient type and disease type scored moderate level of agreement with scores of 0.746 and 0.699 respectively while the level of agreement of patient records on treatment outcome was moderate..

**Table 3. 9: Kappa Scores for Facility Register versus Treatment record card**

<b>Measures of agreement of the various variables between facility register and treatment record card (n=1568)</b>				
<b>Variables</b>	<b>Kappa Value</b>	<b>Asymp. Std. Errora</b>	<b>Approx. Tb</b>	<b>Approx. Sig.</b>
<b>Sex</b>	<b>0.335</b>	<b>0.014</b>	<b>24.024</b>	<b>0.000</b>
<b>Age</b>	<b>0.442</b>	<b>0.013</b>	<b>156.089</b>	<b>0.000</b>
<b>Patient Type</b>	<b>0.201</b>	<b>0.015</b>	<b>14.596</b>	<b>0.000</b>
<b>Treatment Outcome</b>	<b>0.031</b>	<b>0.004</b>	<b>11.373</b>	<b>0.000</b>
<b>Disease Site</b>	<b>0.047</b>	<b>0.005</b>	<b>17.534</b>	<b>0.000</b>

The level of agreement between the facility register and treatment card record for the variable age of 0.442 is moderate. For all the other variables, generally the level of agreement ranged between slight to fair agreement, with treatment outcome scoring 0.031 (3%), disease site scoring 0.047 (4%), patient type scoring 0.201 (20%) and sex scoring 0.335 (33.5%).

Some of the challenges observed included incompleteness of data recording for various variables such as date of start of treatment, date for initiation of ART, serial number of laboratory results and corresponding dates, calculated BMI and date of treatment outcome. There was also notable sub-optimal use of the patient record cards which could be attributed to various reasons including; HCWs workers feeling that the filling it is a duplication of work, cards being out of stock and increased workload. Cases of mismatched registration dates and date of start of treatment, whereby the date of start of treatment precedes the registration date were noted in some areas.

A notable proportion of BMIs were not calculated and there were instances of old phased out registers which do not incorporate the calculation of BMI.

There was poor filing of patient record cards, making it difficult to retrieve records required. This may have contributed to the non-use of this reporting tool.

There were instances of use of telephone communication between DTLCs and the HCWs at the facility to register new patients. This resulted in registration dates differing between facility and district registers. Physical absence of support supervision was noted, especially in facilities with low workload.

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## **4.0 Conclusion and Recommendations**

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### **4.1 Conclusion**

1. There was general consistency of reporting between the facility register and the district register. However there was poor consistency between the patient record card and the district register.
2. The accuracy of reporting on the selected indicators varied in the country. Regions that had acceptable accuracy included; Nairobi North, Coast and Nyanza South.
3. The use of the patient record cards was sub-optimal.
4. The BMI variable was most incompletely reported.

### **4.2 Recommendations**

1. Support supervision should incorporate OSDV as part of the tasks to be undertaken (National and Regional level).
2. Give documented feedback to facilities on data issues, BMI calculation understanding and recording (OJT).
3. The importance of recording on the patient record card should be emphasized at all the levels of TB control (National and County) and proper filing of these records should be enhanced. This will ensure adequate supply and use of current R &R tools at service delivery points.
4. Develop SOPs on the use of R& R tools. In line with this all these tools should have instructions inserted on cover pages for guidance.



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