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# Assessment of the quality of tuberculosis surveillance data in six selected states in Southern Nigeria

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## ABSTRACT

**Introduction:** Tuberculosis (TB) data are used to evaluate the effectiveness of TB program interventions, identify deficiencies, and inform policies and programs. These data are also used for advocacy, resource mobilization, and allocation, both nationally and internationally. This study is aimed at verifying the reliability of the data collated and submitted from the direct observation therapy strategy (DOTS) facilities to the National TB Program (NTP) in some selected states in Southern Nigeria. **Materials and Methods:** A total of 29 facilities providing TB services were purposively selected from six states in Southern Nigeria, based on the treatment success rate as reported in 2009. In each selected facility, the following records were reviewed for concordance: Patient treatment cards and facility TB register, facility TB register and facility laboratory register, facility TB register and local government area (LGA) TB register, and LGA TB register and TB quarterly reports. Furthermore, a total of 273 patients were selected for interview to validate the information contained in the treatment cards. **Results:** Agreement between the data sources was relatively high, though higher in some states than the others. Agreement between patient treatment card and facility TB register, and facility TB register and laboratory register were 97% and 85%, respectively. The lowest concordance was observed between the facility TB register and the LGA TB register. All the patients interviewed confirmed the information as recorded in their treatment cards. **Conclusion:** The study revealed that NTP data in Southern Nigeria is fairly reliable; however, there are variations observed among the states and at various levels. This study underlines the need to improve TB surveillance data in some states, particularly at the facility and at the LGA levels.

**Key words:** Agreement, diagnosis, facility, National TB Program (NTP), Nigeria, treatment outcome

## Introduction

Tuberculosis (TB) surveillance data is an integral component of National TB Program (NTP) for the monitoring and evaluation (M&E) of TB program. The data generated in the course of service delivery are collated and analyzed at the facility level/local government area (LGA) units, and are reported quarterly to the National TB Control Program through the state. These data are used to evaluate the effectiveness of

TB program interventions, identify deficiencies, and determine policies and design programs. They are also used for advocacy, resource mobilization, and allocation, both nationally and internationally. More so, they provide benchmarks to ascertain the progress made toward the achievement of Millennium Development Goal (MDG) 6.<sup>[1,2]</sup> According to Springson *et al.*,<sup>[3]</sup> inadequate data quality may impair our understanding of the true epidemiology of TB, compromise core program functions, and undermine our ability to meet program objectives and goals. Although the availability of accurate and complete TB surveillance data varies considerably between regions as well as countries, these data provide an essential tool for local, national, and global efforts to control and eliminate TB.

In Nigeria, LGA was the functional unit of TB program until recently. Thus, TB notification data is

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collated at the LGA level and reported to the State TB and Leprosy Control Officer (STBLCO), who then notifies the NTP. Each LGA TB program is coordinated by the Local Government TB/Leprosy Supervisor. His mandate includes supervision of the direct observation therapy strategy (DOTS) facilities and the other facilities providing TB services, supply of consumables and drugs, and registration and notification of TB cases. Except for those facilities with high case load, most times there is only one LGA TB register for all the facilities in the LGA. However, in recent times, efforts are being made to introduce facility TB register for the collation of data at the facility level, particularly in those facilities providing both TB and human immunodeficiency virus (HIV) services. Thus, the facilities are expected to submit their TB data to the LGTBLS, who then report to the STBLCO and finally to the National TB and Leprosy (NTBL) office.

For NTP, the data surveillance tools include patient treatment card, facility/LGA TB register, laboratory sputum register at the facility and at the LGA levels (LGTBLS). Each LGTBLS collates data from each DOTS facility within an LGA on case findings and treatment outcome at the end of each quarter, and submits the data to the State TB Control Program. The quarterly reports are presented and validated during the State TB quarterly meetings, which involve all the LGTBLS and the State TB Program officers. Thereafter, LGA quarterly reports are collated at the state level and submitted to the NTP. However, the extent to which data generated at the DOTS facilities reflect the data notified by the NTP is yet to be ascertained. The question then is, are the data generated at the DOTS facilities a true reflection of the data notified by the NTP? Consequently, this study is aimed at verifying the reliability of the data collated and submitted from the DOTS facilities to the NTP in some selected states in Southern Nigeria.

## Materials and Methods

For this survey, modified versions of the methodology and questionnaire used by Trebucq *et al.*<sup>[4]</sup> for a similar survey in Benin Republic were adopted. The survey was conducted in six selected states in Southern Nigeria, supported by the German Leprosy and TB Relief Association (GLRA). A multistage sampling technique was used to select a total of 29 DOTS facilities and 273 TB patients who were certified as “cured” or “treatment completed” in the facility register. The states were first divided into three geopolitical zones, namely, the Southeast, South South, and South West zones. From each geopolitical zone, two states were

selected by simple random sampling and they included Ebonyi and Anambra States in the Southeast zone, Rivers and Akwa Ibom States in the South South zone, and Ekiti and Ondo States in the South West zone. In each selected state, four to six DOTS centers, accounting for at least 60% of the TB patients’ load in the state and with at least 80% case holding rate, were selected for the survey.

## Data collection

A 1-day presurvey tool validation meeting was held with a team of six consultants to discuss the survey objectives, methodology, and tools. Thereafter, each consultant was assigned to a state. In each state with the assistance of the STBLCO, guides were recruited for the selected DOTS facilities. The staff of the selected facilities was informed beforehand on the records to make available; however, details of the survey and the objective were not disclosed to them. This was done to ensure that the survey was completed on schedule as well as to avoid those occasions where the staff reviewed their records. This measure also ensured availability of the staff during a 2-day public holiday that coincided with the survey period. Local government quarterly report of the second quarter of 2009 for each of the selected LGAs was retrieved from the STBLCO, prior to visiting the facilities. On arrival to a facility, each consultant reviewed the following records using a prevalidated checklist: Patient treatment cards, facility TB register, and facility laboratory register. The other record reviewed was the LGA TB register provided by the LGTBLS for the LGA, and the quarterly reports submitted. The records were reviewed for concordance, consistency, and validity to ascertain the quality of the data used for TB surveillance in the state. The records were reviewed as follows:

### *Agreement between patient treatment card and facility TB register*

In each facility, the first 30 consecutive patients in the facility register seen in the first quarter (January-March) of 2009 were listed. In cases where the number of patients registered within the period was less than 30, all were selected, and additional patients were selected from the next quarter to make it up to 30. If a selected patient’s treatment card was not found, the case was replaced with the next eligible patient. Each patient’s classification in case finding and treatment outcome in the facility register and treatment card were compared. If the information was not indicated on the card, it was looked up in the patient’s file. The aim was to be sure that the data in the card is reliable.

*Agreement between facility TB register and LGA TB register*

In each facility, for both new and retreatment cases, notification data of the patients registered in the facility in the second quarter (April-June) of 2009 were recalculated by the survey team for diagnosis and treatment outcome, and compared with the notification of the facility as captured in the LGA TB register. However, during the survey, some facilities were found to not have facility TB register and were excluded from the analysis. If there was discordance between the facility TB register and the LGA TB register, the treatment card was used for confirmation.

*Agreement between LGA TB register and quarterly reports*

In each LGA notification, for both new and retreatment cases, data of the patients registered in the LGA in the second quarter (April-June) of 2009 were recalculated by the survey team for diagnosis and treatment outcome, and compared with the quarterly report submitted to the State TBL Control Office. In case of disagreement, the following two measures were taken:

1. A new analysis of the registers were conducted and the result was considered as the real statistical data (to eliminate any error from the survey itself), and
2. The form filled out by the LGA at the time was compared with the State quarterly report to detect any error during imputation of the data at the state level.

*Agreement between facility TB register and laboratory register*

At each DOTS facility, the first 30 consecutive smear-positive patients (both new and retreatment cases) were reported "cured" or "treatment completed" in the facility TB register in the second quarter (April-June) of 2009. If the number of patients in the register was less than 30, all were selected. For each case, the date of commencement of the treatment, was the sickness "cured" or "treatment completed", the result of the last acid-fast bacillus (AFB) test and its date in the TB register and laboratory were noted. In addition, from the facility TB register, 20 sputum smear-positive patients were selected from the second quarter (April-June) of 2009 (the next quarter was included if necessary or if there were less than 20 patients in this quarter). The smear-positive patients were those who were found in the "diagnosis" column of the laboratory register, twice certified "positive."

*Agreement between patient treatment card and patient interview*

Using the facility TB register and starting from the month of May 2009, the number of the first 10 smear-positive TB patients declared "cured" or "treatment completed" for both new and retreatment cases were

recorded. This is because these cases were believed to have just completed their treatment and were less likely to have relocated or moved away from the address stated in their treatment cards. The treatment cards of the selected patients were sorted to ensure that the information on diagnosis and result of the treatment written on it agreed with the information on the TB register. Discussion was held with the health staff (DOTS providers) on the possibility of visiting these patients at their homes or reaching out to them over the phone using the phone number recorded in their treatment cards, where home visit was not possible. When an individual could not be traced, the reasons were stated. Where home visit was possible or the person could be reached over the phone, using a standardized questionnaire, information was collected from the patient on his biodata to confirm the information in the treatment card, his/her knowledge of TB, previous diagnosis and treatment including all the investigations done, and the outcome of the treatment. Information was also elicited on any difficulty encountered in the course of the treatment and whether the patient was at present experiencing any symptom similar to the one experienced at the diagnosis. If during home visit the patient could not be found but a close family member was found, the questionnaire was filled with the aid of the family member and the reason as to why the patient could not be found was stated.

**Ethical consideration**

Ethical approval for the survey was sought and obtained from the College of Medicine and Health Sciences, Abia State University, Ethics Committee. Administrative approval was obtained from the State Tuberculosis Program (STP) and the facility managers. Patients or their proxies were visited at home and the interview was conducted privately after confidentiality was assured. However, only those who consented after due explanation of the aim, procedure, risks, and benefits of the survey were interviewed.

**Results**

A total of 29 health care facilities were surveyed as shown below in Table 1. The number of facilities surveyed per state was in the range of four facilities for Ebonyi, Rivers, and Ondo and six for Akwa Ibom. The facilities surveyed included primary, secondary, and tertiary as well as public and private health care facilities providing DOTS services in the states.

The data not recorded in the treatment cards or facility TB registers were not included in the analysis. Some data for Onitsha LGA in Anambra within the period

were lost in accident and thus were excluded from the analysis. For case finding, there was no record of TB classification in 30 out of 892 patients reviewed, 16 in the treatment card, 13 in the facility register, and one in both. The result of treatment was not recorded for 399 patients in the card, facility register, or in both.

The treatment card and the facility TB register are the primary sources of TB surveillance data for the NTP. Agreement between both sources of data was about 97% for all the states surveyed. For case finding, the highest level of agreement was reported in Ekiti (99.2%) and the least was in Ondo (93.7%). For treatment outcome, the least level of agreement was recorded in Ebonyi.

### Agreement between treatment register and laboratory register

With respect to diagnosis and treatment, the average level of agreement was about 85%. The least level of agreement was observed in Akwa Ibom for diagnosis (78.3%) and in Ebonyi for treatment outcome (71.4%). More than 88% of the smear-positive cases were diagnosed based on two smear-positive results in all the states surveyed. Also, about 72% of the smear-positive cases diagnosed in Akwa Ibom were based on two positive sputum-smear results.

Tables 2 and 3 show the concordance between the notified cases and the cases as observed during the

survey. The concordance showed obvious variations in the notification data of the facilities submitted to the LGAs, both for case finding and treatment outcome for smear-positive cases (both new and retreatment cases). For case finding and treatment outcome, new smear-positive case concordance was the least for Ondo, Anambra, and Akwa Ibom States. For treatment outcome in the retreatment cases, case agreement was the least for Anambra and Akwa Ibom States. One facility in Ondo reported an additional 10 patients in the treatment outcome than was reported in case finding. Outcome of the retreatment was poorly notified in all the states except Rivers.

Agreement between the survey and the notified cases for LGA quarterly reports showed slight variation at the national levels [see Table 4]. These variations were predominantly accounted for by the data from Ebonyi and Anambra States for case finding. Variations in the treatment outcome were due to data from Akwa Ibom and Ekiti States.

A total of 273 patients reported as “cured” or “treatment completed” in the treatment card were selected for tracing as shown in Table 5. Of them, 103 (37.7%) could not be traced because their addresses was not traceable, their homes were too far away, or because could not reached over the phone. Of the 273 patients, 120 (43.9%) were traced and found by home visit or reached over the phone (the phone number as recorded in the treatment card); six

**Table 1: List of facilities surveyed**

Akwa Ibom	Anambra	Ebonyi	Ekiti	Rivers	Ondo
General hospital, Ikot Ikoro	General hospital, Onitsha	Presbyterian joint hospital, Uburu, Ohaozara	Federal medical, Ido-Osi	Comprehensive health centre, Ahoada	General hospital, Ore, Idigbo
General hospital, Iquita, oron	St Charles Borromeo hospital, Onitsha	Mater Meriscode, hospital, Afikpo	State specialist hospital, Ado Ekiti	chest clinic, Port Harcourt	State specialist hospital, Akure
Infectious disease Hospital, Ikot ekpene	Nnamdi azikiwe university teaching hospital, Nnewi	Mile 4 hospital, Ebonyi	State specialist hospital, Ikere	DOTS clinic, university of port harcourt teaching hospital, Obio/Akpor	chest clinic, Oke Mapo, Owo
Mercy hospital, Abak	St. Joseph's hospital, Adazi	Federal medical center, Ebonyi	Comprehensive health center, Ise-Osun	Kpor health center, Gokana	Basic health center, Okitipupa
St Luke's hospital, Uyo			Comprehensive health center, Ado Ekiti		State specialist hospital, Ondo
Leprosy hospital, Etinam					

**Table 2: Agreement between patients' treatment cards and TB facility registers, and between TB registers and laboratory registers**

	National	Akwa Ibom	Anambra	Ebonyi	Ekiti	Rivers	Ondo
Treatment card and facility register							
Case finding	97.0	97.7	96.1	98.2	99.2	97.5	93.7
Treatment outcome	96.7	97.2	98.0	87.3	96.9	97.2	95.4
TB register and laboratory register							
Treatment outcome	85.2	75.6	79.2	71.4	98.9	97.4	83.6
Diagnosis	85.1	78.3	80.0	81.2	97.7	96.2	79.7
Diagnosis based on two SSP* results	88.7	72.3	90.3	85.0	100.0	100.0	85.7

\*SSP: Sputum-smear positive



**Table 3: Agreement between facility register and LGA register (case finding and treatment outcome)**

	National <sup>**</sup>	Akwa Ibom <sup>**</sup>	Anambra <sup>**</sup>	Ebonyi <sup>**</sup>	Ekiti <sup>**</sup>	Rivers <sup>**</sup>	Ondo <sup>**</sup>
<b>Case finding</b>							
New	494/474	52/54	92/67	185/185	22/22	79/79	64/67
Relapse	21/22	¾	2/2	11/11	0/1	3/3	2/1
Failure	5/8	0/1	¼	1/1	2/1	0/0	1/1
RAD	14/12	2/4	9/5	1/1	0/0	0/0	2/2
Others	33/30	7/5	3/2	15/15	7/7	1/1	0/0
SS-ve	447/455	31/37	80/87	149/148	44/43	58/58	86/81
EPTB	61/59	¾	10/9	25/25	13/11	6/6	4/4
Missing	0/21		0/21				
Total <sup>**</sup>	1,075/1,080	98/109	197/197	387/386	88/85	147/147	159/156
<b>Outcome (new cases)</b>							
Cured	358/305	49/24	59/23	142/142	11/10	57/57	40/49
TC <sup>†</sup>	41/46	0/18	12/5	9/9	5/5	7/7	8/2
Failed	¾	0/0	1/1	0/1	0/0	1/1	1/1
Died	24/21	1/0	2/0	10/9	2/2	4/4	5/6
Defaulted	62/62	2/2	16/11	22/22	¾	9/9	10/14
Transferred out	6/6	0/1	2/1	2/2	1/1	1/1	0/0
NR <sup>¶</sup>	0/35	0/9	0/26				0/5
Total	494/484	52/54	92/67	185/185	22/22	79/79	64/77 <sup>**</sup>
<b>Outcome (retreatment cases)</b>							
Cured	30/23	4/5	13/7	9/9	0/0	3/3	0/0
TC <sup>†</sup>	4/4	0/0	1/1	1/1	5/5	0/0	0/0
Failed	1/1	0/0	0/0	1/1	0/0	0/0	0/0
Died	0/1	0/0	1/0	0/0	0/0	0/0	0/0
Defaulted	2/3	0/0	½	1/1	0/0	0/0	0/0
Transferred out	0/2	0/0	0/2	0/0	0/0	0/0	0/0
Total	37/34	4/5	16/12	12/12	5/5	3/3	0/0

<sup>†</sup>Notified-facility; <sup>\*\*</sup>Survey-LGA; <sup>†</sup>TC: Treatment completed; NR: Not recorded; SS-ve: Sputum smear negative

were not found but their close family member was met. The remaining 44 were traced but could not be found because they had gone back to their village, provided the wrong address, or the phone number was not available. All the patients traced were acknowledged as those who were once diagnosed and treated for TB. They were able to recall the TB symptoms, the treatments received, and the follow-up investigations done as well as clinical improvement during treatment and the treatment outcome. Four of those traced and seen complained of the return of TB symptoms (cough and weight loss) and were advised to revisit the health facility for further evaluation and possible treatment. All the patients visited or phoned confirmed the information on diagnosis and treatment outcome, as recorded in the treatment card.

## Discussion

The survey was limited to the selected states in Southern Nigeria where DOTS services were pioneered thus, this may not reflect what is happening in other parts of the country. The facilities selected account for about 60% of case notifications in the states, which is a satisfactory sample size. The TB surveillance data

used for monitoring of the country's program can be said to be fairly reliable, as shown by the consistency observed in most of the states surveyed; however, there were inconsistencies in the data notified by a few other states.

High level of agreement was reported between the treatment cards and the facility registers. The differences observed are not significant to invalidate the quality of the data at this level, but the proportion of missing records for both diagnosis and treatment outcome was unacceptably high. This was addressed by the noninclusion of the missing records in the analysis. However, one cannot state the extent to which their exclusion might have influenced the level of agreement reported. It is important that the data at this level be completely and accurately captured, since it provides the primary data used for TB surveillance in the country. Besides incomplete recording of case notification and missing records in some facilities and LGAs, the survey revealed among others, poor handling and storage of the TB records, making them prone to destruction by rain, rodents, or pests; the lack of backup support system; inadequately trained manpower to cope with

**Table 4: Agreement between LGA TB register and quarterly report (case finding and treatment outcome)**

	Total <sup>a</sup> **	Akwa Ibom <sup>a</sup> **	Anambra <sup>a</sup> **	Ebonyi <sup>a</sup> **	Ekiti <sup>a</sup> **	Rivers <sup>a</sup> **	Ondo <sup>a</sup> **
<b>Case finding</b>							
New	1,118/1,100	306/307	111/111	359/342	42/40	207/207	93/93
Relapse	34/39	9/11	4/4	15/17	0/1	4/4	2/2
Failure	2/5	0/1	1/1	1/1	0/2	0/0	0/0
RAD <sup>b</sup>	28/29	12/13	10/10	1/1	1/1	0/0	4/4
Others	64/75	2/12	5/5	24/24	12/13	1/1	20/20
SS-ve <sup>b</sup>	729/732	89/76	76/84	244/254	78/76	125/125	117/117
EPTB <sup>c</sup>	65/104	15/14	12/12	5/45	17/17	11/11	5/5
Total	2,040/2,084	433/434	219/227	649/684	150/150	348/348	241/241
<b>Treatment outcome (new)</b>							
Cured	865/818	253/238	91/91	275/261	37/19	152/152	57/57
TC <sup>d</sup>	49/66	3/0	3/3	12/18	0/14	26/26	5/5
Failed	17/5	9/0	0/0	3/0	0/0	4/4	1/1
Died	42/46	6/7	6/6	17/19	1/1	4/4	9/9
Defaulted	93/98	16/8	11/11	34/41	1/5	17/17	16/16
Transferred out	83/85	1/0	0/0	0/3	1/1	76/76	5/5
NR	0/54	0/54					
Total	1,153/1,172	289/307	111/111	341/342	40/40	279/279	93/93
<b>Treatment outcome (retreatment)</b>							
Cured	48/53	17/22	12/12	14/14	1/1	4/4	0/0
TC <sup>d</sup>	2/6	½	1/1	0/0	0/3	0/0	0/0
Failed	3/1	2/0	0/0	1/1	0/0	0/0	0/0
Died	2/1	1/0	1/1	0/0	0/0	0/0	0/0
Defaulted	3/2	1/0	1/1	1/1	0/0	0/0	0/0
Transferred out	0/0	0/0	0/0	0/0	0/0	0/0	0/0
NR	0/1	0/1					
Total	58/64	22/25	15/15	16/16	¼	4/4	0/0

<sup>a</sup>RAD: Return after diagnosis; <sup>b</sup>SS-ve: Sputum smear negative; <sup>c</sup>EPTB: Extra-pulmonary TB; <sup>d</sup>TC: Treatment completed

**Table 5: Agreement between treatment card and patient interview**

	National	Akwa Ibom	Anambra	Ebonyi	Ekiti	Rivers	Ondo
Total selected for tracing	273	60	37	34	48	40	57
Total not traceable either by home visit or by phone	103	24	3	30	2	21	23
Traced and found at home	80	6	24	2	21	19	8
Traced by phone	40	16	0	2	15	0	7
Not found but met a close family relative	6	3	0	0	0	0	3
Traced and not found	44	11	10	0	10	0	13

the increasing work load; high turnover of staff; and low use of IT in data management. Implications of poor data quality can be significant, such as poor planning and resource allocation.

Also, the level concordance between the laboratory registers and the facility registers for case finding and treatment was also fairly high. However, in three states, namely, Ebonyi, Akwa Ibom, and Anambra, less than 80% of the individuals classified “cured” and “treatment completed” in the facility register were found in the laboratory register when their fifth and seventh month sputum results were traced with the dates recorded in the former. Also, in two states,

namely, Akwa Ibom and Ondo, less than 80% of the patients diagnosed as smear-positive were in facility register, were found in the laboratory register. One reason for the disparity that the survey revealed was that some patients did their tests in other facilities, i.e., outside the facility where they were treated. Some reasons why the patients preferred one facility to another were relative distance, stigma, and user fees charged by some facilities for sputum microscopy. To further validate the diagnosis of smear-positive TB, the proportion of cases diagnosed based on two positive smear specimen was assessed using the laboratory register. Akwa Ibom State was least likely to make accurate diagnosis of smear-positive TB.



Some reasons identified for wrong imputation of the data in earlier studies include the intention to falsify data to meet targets and increased workload for TB care providers.<sup>[4]</sup>

Disparities were observed in the total number of cases notified compared to the total number calculated for case findings and treatment outcome while comparing the facility TB register and the facility data in the LGA register. The disparity was most marked in Anambra, Akwa Ibom, and Ondo. To ensure consistency in the data, the NTP surveillance was based on the standard definitions for case finding and treatment outcome. But the survey revealed apparent misclassification of cases in the data included in the LGA register from the facilities. A reason for this could be the low capacity of TB care providers in some facilities which is made worse by high staff turn-over, particularly in the large DOTS facilities where routine staff redeployment is often carried out. Fewer disparities in the total number of TB cases were observed between the surveyed data and the notified data. This was most obvious in Ebonyi, followed by Anambra. However, misclassification of the treatment outcome was still observed in Akwa Ibom, Ebonyi, and Ekiti for the new cases and for most states in the retreatment cases. The improvement in agreement at this stage of reporting is because reporting at this stage is carried out by the LGA TBLS, most of whom are quite knowledgeable and experienced than most personnel at the facility level. All the traced patients confirmed the information as contained in their treatments. Trebucq *et al.*<sup>[4]</sup> reported that although this is the most challenging aspect of the survey, it, however, serves as the ultimate confirmation of the validity of the TB surveillance data. Although, errors may occur in the other stages of collation and compilation of TB surveillance either intentionally or unintentionally, the information supplied by the patient is less likely to be disputed.

Collection of valid TB surveillance data is critical to the public's health. Implications of invalid data can be profound and may have unintended consequences, compromised program planning, evaluation and research, inaccurate targeting of interventions,

inadequate TB prevention and control policies, and inappropriate allocation of resources. Therefore, measures to improve the data quality in the NTP should include regular independent assessment of TB surveillance data notified by the LGAs and the states to ensure reliability. There is a need to build capacity of TB care providers at the facility level on TB data management, including data handling and storage, so as to ensure consistency and validity. Adequate and appropriate space should be provided in health care facilities for the safekeeping of treatment cards, folders, and registers. Advocacy to health managers is imperative to reduce the high turnover of TB care providers in most facilities. As DOTS services devolve further to health care facilities, there may be a need to engage dedicated staff to handle TB surveillance data in health care facilities. Automation of TB surveillance data management through the use of computers at both the facility and LGA levels will also improve the quality of TB data in the country. Data analysis was done on state basis, so as to identify the likely sources of variation and to objectively address them. However, based on the facility types there may be a need to further study the differences so as to effectively address these challenges.

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