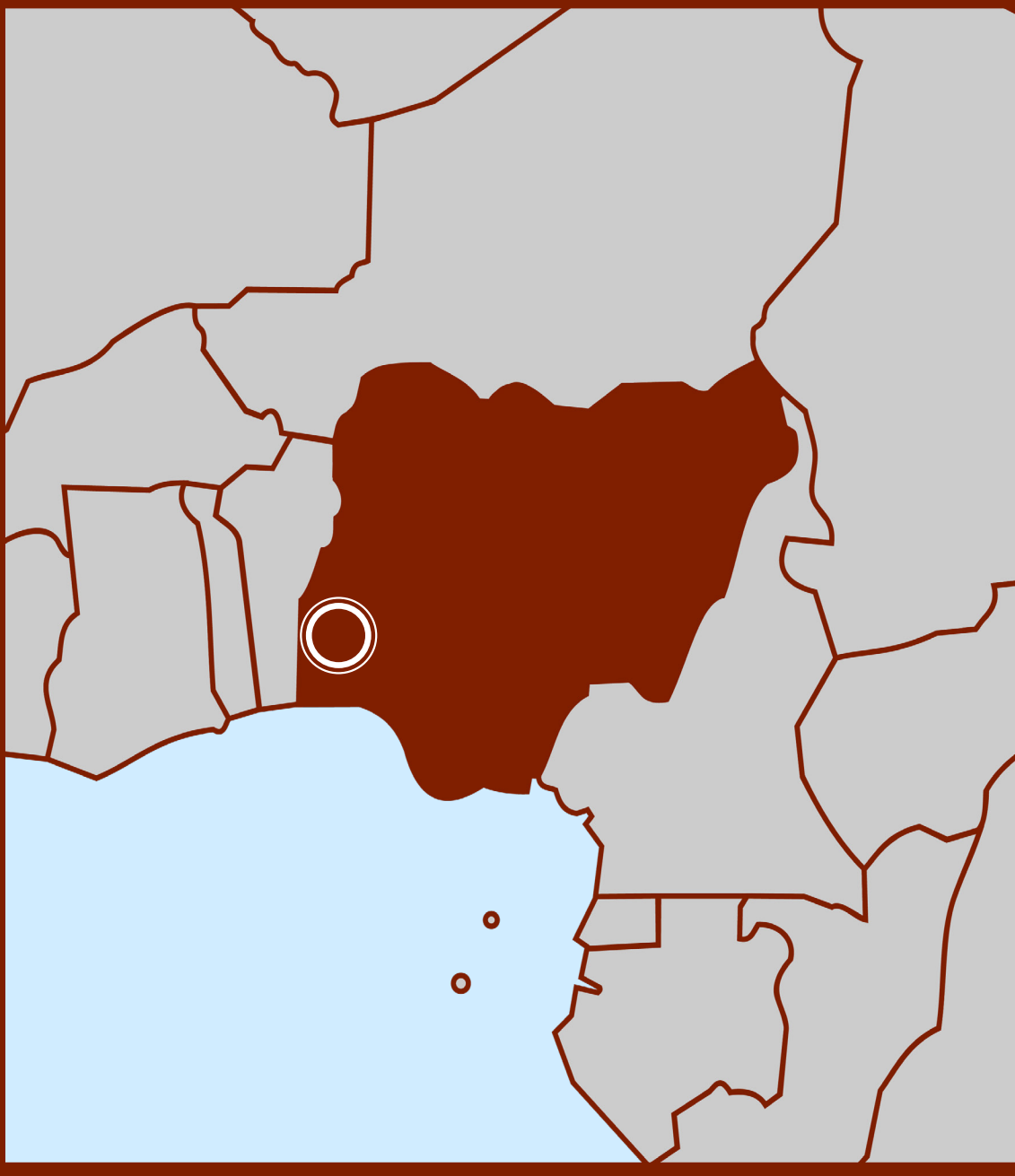
The Pan African Medical Journal

Analysis of Tuberculosis Surveillance Data in Oyo State, Nigeria, 2011-2014

Participant Guide



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Analysis of Tuberculosis surveillance data in Oyo State, Nigeria, 2011-2014

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Abstract

The role of surveillance in tuberculosis (TB) management and control is imperative to the eradication of the disease. Training of TB focal persons, TB program officers and medical officers involved in data management will help to improve the quality of surveillance data. This case study was developed using data extracted from the Oyo state Integrated Disease Surveillance and Response (IDSR) database on TB from January 2011 to December 2014. The case study aims to evaluate surveillance data with the overall goal of improving data quality for TB control. The training will describe the requirements of routine surveillance as well as procedures for determining the burden of TB and the evaluation of some of the key indices for surveillance data quality. The participants must have prior knowledge of how to analyze and manage data and should be able to complete the exercises in approximately three hours.

How to use the Case Study

General instructions: For the purpose of this case study one instructor per 10 participants will be required that will moderate the sessions involving 8-20 participants in a conference or similar room. Participants should sit facing each other while the instructors utilize approaches that provide an opportunity for all participants to contribute. The facilitator asks questions directed at named participants while answers follow discussions involving all or small groups of participants. Time is also given to participants to undertake calculations using laptop computers in generating answers.

Audience: Medical officers, TB focal persons, and TB program officers working for government at the local, state and national level, private medical practitioners involved in Directly Observed Therapy (DOT) implementation

Prerequisites: Previous lectures on principles of surveillance and data analysis and prior training in basic epidemiology and basic knowledge of MS Excel

Materials needed: Flip charts, white board with markers, calculators, laptop computer with Microsoft Excel

Level of training and associated public health activity: Intermediate

Time required: 3 hours

Language: English Language

Participant Guide

Goal of the Case Study: Assessment of surveillance data towards improving data quality for TB control

Learning Objectives: After completing this case study, the participants should be able to:

1. Name the variables that are required to be collected and recorded in a routine TB surveillance form
2. Identify which of the variables are required and used in the determination of the burden of the disease in the population
3. Summarize surveillance data by time, person and place
4. Compare the national and global TB burden with that of Oyo state from 2011-2014
5. Identify parameters for evaluating the quality of surveillance data
6. Identify gaps in data collection
7. Draw conclusions on the status of TB burden in Oyo state

Introduction

Medical officers at the Directly Observed Therapy (DOT) centers, Tuberculosis (TB) focal persons at the Local Government Areas (LGA), monitoring and evaluation officers at the LGA and TB program officers at the state are responsible for the generation of good quality TB surveillance data and its analysis. The data generated provide inputs for the estimation of the population burden of TB. Quantifying the magnitude of the disease at the local, regional, national and international levels is essential for detection of changes in trend and assessing the impact of control measures in reducing cases and deaths due to the disease.

The Federal Ministry of Health (FMOH) in Nigeria receives TB surveillance data from all the 36 states of the federation. Among these states is Oyo state, the second largest state in South-Western Nigeria with 33 LGAs and a population of 6 million at the time of the 2006 census. There area total of 1729 health facilities disaggregated into 712primary healthcarecenters (PHCs), 46 secondary health facilities, 3tertiary health centres and 968 registered private health facilities (1).

TB is a global public health problem and a notifiable disease in Nigeria. Surveillance for TB is guided by international guidelines that seek to provide information on national and global burden. The Federal Ministry of Health (FMOH) accordingly utilizes standardized forms (DHIS 2.0) for use in reporting and notification of TB from surveillance sites as provided in the Integrated Disease Surveillance and Response document. (2, 3)

The WHO recommends the DOTS strategy to maximize compliance and treatment efficacy and to reduce the development of drug resistant strains. (4) The goal of surveillance is early detection of persons with infectious lung disease to improve chances of clinical improvement and reduce transmission of TB.

Question 1: What variables would you require in a routine TB surveillance form?

In order to ensure compliance with recommended treatment procedures, TB patients are required to take medication under supervision at DOTcentres. There are two methods of reporting TB at the state level. The first is through the TB program and the second is through the Health Management and Information System (HMIS). Under the TB program, medical officers at health facilities and DOT centres record and send completed case forms to TB focal persons at the Local Government Area (LGA) level, who then submit the information to the TB and Leprosy program officer at the state for collation and analysis (3). The data are discussed at the south west zonal level before onward submission to the FMOH for further processing. These processes are done routinely for the generation of monthly reports at the state and national level. The national reports provide data to WHO for estimation of global TB burden. Under the HMIS, medical officers at health facilities and DOT centers use the DHIS 2.0 electronic forms to enter TB data which is automatically visible at the state and national levels.

Routine analysis of surveillance data may involve the description of the incidence of disease.It may be necessary to present the number of cases of TB in terms of certain characteristics such as person, place and time. Tables are used for these purposes.

Question 2: Develop a set of three table shells to summarize the number of cases by year, age & LGA.

Question 3: Using the surveillance data provided in Appendix 1, use MS Excel or any software of your choice to analyze the data and complete the table shells developed in the previous question.

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Question 4: What measures are required to describe the burden of diseases such as TB in the population?

Question 5: What information would you require to calculate the indices identified in Question 4?

Table 1 summarizes surveillance data for Oyo State by presenting the reported number of TB cases by year. This type of tabulation represented in Table 1 is helpful to show the trend of the disease over time.

Table 1: Number of TB cases in Oyo State, 2011-2014

Year	Number of TB cases	Estimated Population
2011	1159	8,322,413
2012	1737	8,605,375
2013	1506	8,897,956
2014	521	9,200,488

Question 6: Using the data in Table 1, calculate the cumulative incidence of TB for each year 2011, 2012, 2013, 2014.

In describing the epidemiology of TB in Oyo state, it is important to report the burden of disease in terms of place (such as LGA), time (year) and person (age of subject) as this will assist in proposing appropriate public health interventions. Therefore, it is important to calculate the burden of the disease vis a vis other variables in the data set. The number of TB cases by year in the different age groups for Oyo State is shown in Table 2.

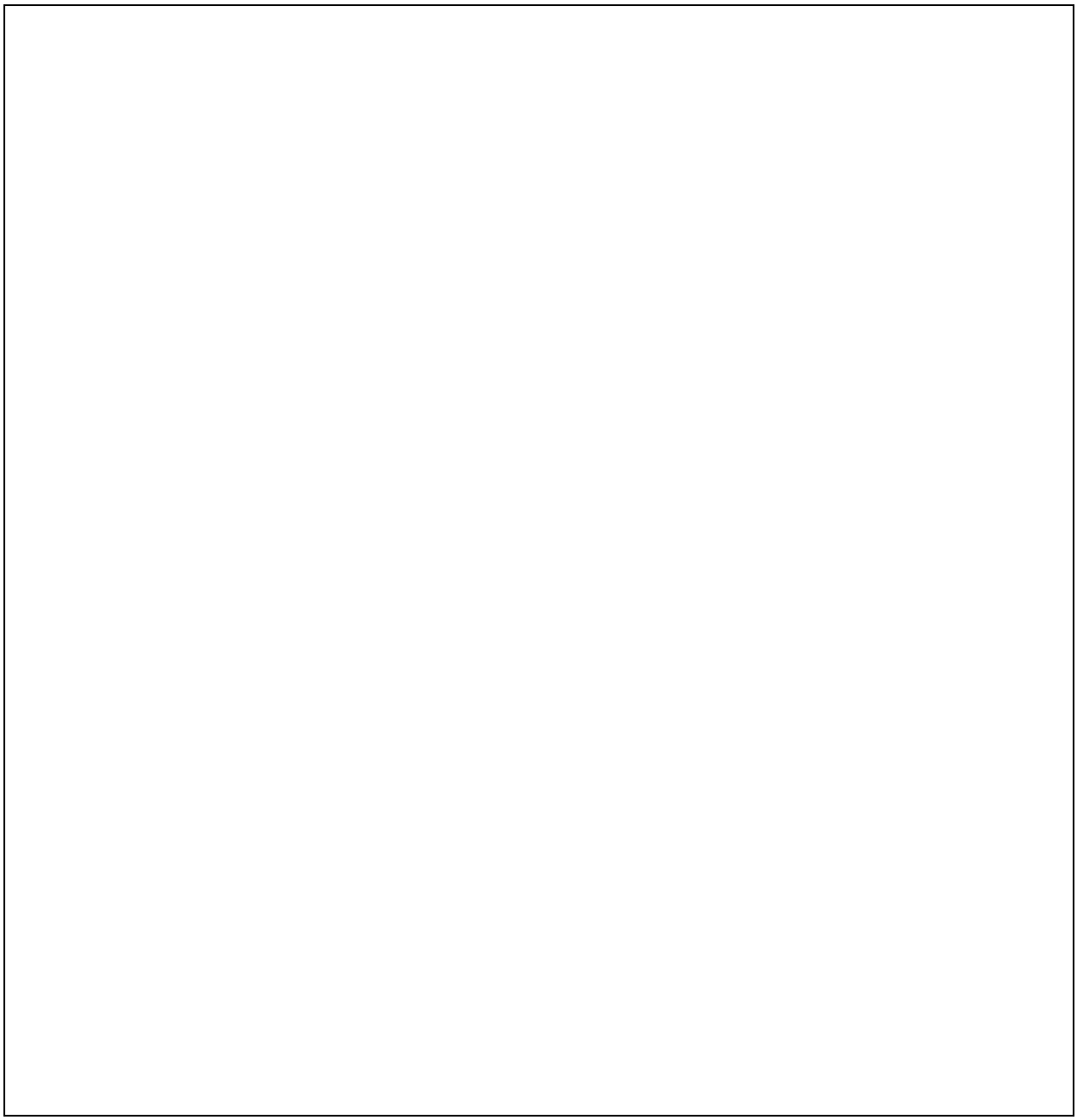
Table 2: Distribution of TB cases by age and year in Oyo State; 2011-2014

Age	Year				Total
	2011	2012	2013	2014	
0 – 28days	6	0	4	0	10
1 – 11 months	6	12	2	4	24
12 – 59months	31	33	10	6	80
5 – 9yrs	37	65	26	17	145
10 – 19yrs	205	234	212	62	713
20 – 40yrs	546	794	574	189	2103
>40yrs	328	599	678	243	1848
Total	1159	1737	1506	521	4923

Question 7: Using the information in Table 2, calculate the cumulative incidence of TB in the under-five agegroup for the year 2011, knowing that those less than 5 years of age constitute 17% of the population in 2011.

The WHO since 1997 has been reporting global TB surveys in countries all over the world (7, 8, 9, 10). These surveys provide comprehensive and up-to-date information on the epidemic as well as progress made at global, regional and country levels towards reducing incidence of TB to 55 cases per 100,000 population (7). Since 2013, the report also captures national TB survey data for multidrug resistant TB (10). It is worth noting that the FMOH in 2012 published the report of the first national household survey on TB prevalence in Nigeria in partnership with WHO (7). Before this time, the burden of the disease hadbeen based on estimates from WHO assessments of surveillance data. Publication of the Nigerian national survey report resulted in an upward revision of the burden of TB in Nigeria which doubled that of earlier estimates, placing Nigeria as the third country with the highest burden of TB in world (4).

Question 8: Compare the cumulative incidence for 2011, 2012, 2013, 2014 calculated in Question 6 with reported national and global estimates (obtained from the reports available in the references list provided at the end of the case study). Provide explanations for your comparison.



National and international surveillance reports usually summarize data for decision making in tables, graphs and charts. The charts in particular give clear illustrations of trends and spatial distribution of disease within and across regional, national and international boundaries. Disease information summary are developed by state surveillance officers for action at state levels even before national data analysis. Analysis of surveillance data helps to identify trends over time and alert the system of unusual patterns. It also helps in identifying geographic areas at risk. Table 3 presents the number of TB cases for Oyo state by month and year or reporting.

Table 3: Distribution of cases by month and year (2011-2013) in Oyo State

Months	Year			
	2011	2012	2013	2014
Jan	81	130	136	158
Feb	47	84	185	175
Mar	79	98	200	181
Apr	94	136	312	0
May	55	117	138	7
Jun	124	182	215	0
Jul	96	116	132	0
Aug	166	231	188	0
Sep	109	147	0	0
Oct	0	118	0	0
Nov	181	244	0	0
Dec	127	134	0	0

Question 9: Using data in Table 3, develop in MS Excel a linechart displaying the monthly number of cases for the four years (January-December)?

Question10: Interpret the chart developed in Question 9.

The time trend of cases and deaths due to TB nationally and internationally is dependent on the quality of the surveillance data from the primary point of collection to the national level. The WHO and United States Centers for Disease Control and Prevention (CDC) have provided guidelines to assist authorities in charge of surveillance to ensure quality control in data collection and analysis as provided in the IDSR and the CDC updated guidelines for evaluation of surveillance system. (12)

Question 11: Name the parameters used in the evaluation of surveillance data based on CDC and National IDSR guidelines.

Question 12: Which of these parameters can you determine using the available surveillance data for Oyo State? Which ones cannot be determined?

Question 13: Examine the data presented in Table 2 showing the distribution of cases by age group and year. Comment on the limitations (if any) of using the age variable in a categorized form.

Question 14: Which required variables are missing from the Oyo State surveillance data? And what may be the consequences of omitting these variables?

Question 15: What conclusions can you draw on the burden of TB in Oyo State based on the analysis?

Question 16: What conclusions can you draw from the data quality?

Conclusion

Tuberculosis remains a major global, public health problem particularly in developing countries. Global and national efforts to reduce the burden of TB have focused on the target set in the context of the Millennium Development Goals, which is to reduce by half the burden and deaths due to the disease by 2015 compared to the baseline of 1990. Moving from the MDGs to the Sustainable Development Goals (SDGs) era, the role of surveillance remains crucial in achieving the goal of ending the global TB epidemic. TB focal persons and program officers are charged with the responsibility of collecting, collating and analyzing TB data. A good surveillance system should provide data suitable for calculating indices for measuring the burden of the disease as well as for determining and showing trends over time. In addition, morbidity and mortality indices need to be compared with global as well as with national estimates to see how the state (regions) is faring in comparison. Further analysis or assessment (such as using tables and charts) will show the regions or LGAs that are most affected so that more efforts towards control can be put in place. Improving the capacity of these officers in data collection and management will impact not only the quality of the data but also the control of TB and the reduction of national burden as the world moves towards ending the disease.

Conflict of interest

The authors declare no conflict of interest in the conduct and reporting of this case study.

Authors' contributions

Yusuf and Kabir conceived and developed the case study. Alaribe gave support in the writing of the case study. All authors approved the final draft.

Acknowledgement

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Background Reading

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Appendix 1. TB Surveillance Dataset

Appendix 1_dataset_2ndec20

Appendix 2. IDSR immediate/ case-based surveillance reporting form

Appendix 2 IDSR Form1.docx

Appendix 3. Case-based multi-drug resistant and extensively drug resistant tuberculosis reporting form

Appendix 3 IDSR Form2.docx