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Development of P2TB Surveillance Information System on Children In Health Office of Surabaya

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ABSTRACT

The implementation of SIK in TB program uses Integrated TB Information System (SITT), which is an electronic web-based logging and reporting system and connected directly to SIK nationally. In practice, SIK P2TB in Health Office of Surabaya still needs development especially in analyzing some child TB indicators. The purpose of this research is to design the development of P2TB surveillance information system of children in Health Office of Surabaya to overcome the problem of current P2TB surveillance information system. The research used descriptive design to describe the model of design development of tuberculosis surveillance information system of children in Health Office of Surabaya by indepth interview to 3 (three) managers of P2TB. Informants in this study as many as 3 people consisting of 2 TB vice supervisors and one contractor of P2TB. Data analysis was described in the form of DFD (Data Flow Diagram) and analyzed descriptively. The results of this study indicated that the type of information required on the output component was proportion of TB TB among all TB patients, case of TB case finding, success rate of TB treatment, coverage of children <5 years who received PP INH, and proportion of children who completed PP INH among all children receiving PP INH; The design of the components of the P2TB surveillance information system development process was the child TB analysis process and dissemination of the results of the analysis in accordance with the design of the DFD; and Data requirement on the input component is in accordance with the data in SITT 10.04 and recap PP INH. The development of surveillance information systems at P2TB is expected to assist in analyzing some of the child TB indicators that have not been processed so as to provide information for TB child reporting.

Keywords: Child TB, Surveillance, Information

INTRODUCTION

Background

Relevant data and information that is accurate, precise, and fast data is a strategic resource in health development through management process and decision making. The causes of health policy makers to make informed decisions are the occurrence of limitations or even unavailability of data and information required⁽¹⁾.

The decision-making assisted by the Health Information System (SIK), among others, is the implementation of daily health services, quick intervention in the prevention of health problems, and support health management from the district/city, provincial, to the center, especially in the preparation of short-term plans, medium term, and long term⁽²⁾.

The rapid development of Information and Communication Technology (ICT) provides convenience in the strengthening and development of SIK. Currently, there has been an ICT utilization in SIK (eHealth) in order to improve the management and implementation of health development⁽¹⁾.

Various programs have been running a lot of Health Information Systems, one of which is the program P2TB (Prevention and Control Tuberculosis). Data for TB control programs were obtained from TB recording and reporting systems. Recording using standard forms manually is supported with information systems

electronically, while for P2TB reporting uses electronic information systems. Integrated TB Information System (SITT) is a web-based electronic record-keeping and reporting system for TB and is directly connected to a national health information system⁽¹⁾.

Integrated Information System TB (SITT) itself has been progressing from version 3.5 to version 10.04. The development of SITT is done to facilitate the processing of data in completing report, conversion result, and treatment result from health facility level to reporting at national level. In practice, P2TB health information systems still require development to complement the recording and reporting functions so as to produce accurate, precise, and fast data and information. Evaluation of the TB surveillance and information system has been implemented within the scope of health office of Surabaya city by analyzing problems based on input, process and output components, determining problem priorities, and formulating alternative solutions⁽³⁾.

A priority issue is that there are still TB-related indicators that have not yet been analyzed. The cause of the priority of the problem is the input component, it needs some data that is the number of child TB patients, the total number of TB children whose treatment is complete, the number of TB patients treated, the number of children receiving Prevention Treatment (PP INH), and the number of children complete PP INH; In the process component, there is no data processing feature of TB treatment success of children and other indicators on SITT system, so that data processing is done using microsoft excel help with the process of sorting by age. This causes the processing and data analysis takes a relatively long time. Another problem is the abundance of TB program indicators required so that TB theorists prioritize processing and data analysis for key indicators; and In the output component, current applications can not assist data processing and analysis to directly illustrate the success indicators of TB child treatment and other indicators as a basis for monitoring and evaluation⁽³⁾.

Based on the information previously mentioned, it is necessary to develop P2TB surveillance information system in Health Office of Surabaya. The purpose of this research is to design the development of P2TB surveillance information system of children in Health Office of Surabaya in overcoming the problem of current P2TB surveillance information system.

METHODS

This research used descriptive design, to describe the model of design development of tuberculosis surveillance information system of children in Health Office of Surabaya. The development plan consists of identifying the information required for tuberculosis child surveillance activities, then designing activities to generate the required information and identifying the data, resource, and method requirements for floating the system on output components.

Data collection was done by way of indepth Interview by using interview guideline to some P2TB employees. As for the informants in this study as many as 3 people consisting of 2 TB vice supervisors and one contractor of P2TB. Data and information that has been obtained then described in the form of DFD (Data Flow Diagram) and analyzed descriptively.

RESULTS

Identify the Type of Information Needed and its Beneficiaries as an Output Component on Child P2TB of Surveillance System at Health Office of Surabaya

The first system development design is identifying information needs. The need for information required as an output component is as follows:

Table 1. Design of information requirement on child P2TB of surveillance system at health office of Surabaya

Number	Information Needs	Operational Definition	Presentation form	Period	Reference
TB Invention Indicators					
1.	Proportion of TB patients among all TB patients	<u>Numerator:</u> Number of TB patients children (0-14 years) treated <u>Denominator:</u> The total number of TB patients treated	Table	Quarterly	1
2.	Coverage of child TB case finding	<u>Numerator:</u> The total number of child TB cases found <u>Denominator:</u> Estimated number of TB children = $12\% \times \text{estimated total number of TB}$	Table and Graphic	Quarterly Annually	4

Number	Information Needs	Operational Definition	Presentation form	Period	Reference
		cases (incident)			
TB Treatment Indicators					
3.	Success rate of TB child treatment	<u>Numerator:</u> Number of TB Children with Complete Medicine (PL) <u>Denominator:</u> Number of TB patients treated children	Table and Graphic	Quarterly Annually	1
4.	Coverage of children <5 years who receive PP INH	<u>Numerator:</u> Number of children <5 years reported receiving PP INH <u>Denominator:</u> Estimated number of eligible children <5 years given PP INH = number of TB patients to be treated × proportion of new positive smear (62%) × number of new positive smear-positive TB patients with children (30%) × number of children <5 years (1 person) × number of children <5 years who have no TB disease (90%)	Table and Graphic	Quarterly Annually	5
5.	The proportion of children who completed the INH PP among all children who received PP INH	<u>Numerator:</u> Number of children who completed PP INH for 6 months <u>Denominator:</u> Number of children receiving PP INH	Graphic	Quarterly	1

Here are the information needs based on the system user:

Table 2. Information Needs Based on System Users

Number	Information Needs	System Users				
		Input		Output		
		Public Health Center	Hospital	City Health Office	Province Health Office	Ministry of Health
1.	Proportion of TB patients among all TB patients	✓	✓	✓	✓	✓
2.	Coverage of child TB case finding	-	-	✓	✓	✓
3.	Success rate of TB child treatment	✓	✓	✓	✓	✓
4.	Coverage of children <5 years who receive PP-INH	-	-	✓	✓	✓
5.	The proportion of children who completed the PP INK among all children who received PP INH	✓	✓	✓	✓	✓

Identification of Activities on the Components of P2TB Surveillance Information System Development Process in Health Office of Surabaya

In the development of surveillance information systems in child P2TB, activities to produce the required information on the process components as follows:

1. Data collection

Recording and reporting activities are conducted at the health care facilities and district/city levels. Records at public health center and hospital levels use standard forms manually and electronically supported information systems, while TB reporting systems use electronic information systems. TB recording and

reporting systems electronically using the Web-based Integrated Information Information System (SITT) version 10.04 and integrated with the National Health Information System. Based on the results of interviews and documentation studies, the data needed to analyze child TB indicators already exist and available within the SITT used by P2TB of Health Office of Surabaya.

2. Data Compilation

Based on interviews and document studies, the data available in Health Office of Surabaya have been grouped according to the person (gender and age) variable, place, and time.

3. Analysis and Interpretation Data

Processing and analysis of data adapted to the needs of information or data output required by health centers, province of health center, and central. The results of data processing and analysis are usually performed by Health Office of Surabaya, Case Notification Rate (CNR), Success Rate (SR), CDR (Case Detection Rate), TB Child Proportion, MDR TB, HIV-TB and some other indicators.

Identification of Data Requirement on Input Components Development on Child P2TB of Surveillance Information System at Health Office of Surabaya

1. Data

In the development of child P2TB of surveillance information system in Health Office of Surabaya, the required data can be seen in Table 3 below:

Table 3. Data Requirement on Child P2TB of Surveillance Information System in Health Office of Surabaya

Number	Information	Data Required	Data Source
1.	Patient data	- Patient's name - Telephone number/handphone - Complete address - Sex - Date of birth - Age - Weight - Height - Previous medical history	Form TB 03
2.	Data of health care facility	- Name of health care facility - Year - District/City - Provinces - No. Reg. TB. 03 health care facility - No. Reg. TB. 03 district	Form TB 03
3.	Inspection data	- Grate BCG - Child TB scoring - Other checks - Tuberculin test - Chest X-ray - fine needle biopsy (FNAB) - Culture of test sample other than phlegm	Form TB 03
4.	Data diagnosis and Classification of patients	- Type of diagnosis - Bacteriologically confirmed - Clinical diagnosis - Classification by anatomical location - Pulmonary TB - Extrapulmonary TB - Classification by HIV status - Positive - Negative - Unknown	Form TB 03
5.	Treatment Data	- Alloy OAT - Category 1 - Category 2 - Child category - OAT shape	Form TB 03

Number	Information	Data Required	Data Source
6.	Data on treatment outcomes	- KDT - Kombipak/adult freelance drugs	Form TB 03
		The end result of treatment - Heal - Complete treatment - Failed - Died - Lost to follow up - Not evaluated	
7.	Data of preventive treatment	Preventive treatment criteria - Child <5 years old - ODHA - Others Checking - Test tuberculin - Chest x-rays - Grate BCG	TB 01P

2. Form

The forms used in the P2TB surveillance information system are:

- Card treatment of TB or TB01 patients;
- Register TB district/city or TB03;
- TB or TB01P prevention treatment card;
- Recapitulation of giving PP INH TB to children at public health center and DOTS hospital of Surabaya city in quarter 1-4 year 2017.

Design of Information Systems Development Model of Child TB Surveillance

Overall, Child P2TB of surveillance information systems are included in the P2TB surveillance information system. Below is a context diagram of P2TB surveillance information system at Health Office of Surabaya:

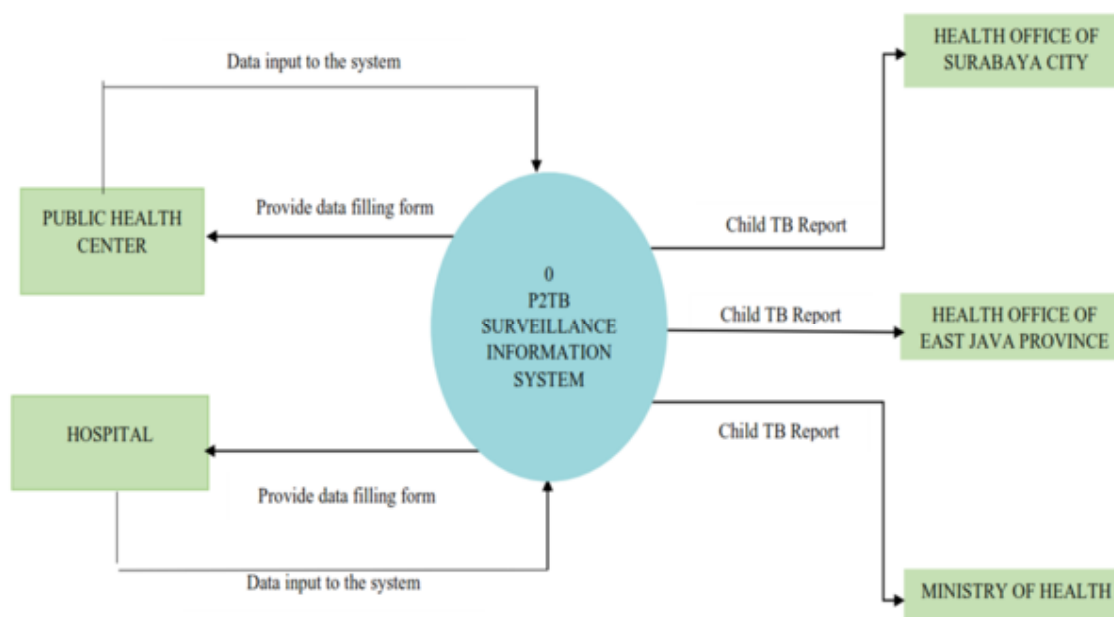


Figure 1. Context Diagram of P2TB Surveillance Information System is running in Health Office of Surabaya

There are several processes in the P2TB Surveillance Information System that can be seen in more detail in the diagram of the current level 0 data flow:

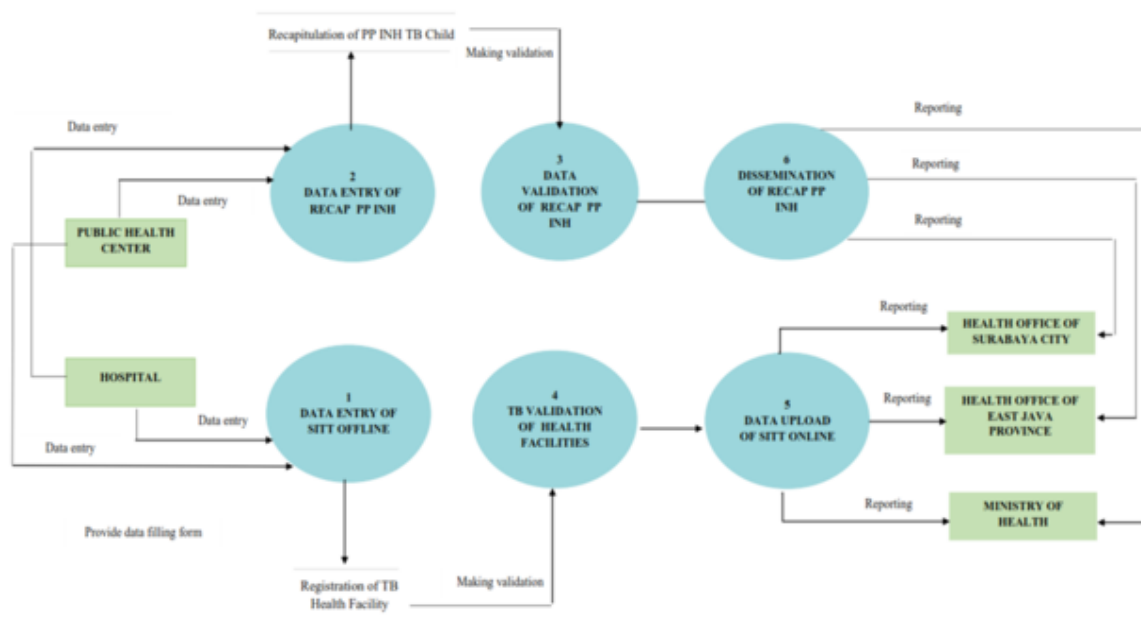


Figure 2. Data Flow Diagram Level 0 P2TB Surveillance Information System at Health Office of Surabaya

Development of P2TB surveillance Information Systems on children can be seen in the data flow diagram level 1 below:

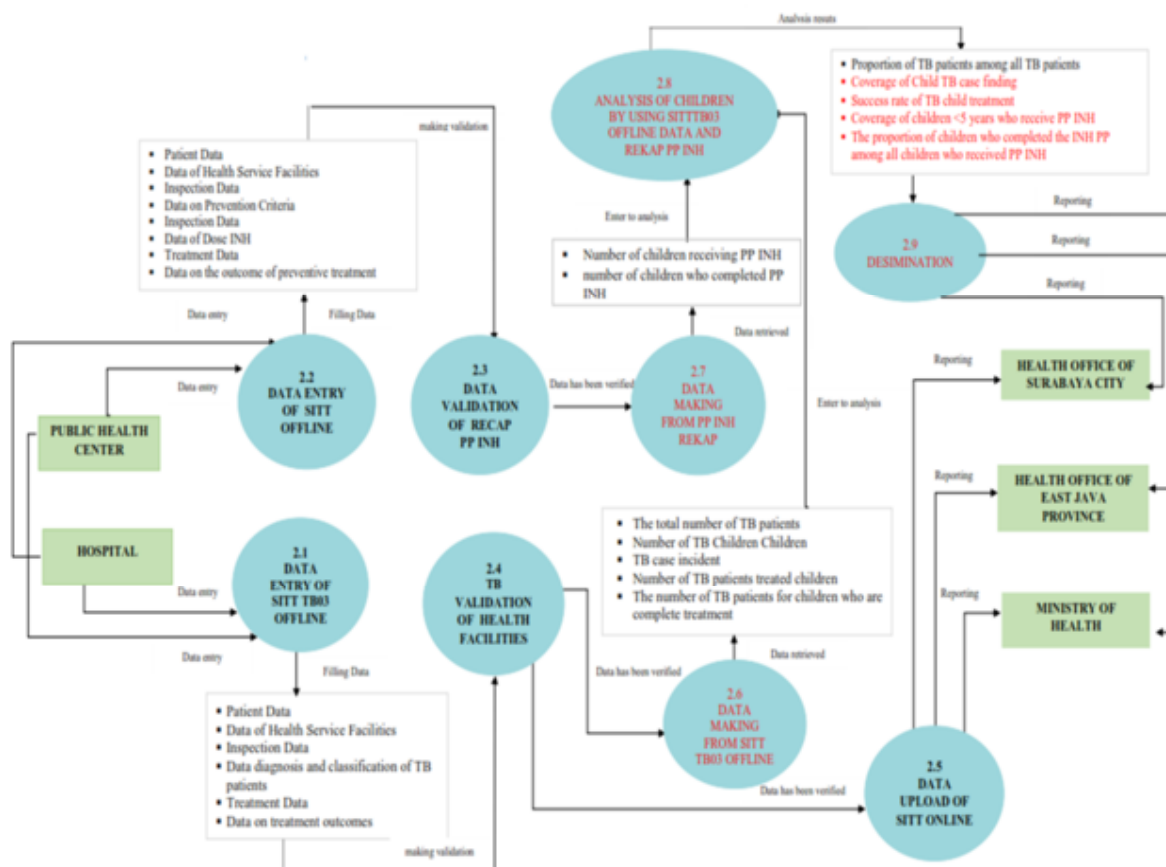


Figure 3. Flow Diagram Data Level 1 Development of P2TB Surveillance Information System on Children in Health Office of Surabaya

DISCUSSION

Identify the Type of Information Needed and its Beneficiaries as an Output Component on Child P2TB of Surveillance System at Health Office of Surabaya

The first step that is taken as system development is identifying information needs. Information needs were obtained from indepth interviews with TB program managers and adjusted to the existing policy of Tuberculosis Control National Guidance in 2014, Technical Guidance on Management and Procedure of Child TB in 2016, and Minister of Health Regulation number 67 in 2016 on Tuberculosis Treatment.

Based on the results of interviews and documentation studies, SITT version 10.04 still can not be used to analyze child TB indicators. Therefore, system development is carried out on child TB of surveillance information systems to assist and support existing systems in delivering the required output.

The type of information required on the output component for the discovery indicator is proportion of TB patients among all TB patients and cases of child TB case finding. While for TB treatment indicator is the success rate of treatment of child TB, coverage of children <5 years who get PP INH, and proportion of children who completed PP INH among all children who get PP INH.

Users of the system in the information include the public health center and hospital which is also an input entity that will provide data, while the Health Office of Surabaya in addition to being a process entity is also an output entity that will get the results of the analysis of surveillance information system on TB child. As for the other output entities are Health Office of East Java Provincial and Ministry of Health.

As explained earlier, the information generated from the interview is also adjusted to the existing policy. The first information is the proportion of TB patients among all TB patients. The proportion of child TB patients can illustrate child TB surveillance activities at the city level. The expected range in this indicator is 8-12%⁽¹⁾. The calculation and analysis of the indicator figures are conducted quarterly with the aim of money health care facilities to improve TB surveillance on children so that indicators can be achieved.

The second information is coverage of child TB case finding. The coverage of TB case findings used an estimated child TB case of 12%. This estimate is based on Mathematical modeling study by Dodd *et al* published in 2014. This indicator alone illustrates the number of child TB cases found by the program among children's estimated TB cases⁽⁴⁾. Calculations and analysis are conducted quarterly to see progress of P2TB and annual program to see the trend of invention from year to year so that it can be done quickly monitoring and evaluation.

The third information is the success rate of TB treatment. The success rate of TB treatment illustrates the quality of TB child management in the national program. If this figure is less than the expected number of 85%, it is necessary to evaluate the monitoring of TB case treatment of children in areas with numbers below standard⁽¹⁾.

The fourth information is the coverage of children <5 years old who received the PP-INH listed in the Technical Manual of Management and Procedure of Child TB in 2016. This indicator describes many children <5 years who get PP-INH among children <5 years who should have PP-INH⁽⁵⁾. The fifth information is the proportion of children who completed the PP-INH among all children who received the PP-INH listed in the TB Control National Guidelines of 2014. This figure indicates the proportion of children either without HIV status or with HIV positive status protected against the risk of contracting TB disease as a result of the possibility of being exposed to a positive tuberculosis patient with a child⁽¹⁾.

Identification of Activities on the Components of P2TB Surveillance Information System Development Process in Health Office of Surabaya

In the development of P2TB surveillance information systems on children, activities to produce the required information on the process components as follows:

1. Data collection

Data collection was conducted by 91 health care facilities serving of TB DOTS, consisting of 63 public health centers and 28 hospitals both government and private to Health Office of Surabaya. Data at health care facilities level in entry based on name and address with offline SITT. Every 3-monthly routine meetings are performed data validation by TB theorist in Health Office of Surabaya. Validation is as the process of editing and cleaning data. After confirmed the valid data, vice supervisor of TB in health office of Surabaya to verify and upload with SITT online, so that East Java Province Health Office and Directorate General of P2PL can access the data through their respective accounts. Routine reports are disseminated by the Health Office of Surabaya in the form of SITT database.

2. Data Compilation

The data compilation is done by using a computer/laptop and application program software provided by National TB Control Program which is SITT (Integrated Tuberculosis Information System) 2 Version 10.04

which is the latest version of SITT. Based on interviews and document studies, the data available in Health Office of Surabaya have been grouped according to the person (gender and age) variable, place, and time.

3. Data Analysis and Interpretation

The data has been collected subsequently processed and analyzed by vice supervisor of TB. Based on the results of interviews and document studies, it can be evaluated that data analysis is done based on epidemiological information is people, place, and time. And the presentation of data that has been analyzed is made in the form of tables, graphs, diagrams, and maps. Based on the results obtained that from the indicators analyzed there is only one TB indicator that is calculated is the proportion of child TB.

Identification of Data Requirement on Input Components Development on Child P2TB of Surveillance Information System at Health Office of Surabaya

Requirement of data on P2TB Surveillance Information System at Health Office of Surabaya include patient data, health care facilities data, examination data, patient diagnosis and classification data, medication data, and final treatment result data. Each of these data can be obtained from the district TB registers (TB 03 districts/ municipalities). Preventative treatment data or PP-INH data can be obtained from TB Prevention Medicine Card (TB 01P).

Design of Information Systems Development Model of Child TB Surveillance

The design stage is a critical stage. Implementation of a system model can run smoothly if the design is good and vice versa, if the design is not good then the implementation can not run smoothly. The impact of poor system model design can be felt during its implementation⁽⁶⁾.

The tools or methods used in the development of TB tube information system are Data Flow Diagrams (DFD). DFD is a graphical documentation tool consisting of 4 (four) symbols namely environmental elements, processing, data flow and data storage so relatively simple enough, then people who have never studied the field of computers can also read it properly⁽⁶⁾.

Description of the design of TB child surveillance information system development in this study starts from the context diagram to the data flow diagram level 1.

1. Context Diagram

Context diagram describes the system in an environment consisting of a symbol of the process that shows the system as a whole and is currently running⁽⁷⁾. In the context diagram of P2TB surveillance information system, public health center, and hospital are input entity, Health Office of Surabaya is an entity that can see and access, process, and analyze data result of entry by public health center and hospital through SITT 10.04 offline, while Health Office of East Java Provincial is an entity that can view and access the reporting results of TB surveillance activities in Health Office of Surabaya through SITT 10.04 online and the Ministry of Health is an entity that can also directly access the report results from TB surveillance activities in Health Office of Surabaya through SITT 10.04 online.

2. Diagram of data flow level 0

The data flow diagram of level 0 describes the system in detail consisting of major processes in the system and added with store data⁽⁷⁾. In this level 0 data flow diagram, health centers and hospitals perform offline data entry SITT and recap PP INH separately. This is because until now SITT does not have its own format related to PP INH. Therefore, the reconstruction of PP INH is developed by each District Health Office according to the existing requirement. Data in the entry and reported to the Health Department of Surabaya City and Health Office of Surabaya to validate the data as the process of cleaning and editing data. After the data is valid and verified, then Health Office of Surabaya uploads data to SITT online as a form of reporting to Health Office of East Java Provincial and Ministry of Health. Reporting done by Health Office of Surabaya is in the form of online SITT where the recapture of PP INH not yet entered therein. So the development of P2TB surveillance information system especially TB-related child is done in the process of analysis and dissemination of information.

3. Level 1 data flow diagram

This level 1 data flow diagram is the development of the previous level 0 data flow diagram. In this diagram, the main processes in the ongoing system remain depicted, but there are new processes and data necessary to design a child TB surveillance information system. The new process developed in TB child surveillance information system is after validation process, there is data retrieval process from recap PP INH and data retrieval from SITT TB03 Offline. Once the data is retrieved, then it goes into the TB analysis process. The data were analyzed and produced some of the indicators needed for TB-related childhood such as the proportion of TB patients among all TB patients, the coverage of TB case finding, the success rate of TB treatment, the coverage of children <5 years who received PP INH, and the proportion of children who completed PP INH among all children who get PP INH. The results of the analysis can be directly used by

the Health Office of Surabaya and disseminated to the Health Office of East Java Province, and the Ministry of Health.

CONCLUSION

Type of information required on the output component is proportion of TB among all TB patients, case of TB child finding, success rate of TB child treatment, coverage of children <5 years who received PP INH, and Proportion of children who completed PP INH among all children who get PP INH. The design of the components of the P2TB surveillance information system development process is the child TB analysis process and the dissemination of the results of the analysis in accordance with the DFD design. The data requirements of the input component are in accordance with the data in SITT 10.04 and the PP INH recap starting from patient data, health care facilities data, examination data, patient diagnosis and classification data, treatment data, final treatment data, and preventive treatment data.

Support and cooperation from various parties such as health centers, hospitals, clinics, DPM, to mass organizations is very important in supporting and providing data accurate, precise, and fast, and relevant. Need for input component that support in applying system which have been developed starting from human, tool, facility and infrastructure. Therefore it is necessary to conduct training to P2TB program managers who will use the system to improve the knowledge and skills in managing the system, and the need for trials and evaluations to know the deficiencies and support of the developed system so as to accommodate the information needed.

REFERENCES

1. Kemenkes RI. National Guidelines for Tuberculosis Control (Pedoman Nasional Pengendalian Tuberkulosis). Jakarta: Kemenkes RI; 2014.
2. Gavinov IT, Soemantri JFN. Health Information System (Sistem Informasi Kesehatan). Yogyakarta: Nuha Medika; 2016.
3. Septiani ND. Analysis of Child P2-TB Surveillance System at Health Office of Surabaya City. Airlangga University (Analisis Sistem Surveilans P2-TB Anak di Dinas Kesehatan Kota Surabaya). Surabaya: Universitas Airlangga; 2017.
4. Kemenkes RI. Regulation of the Minister of Health No. 67 on Tuberculosis Control Jakarta (Peraturan Menteri Kesehatan Nomor 67 Tentang Penanggulangan Tuberkulosis Jakarta). Jakarta: Kemenkes RI; 2016.
5. Kemenkes RI. The TB Management and Management Technical Guidelines (Petunjuk Teknis Manajemen dan Tatalaksana TB Anak). Jakarta: Kemenkes RI; 2016.
6. Nugroho E. Management Information System: Concepts, Applications, and Development (Sistem Informasi Manajemen: Konsep, Aplikasi, dan Perkembangannya). Yogyakarta: Andi; 2008.
7. Maniah, Hamidin D. Analysis and Design of Information Systems: Practical Discussion with Case Examples (Analisis dan Perancangan Sistem Informasi: Pembahasan Secara Praktis dengan Contoh Kasus). Yogyakarta: Deepublish; 2017.