

# Analysis of basic immunization coverage in Tulungagung District, Indonesia

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**Abstract:** Basic Immunization coverage is still one of problems in Tulungagung district. For the last 3 years, the basic immunization coverage did not cover all the target infants. In 2018, from the target of 15,147 infants, there were 1,116 infants who did not receive immunization of Hepatitis B, 689 infants were not immunized with Bacillus Calmette Guérin (BCG) and 849 infants were not immunized for Oral Polio Vaccine (OPV 1). Aim of the study : To analyze the problems of basic immunization program. Method: This study is a descriptive observational study, conducted at Tulungagung District Health Office from January to February 2019. Identification of problems was done by conducting interviews, analyzing secondary data on basic immunization coverage of the Tulungagung health profile from 2016 to 2017 and section report Surveillance and Immunization in 2018. Prioritisation of Basic Immunization problems was done using *Urgency, Seriousness, Growth* (USG) criteria. Analysis of the problem cause was done by Fishbone methods. Results: Of the problems identified, the first priority problem in Tulungagung District 2018 is Hepatitis B immunization coverage does not reach the target. The root causes were poor immunization, under qualified workers in data collection and validation of targets, poor integration of Basic Immunization and Maternal and Child Health (MCH), lack of promotion and media campaign. Conclusion: Low Hepatitis B immunization coverage is a priority problem for basic immunization programs. Optimization of the integration of child and maternal health immunization program (MCH) is needed, periodic validation of program coverage and health promotion on immunization using creative promotional media.

**Keywords:** Basic Immunization, USG, Fishbone, Maternal and Child Health

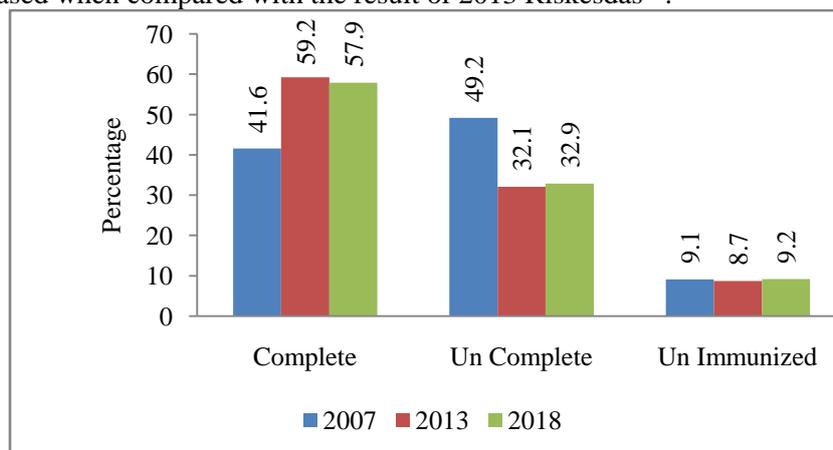
## 1. Introduction

Immunization is the process whereby a person is made immune or resistant to an infection, typically by the administration of a vaccine. Vaccines are highly regulated, complex biologic products designed to induce a protective immune response both effectively and safely<sup>(1)</sup>. Immunization is one of the most effective and efficient forms of intervention in health sector to prevent the spread of an infectious disease, especially ones that can be prevented by immunization (PD3I)<sup>(2),(3),(4)</sup>. Immunization can prevent the spread of a disease within a region and between regions. Smallpox has been eradicated successfully through the administration of immunization<sup>(3)</sup>, and Indonesia was declared free from smallpox in 1974<sup>(4)</sup>.

According to World Health Organization (WHO) records, the proportion of global child immunization coverage has not changed in the last few years. In 2018, around 86% of children worldwide (116.3 million babies) have been immunized with 3 doses of diphtheria-pertussis-tetanus vaccine (DPT), and 129 countries have reached 90% of DPT3 coverage. Additionally, in 2018, basic immunization service targetted 19.4 million children worldwide, and it was not achieved (3 times the dose of DPT vaccine). About 60% of these children live in 10 countries: Angola, Brazil, Democratic Republic of the Congo, Ethiopia, India, Indonesia, Nigeria, Pakistan, the Philippines and Vietnam<sup>(5)</sup>.

The Government of Indonesia through the Ministry of Health has targetted the coverage of Complete Basic Immunization in the 2015-2019 Strategic Plan (Renstra) of the Ministry of Health's Immunization Program, while the coverage of Complete Basic Immunization in 2018 is 92.5%<sup>(6),(7)</sup>.

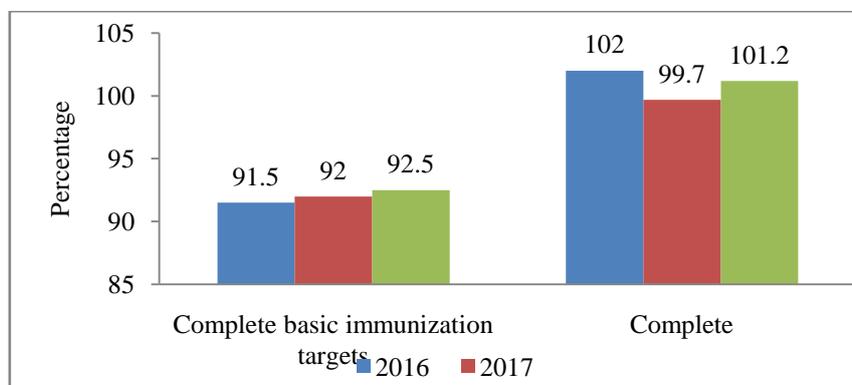
The result of the Basic Health Research (Riskesdas) in 2018 showed that the coverage of Complete Basic Immunization in children aged 12-23 months only reached 57.9%, failing to reach the target, and even decreased when compared with the result of 2013 Riskesdas<sup>(8)</sup>.



**Figure 1.** Proportion of Complete Basic Immunization in 12-23 Years Old Children in Indonesia in 2007-2018.

**Table 1** Distribution of UCI Villages in Tulungagung District in 2016-2018

No	Year	Number of villages	Number of UCI villages	
			N	%
1	2016	271	247	91,1
2	2017	271	229	84,5
3	2018	271	246	90,8



**Figure 2.** Proportion of Complete Basic Immunization in Tulungagung District in 2016-2018

Figure 2 shows that complete basic immunization coverage in Tulungagung District has reached the target set, even exceeding it by 101.2%, suggesting that 14,974 babies have received complete basic immunization in 2018. However, the result of coverage of each antigen have not been evenly distributed to all *puskesmas* areas and village. In fact, some *puskesmas* have poor 0-day hepatitis B antigen coverage for, reaching only 63.5% in the Bendilwungu *Puskesmas*.

Many factors cause the uneven coverage of basic immunization for each antigen. One of them is the lack of validation of cross-program coverage so there is no similarity of cross-program coverage data<sup>(9)</sup>. Hence the needs to conduct an analysis of the implementation of basic immunizations to obtain precise and accurate information. The purpose of this study is to analyze and determine the priority of health problems in the basic immunization program at the Tulungagung District's Public Health Office.

## 2. Method

### a. *Research Design, population, sample, and variables*

The research design used is descriptive qualitative observational approach. Cases were identified using secondary data, which is the monthly immunization program reports, as well as using discussion report using a questionnaire involving the head and staff of the immunization surveillance section. The priority of the problem is determined using the Urgency, Seriousness, and Growth (USG) method. Determination of the root cause of the problem uses the fishbone method. The key sample of this research information is related to the immunization surveillance program, involving the Head of the Disease Prevention and Control Division, the Head of the Surveillance and Immunization Section and the immunization and Cold Chain program manager at the Tulungagung District's Public Health Office. Health Problems Analysis activities at the Tulungagung District's Public Health Office were conducted from January 14 to February 9, 2019.

### b. *Research instrument*

The instruments used in this study include problem identification sheets and structured interview guidelines.

### c. *Research and analysis procedure*

The data analysis was conducted as per the analysis plan to achieve the objective set out at the outset. Descriptive statistic were used to summarize the data on basic immunization coverage utilizing narrations, tables, and figure. Result of the identification of basic immunization problems, priority problems, root causes of problems, and alternative solution by using a system approach theory to classify causal factors.

## 3. Result

In accordance with 2015-2019 Strategic Plan/RPJMN of the Ministry of Health of the Republic of Indonesia, a village shall be categorized as Universal Child Immunization (UCI) if the result of complete basic immunization coverage reaches the set target. Figure 3 presents the coverage of UCI villages in Tulungagung District for the last 3 years, showing the lowest coverage in 2017. Whereas it reached or even exceeded the target set in 2016 and 2018.

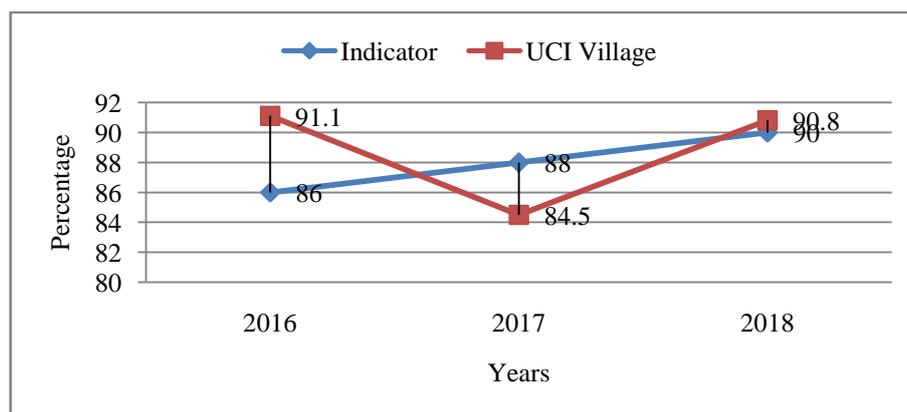


Figure 3. Distribution of Percentage of UCI Village Coverage in Tulungagung District's Public Health Office in 2016-2018

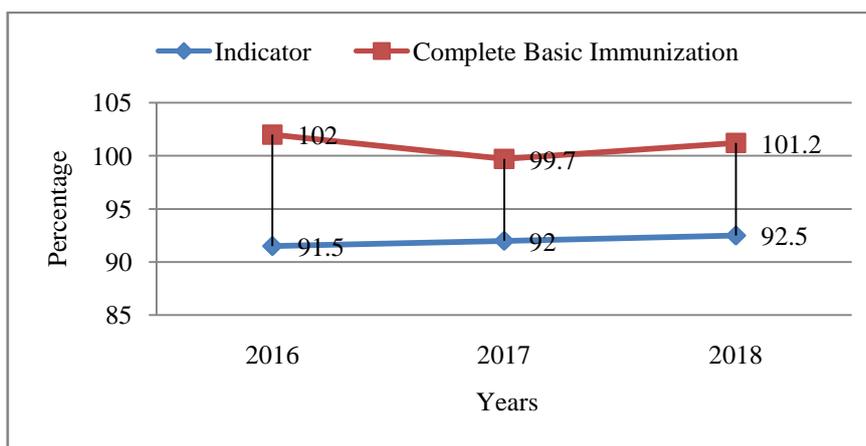


Figure 4. Distribution of Percentage of Complete Basic Immunization Coverage in Tulungagung District's Public Health Office in 2016-2018

Figure 4 shows that the coverage of complete basic immunization in Tulungagung District over the past three years has exceeded the national target<sup>(9)</sup><sup>(11)</sup>.

The realization of the result of basic immunization program coverage in Tulungagung District in 2018 shows a very good outcome when compared to the target set. Of all the existing antigens, the lowest coverage result was the 0-day hepatitis B antigen, with a coverage result of 92.6%. Where the target set for 0-day hepatitis B antigen is 95% of the target, which is 15,147 infants.

Table 2. Percentage of Basic Immunization Coverage in Tulungagung District's Public Health Office in 2018

NO	ANTIGEN	TARGET		COVERAGE		DIFFERENCE	
		N	%	N	%	N	%
1	Hepatitis B 0	15,147	95	14,031	92.6	1,116	7.4
2	BCG	15,147	95	14,458	95.5	689	4.5
3	POLIO 1	15,147	95	14,298	94.4	849	5.6
4	DPT/HB-Hib (1)	14,791	95	14,636	99.0	155	1.0
5	POLIO2	14,791	95	14,650	99.0	141	1.0
6	DPT/HB-Hib (2)	14,791	95	14,636	99.0	155	1.0
7	POLIO3	14,791	95	14,595	98.7	196	1.3
8	DPT/HB-Hib (3)	14,791	95	14,839	100.3	(48)	-0.3
9	POLIO4	14,791	95	14,792	100.0	(1)	0.0
10	MR	14,791	95	14,821	100.2	(30)	-0.2

Table 2 illustrates that 0-day hepatitis B antigen coverage does not reach the target set. This shows that there is still a gap in the result of 0-day hepatitis B immunization coverage in Tulungagung District by 7.4% or in around 1,116 infants. Infants who do not get 0-day hepatitis B immunization will lose the opportunity to get complete basic immunization, because 0-day hepatitis B immunization is the baby's first access to immunization services.

Drop Out (DO) DPT/Hb/Hib 1-DPT/Hb/Hib 3 is the realization of regional monitoring to assess the efficiency of the immunization program. The DO threshold value is 5%. In Tulungagung District, from 2016 to 2018, the value of Drop Out DPT/Hb/Hib 1-DPT/Hb/Hib 3 poorly below of the threshold, suggesting the efficiency of the immunization program in Tulungagung District is very

good (Figure 5.). However DO values are not evenly distributed for all puskesmas, as there are still puskesmas with DO values of more than 5%. BendilwunguPuskesmas is one of the puskesmas with a DO value of more than 5% (Figure6.).

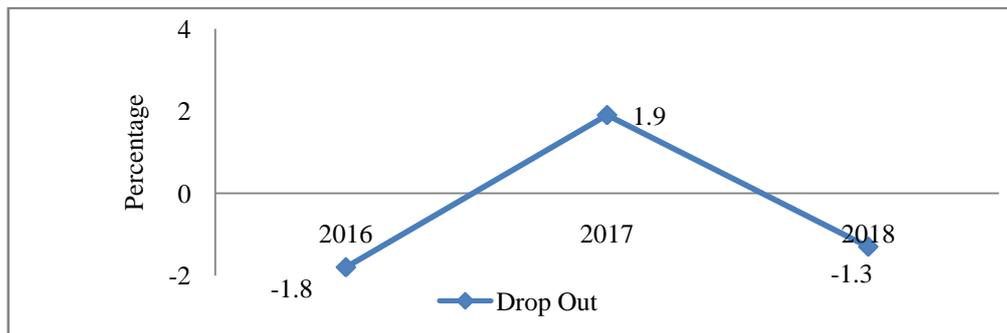


Figure 5. Percentage of Drop Out DPT/Hb/Hib 1-DPT/Hb/Hib 3 inTulungagung District's Public Health Office in 2016-2018

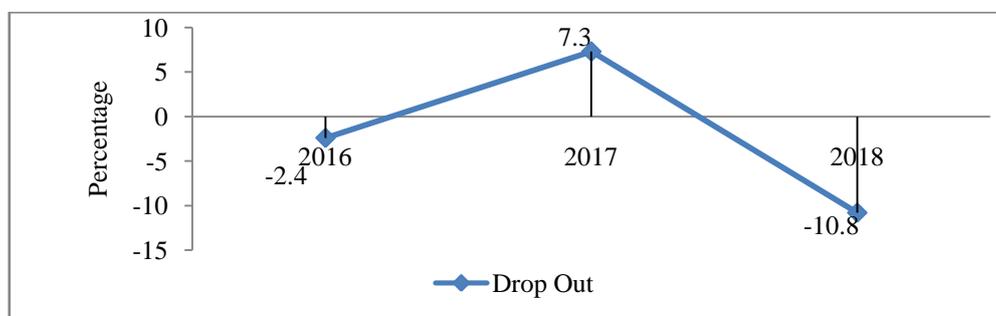


Figure 6. Percentage of Drop OutDPT/Hb/Hib 1-DPT/Hb/Hib 3 in Puskesmas Bendilwungu, Tulungagung District in 2016-2018

Based on the results of discussions and interviews with the Head of the Division of Disease Prevention and Control, the Head of the Surveillance and Immunization Section and the administrators of the immunization and Cold Chainprogram, information was obtained that in addition to the problem of basic immunization program coverage, there are still some problems experienced in implementing the basic immunization program, including:

- a. The immunization program microplanning did not go well in some levels of service.
- b. Lack of data validation of the coverage results from the village/sub-district to Puskesmas and from Puskesmas to Tulungagung District's Public Health Office

Following the problems identified, the prioritizing is done by distributing form sheets based on the indicators Urgency, Seriousness, and Growth. The form is filled out by the Head of the Division of Disease Prevention and Control, the Head of the Surveillance and Immunization Section and the administrators of the immunization and Cold Chain program, and also the staff of the Surveillance and Immunization Section.

Table 3. Priority Determination of Basic Immunization Program Problems at the Tulungagung District's Public Health Office in 2018

NO	PROBLEMS	Number			Total	Priority
		U	S	G		
1	Coverage of UCI village in 2017 did not reach the target set	26	28	26	80	2

2	Coverage of 0-day Hepatitis B Immunization in 2018 did not reach the target set	29	27	29	85	1
3	Puskesmas Bendilwungu had the highest DO DPT/Hb/Hib 1- DPT/Hb/Hib 3 value	25	26	24	75	3
4	Microplanning of immunization program did not go well	24	24	21	69	4
5	Lack of validation of coverage tiered data	25	24	20	69	5

Table 3 explains the result of the prioritizing of basic immunization coverage in Tulungagung District. Coverage of 0-day hepatitis B immunization in 2018 did not reach the target set as the priority issue was ranked first. Because 0-day hepatitis B immunization is a baby's first access to immunization services which if left untreated will cause the baby to lose the opportunity to get complete basic immunization.

Based on the analysis of the root causes of the problem using the Fishbone Diagram, several root causes of the problem of 0-day hepatitis B immunization coverage in 2018 include: immunization officials did not do the data collection and target validation very well, integration of immunization programs and maternal and child health (MCH) did not go well, the lack of promotion for immunization programs.

#### 4. Discussion

All infants should receive their first dose of hepatitis B vaccine as soon as possible after birth, preferably within 24 hours. In countries where there is high disease endemicity and where Hepatitis B Virus is mainly spread from mother to infant at birth or from child to child during early childhood, providing the first dose at birth is particularly important, but even in countries where there is intermediate endemicity or low endemicity an important proportion of chronic infections are acquired through early transmission<sup>(12)</sup>.

The problem considered a priority by Tulungagung District's Public Health Office based on the Health Problems Analysis is the 0-day Coverage of Hepatitis B Immunization in 2018 that did not reach the set target. Hepatitis B is a viral infection that attacks the liver<sup>(12)</sup>. It is estimated that around 240 million people in the world have been chronically infected by hepatitis B. In Indonesia, hepatitis B virus infection is still one of the important health problems. HBV infection has been reduced through the hepatitis B immunization program for newborns, but this infection continues its threat in Indonesia<sup>(13)</sup>.

The World Health Organization has recommended infant vaccinations including diphtheria, tetanus, pertussis, hepatitis B, hemophilus influenza B, and measles vaccine for all children. In 2011, around 107 million infants (83%) worldwide had received a 3-dose DPT immunization. However, there are still around 2-3 million children who suffer every year because they do not get vaccinated<sup>(14)</sup>. Vaccination can prevent a person from suffering from an infectious disease and protect it from contact with people who have been infected and not vaccinated<sup>(15)</sup>. Hepatitis B immunization for infants has been introduced in 189 countries by the end of 2018. Coverage of Hepatitis B immunization for 3 doses globally is estimated to have reached 84%, and about 90% in the Western Pacific. In addition, 109 countries have introduced one dose of hepatitis B vaccine for newborns within the first 24 hours of life, with global coverage of 42%<sup>(12)</sup>.

The result of the analysis of the causes of problems using the Fishbone diagram shows that because immunization officials did not do the data collection and target validation well, the integration of immunization programs and maternal and child health (MCH) was hindered, not to mention the lack of promotion for immunization programs.

The integration of immunization programs and maternal and child health (MCH) can be measured from the comparison of the results of hepatitis day immunization coverage with the coverage of the first neonatal visit (KN1). Delivery time is the right time to deliver health and advice messages and administer 0-day hepatitis B immunization<sup>(16)</sup>. Based on this, it is expected that between health workers in the MCH section and immunization officials improve a good cooperation to increase the 0-

day hepatitis B immunization coverage. Also, health workers should be able to increase their role as educators through counseling on Hepatitis B immunization for when mothers are visiting health services.

The lack of promotion for immunization programs is one of the root causes of the problem of hepatitis B immunization coverage not reaching the target. This is in line with the result of a research by Rachman, I., et al (2015) stating that health workers who do not provide information to the mothers' family about Hepatitis B immunization have an impact on the knowledge and attitudes of mothers who have less information about Hepatitis B immunization<sup>(17)</sup>.

The availability of promotional media is also very influential as it can provide information about hepatitis B immunization to the public. This is supported by a research by Harahap, R. A, (2016) stating that health facility variables are the most influential factor in providing hepatitis B immunization.<sup>(18)</sup>

## 5. Conclusion

The coverage of 0-day hepatitis B immunization in 2018 did not reach the target set. It caused immunization officers did not do the data collection and validation of target very well, and the immunization coverage problem. Furthermore, integration of the immunization program and maternal and child health (MCH) did not go well in terms of target validation and validation of 0-day hepatitis B immunization coverage and coverage of the first neonatal visit (KN1). The lack of promotion of the immunization program affects the information about the benefits of hepatitis B immunization to the public.

## 6. Research Limitations

The limitation of this study includes the exclusion of primary data collection in the community and immunization program officials in the health center office.

## 7. Acknowledgment

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