



**LEPTOSPIROSIS PREVENTION AND CONTROL STRATEGIES ONE HEALTH  
BASED IN KARANGTENGGAH DEMAK INDONESIA**

Nura Ma'shumah<sup>1</sup>, Bagoes Widjanarko<sup>2</sup>, Adi Sakundarno<sup>3</sup>

<sup>1</sup>Master Student of Health Promotion, Diponegoro University, Semarang, Indonesia

Email : [nurama.shumah@gmail.com](mailto:nurama.shumah@gmail.com)

<sup>2</sup>Lecture in the Master of Health Promotion, Diponegoro University, Semarang, Indonesia

<sup>3</sup>Lecture in the Master of Health Promotion, Diponegoro University, Semarang, Indonesia

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**Abstract**

Leptospirosis transmission is closely related to the low behavior of clean and healthy living in humans. Leptospirosis occurs every year in Indonesia including Karangtengah Demak which has 2 cases with 1 death in 2016, 2017 there are 2 cases, 2018 there are 12 cases with 3 deaths. The target IR is  $\leq 3 / 100,000$  population and CFR  $\leq 10\%$ . In 2018 IR Karangtengah 16.82 / 100,000. and CFR is very high, namely 25%, because only the health sector is engaged in preventing leptospirosis.

The research method is qualitative with an active participatory design using OH-SMART which aims to obtain a strategy / model for the prevention and control of leptospirosis with a one health approach. The

research subjects are public health center health workers such as surveillance, health promotion personnel, environmental health workers, doctors, private clinics, village health post midwives, the Coordinator of the Agricultural Extension Center, the Head of the Technical Implementation Unit of the Education and Culture Office, the Islamic Religious Education Office, the Principal of the School. Junior High School, Senior High School, Head of the Subdistrict Family Welfare Empowerment Team, 4 Village Heads. Collecting data by means of Focus Group Discussion (FGD) for two days.

Results from OH-SMART: The strategy for leptospirosis prevention and control resulted from OH-SMART is the formation of a one health team in Karangtengah sub-district, advocacy to the Karangtengah sub-district head, coordination through the Whattaps group, cross-sector monitoring, cross-sector activity reports, evaluation of OH team activities, OH team training, dissemination of early diagnosis of leptospirosis to clinics, monitoring and evaluation of leptospirosis detection carried out by clinics, counseling on safe rat control to farmer groups by Bapeluh, eradicating rats by the community, routine chlorination, monitoring chloritization, leptospirosis counseling in schools, Discipline application of Clean and Healthy Behavior in schools, installation of leptospirosis promotional media, monitoring of the implementation of Clean and Healthy Behavior in schools.

**Keywords :** *leptospirosis, one health, OH-SMART*

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## INTRODUCTION

Leptospirosis is a disease caused by leptospira bacteria. This disease is a zoonotic disease, because it is transmitted through animal intermediaries, usually rats, so it is also called rat urine disease. Other animals that become hosts are cats, dogs, pigs, sheep, cows, goats and others. The mode of transmission from rat urine containing leptospira bacteria enters the human body through the mucosa of the mouth, nose, eyes, wounds on the skin (Kemenkes RI, 2017)

The incidence of leptospirosis worldwide is estimated to be more than one million each year, with 58,900 deaths each year. (Rahman MHAA, Hairon SM, Hamat RS, Jamaluddin TZMT, Shafei MN, Idris N, 2018) In Indonesia in 2013 there were 641 cases, a figure mortality 9.38%. In 2014 there were 519 cases, the death rate was 11.75%. One of the provinces with the most cases of leptospirosis is Central Java. (Ministry of Health, 2016) In 2013 in Central Java there were 156 cases with 17 deaths (CFR 10.9%). In 2017 there were 207 cases with 34 deaths (CFR 16.4%). In 2018, it increased by around 200%, namely 427 cases (IR 1.24 / 100,000) and 89 deaths (CFR 20.8%). The target IR leptospirosis is  $\leq 3 / 100,000$  population. While the target CFR is  $\leq 10\%$ . (Central Java Health Office, 2017) The district with the highest incidence rate is Demak, namely 7.99 / 100,000 population (94 cases) and 24 deaths (CFR 26.1%) in 2018. (Central Java Health Office, 2019) Karangtengah is one of the endemic leptospirosis districts. The case for the last 3 years continues to increase, as is the death rate. In 2017 there were 2 cases, in 2018 there were 12 cases with 3 deaths (CFR 25%), in 2019 there were 10 cases with 3 deaths (CFR 30%). (Karangtengah Community Health Center, 2018; Karangtengah Community Health Center, 2019)

The high mortality rate due to leptospirosis is due to the difficulty in detecting leptospirosis early on, so that the patient is already in a severe condition while in the hospital. This is because the clinical symptoms of leptospirosis are almost the same as other diseases such as dengue fever, typhoid, hepatitis, influenza. Therefore, this disease is a neglected disease, a forgotten disease (Sofiyani M, Dharmawan R, 2017)

Epidemiologically, based on geographic location, the incidence of leptospirosis in Karangtengah is scattered in areas near rivers, ponds and rice fields. While the risk factors for leptospirosis based on epidemiological investigations in Karangtengah, are the presence of rats in the house, contact with stagnant water, injuries to the feet, contact with rats, hoeing / farming, flooding / mud, cleaning gutters without personal protective equipment, bathing in rivers, fishing, and swimming. Thus the affected community groups are farmers, fishermen, rubbers, housewives, adolescents. The causes are not wearing footwear, not washing hands and feet using



soap and running water, littering, not covering food / drinks, not storing kitchen utensils in a closed place. (Karangtengah Community Health Center, 2018)

The efforts that have been made by the Karangtengah Community Health Center are counseling on the prevention of leptospirosis to the community, inviting cross-sectoral activities in Karangtengah District to jointly prevent leptospirosis according to their fields. These efforts have not been successful. This can be seen from the number of leptospirosis cases in 2018 (12 cases) and 2019 (10 cases) with increasing mortality, namely 2018 (CFR 25%), 2019 (CFR 30%), so it is necessary to conduct research to obtain prevention strategies and control of leptospirosis in Karangtengah with a one health approach, an approach that recognizes that human health is closely related to animal health and the environment.

## **METHODS**

This research is a qualitative study using OH-SMART as a tool to identify gaps and opportunities for system improvement. Collection data through focus group discussion (FGD). The object of his research is the process of handling leptospirosis by related sectors in Karangtengah District. The research subjects are sectors related to the treatment of leptospirosis, namely Public Health Center officers (doctors, nurses, surveillance, public health, sanitarians), doctors / clinicians, Head of the Technical Implementation Unit of the Education and Culture Office, Principal of Junior High Schools, Principal of Senior High School, Office of Islamic Religious Education, Agricultural Training Center, Sub-district Family Welfare Empowerment Team, 6 midwives, Village Health Post, 4 Village Heads with leptospirosis cases.

OH-SMART Steps:

1. Identify cross-sector networks
  - a. What sectors are involved
  - b. What sectors are included in the main and supporting sectors
2. Identifying roles across sectors according to their main duties and functions
3. Define the system through the process mapping of each agency
  - a. The process of treating leptospirosis in each agency (real conditions)
  - b. Process mapping by creating a color map on the Modern Monetary Theory sheet
4. Analyze the system through a multi-agency workshop
  - a. Combines the cross-cutting process map for leptospirosis
  - b. Look for gaps / problems / gaps in the process of handling leptospirosis in each agency.
5. Identify opportunities to strengthen system operation
  - a. Resolution for problem solving
6. Develop a plan of action / activity to prevent and control leptospirosis



a. Plan of action / activities to prevent and control leptospirosis. (Artama WT, 2015)

This action plan / activity is a one health-based leptospirosis prevention and control strategy in Karangtengah Demak.

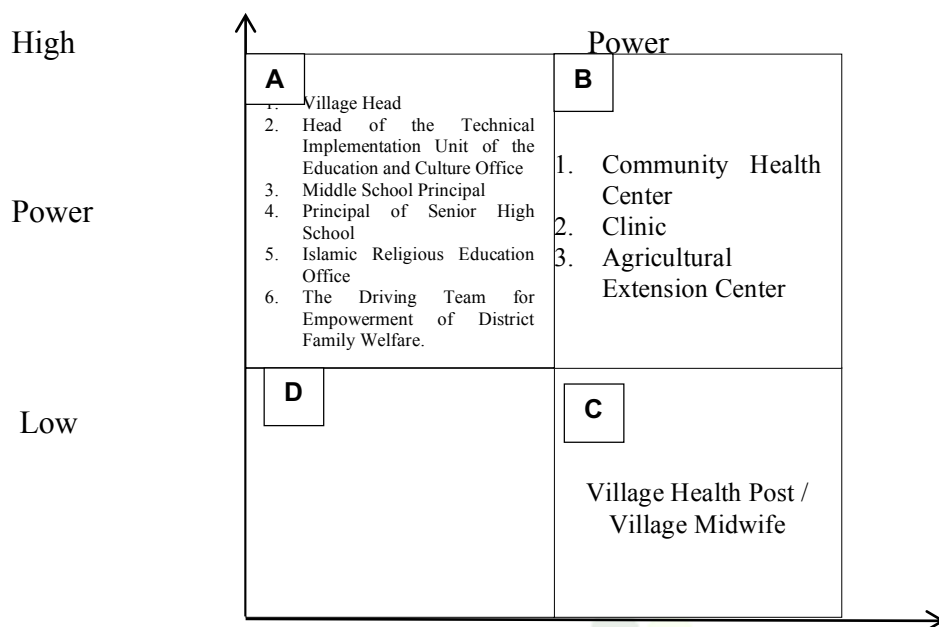
## **RESULTS**

The OH SMART workshop was held for 2 days, attended by 23 people consisting of 11 agencies / sectors. 10 Sectors are sectors that exist in Karangtengah District, 1 sector, namely the Department of Agriculture and Food of Demak Regency, was invited to find out about the existence of a one health team for leptospirosis management in Karangtengah District and can foster a one health team.

The first day identifies the networks / sectors involved in the prevention and control of leptospirosis. There are 10 sectors involved, namely Community Health Centers, Clinics, Village Health Posts, Agricultural Extension Centers, Village Governments, Junior High Schools, Senior High Schools, Technical Implementation Units of the Education and Culture Office, Islamic Religious Education Office, Driving Team Empowerment of District Family Kesejahteraan. There were 2 Village Governments who did not attend because there were events that could not be left out, namely Karangsari and Kedunguter villages.

The ten sectors are differentiated into main and supporting sectors by using a stakeholder analysis matrix, which is divided into 4 matrix areas based on their strengths and weaknesses and their interest in the problem of leptospirosis. This is useful for determining strategies in communication with stakeholders so that they are interested in the problem of leptospirosis control.

For those with high interest, both high and low power, are included in the main sectors, except for junior high schools, senior high schools and village governments, although low interest is included in the main sectors, because junior high schools and senior high schools play a role in changing student behavior. and the community to have a clean and healthy lifestyle so as to prevent leptospirosis. Sectors that are included in the low interest area are included in the supporting sector, namely the Technical Implementation Unit of the Education and Culture Office, the Office of Islamic Religious Education, the Driving Team for the Empowerment of District Family Welfare.



Picture 1. Stakeholder Matrix

The next step is to identify the role of each sector in the prevention and control of leptospirosis in accordance with the main tasks and functions of the agency / sector.

Table 1. Identification of Involved Cross-Sectors

Problem	:	The high number of leptospirosis cases and leptospirosis mortality rates in Karangtengah District
Scope / level	:	sub-district
Creation Agency	:	Researcher
Posisi	Role	
Key stakeholders / main sectors. / Corner sectors		
a. Community Health centers	<ol style="list-style-type: none"> <li>1. Treatment</li> <li>2. Refer leptospirosis patients who have severe symptoms to the hospital</li> <li>3. Epidemiological investigation</li> <li>4. Education</li> <li>5. Cross-sectoral coordination with the Village Government, Village Midwives and cross-sectoral</li> </ol>	



	districts to tackle leptospirosis
b. Clinic	<ol style="list-style-type: none"> <li>1. Treatment</li> <li>2. Refer leptospirosis patients who have severe symptoms to the hospital</li> <li>3. Coordination with the Community Health Center when finding leptospirosis cases to be examined in the laboratory</li> </ol>
c. Village Health Post	<ol style="list-style-type: none"> <li>1. Detection of leptospirosis</li> <li>2. Report to the Public Health Center if there are cases of leptospirosis</li> <li>3. Refer leptospirosis patients to a Community Health Center</li> </ol>
d. Agricultural Extension Center	<ol style="list-style-type: none"> <li>1. Counseling and assistance in eradicating rats in fields that are safe and do not pollute the environment</li> </ol>
e. Junior High School /Senior High School	<ol style="list-style-type: none"> <li>1. Provide education to students to keep the school environment clean</li> <li>2. Implementing a Clean and Healthy Life Behavior in schools by scheduling students and teachers to picket cleaning the school environment</li> <li>3. Encourage the active role of existing Youth Health Cadres to monitor the cleanliness of the school environment and mobilize students to routinely carry out community service cleaning the school environment</li> </ol>
f. Village government	<ol style="list-style-type: none"> <li>1. Order Neighborhood Association, or Citizens Association to clean the environment and chlorinate places that are humid and waterlogged</li> <li>2. Fulfilling the need for transportation infrastructure to refer people affected by leptospirosis to the hospital</li> <li>3. Assisting public health center surveillance officers in conducting epidemiological investigations of leptospirosis</li> </ol>

Continued Table 1. Cross-Sector Identification Involved



Problem	:	The high number of leptospirosis cases and leptospirosis mortality rates in Karangtengah District
Scope / level	:	sub-district
Creation Agency	:	Researcher
Position	Role	
Supporting stakeholders / supporting sectors		
a. Implementing Unit of the Education and Culture Office	1. Instruct Kindergartens, Early Childhood Education, Elementary Schools in the Karangtengah area to clean the school environment and educate students to have a clean and healthy lifestyle to avoid leptospirosis and implement Clean and Healthy Behavior in schools	
b. Islamic Religious Education Office	Instructing Islamic Elementary Schools, Islamic Junior High Schools, Islamic Senior High Schools in the Karangtengah area to clean the madrasa environment and educate students to live clean and healthy lives in order to avoid leptospirosis and implement healthy and clean behavior in Islamic schools	
c. The Driving Team for Empowerment of District Family Welfare	Socialization on the prevention of leptospirosis and appeal to the Empowerment of Village Family Health to mobilize residents to adopt a Healthy and Clean Life Behavior and to carry out chlorination  Instruct health cadres to report residents who have complaints of fever, headache, muscle pain to the village midwife	

In the mapping flow, you can see gaps in the process of handling leptospirosis, namely:

1. The clinical case finding of leptospirosis is lacking
2. There is no coordination between the Community Health centers and the Agricultural Extension Center, the Technical Implementation Unit of the Education and Culture Office, the Office of Islamic Religious Education, Junior High Schools, Senior High Schools, and the Driving Team for the Empowerment of District Family Welfare
3. There is no handling of animals that cause leptospirosis





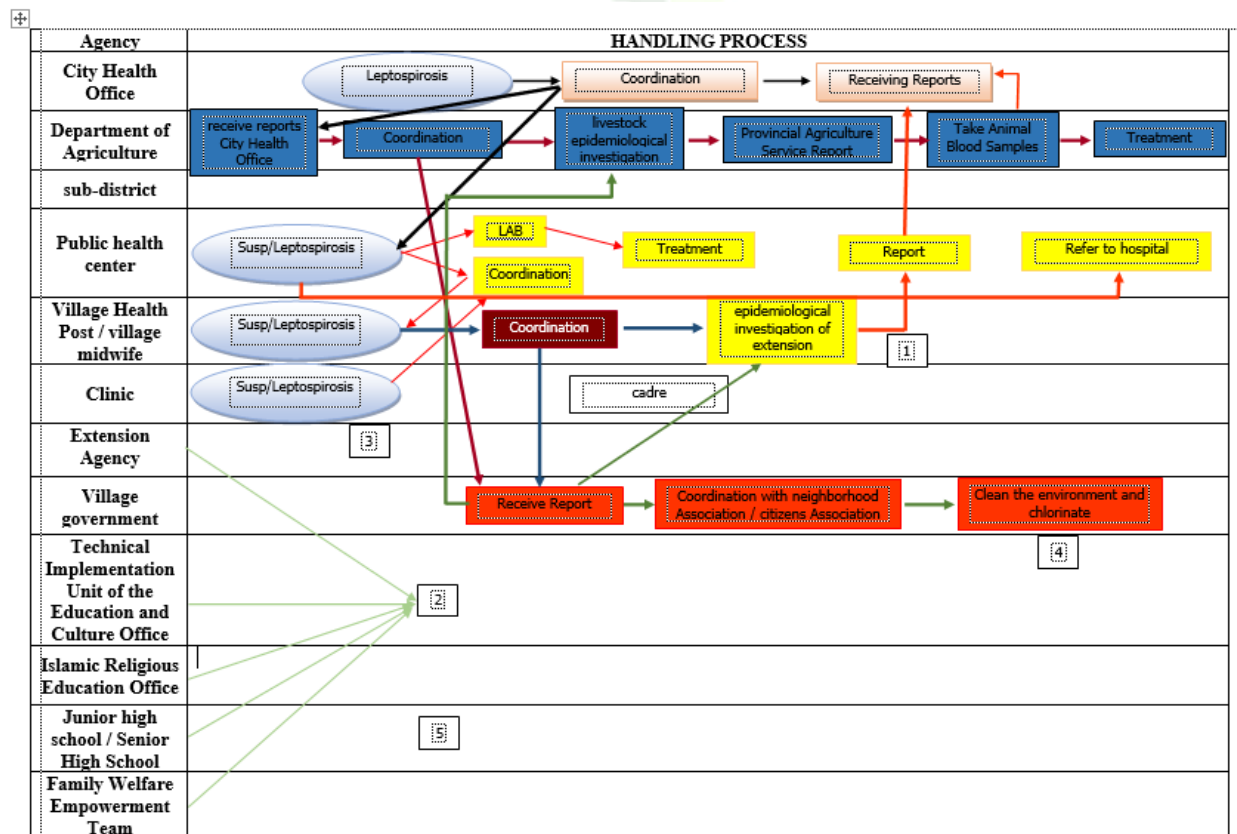
- 4. Chloritization has not been carried out routinely
- 5. Lack of health promotion on leptospirosis in schools such as junior and senior high schools

**Picture 2. Mapping Flow of Leptospirosis Treatment Process**

This gap is an opportunity to find a solution as in the following table.

Table 2. Problem Resolution

Problem	Resolution	Priority
1. Case finding of leptospirosis from private clinics is lacking	1. Socialization of early diagnosis of leptospirosis to private clinics 2. Monitoring and evaluation of leptospirosis detection	1. Socialization of early diagnosis of leptospirosis to private clinics 2. Monitoring and evaluation of leptospirosis detection 3.







<p>2. There has been no coordination between the Community Health centers and the Agricultural Extension Center, the Technical Implementation Unit of the Education and Culture Office, the Office of Islamic Religious Education, Junior High Schools or Senior High Schools, the Driving Team for the Empowerment of District Family Welfare</p>	<p>1. Advocacy to the Head of Karangtengah Subdistrict 2. To coordinate, communicate and collaborate</p>	<p>1. Advocacy to the Head of Karangtengah District 2. To coordinate, communicate and collaborate</p>
<p>3. There is no treatment in animals that cause leptospirosis</p>	<p>The Agricultural Extension Center provides counseling on safe rat control to farmer groups</p>	<p>The Agricultural Extension Center provides counseling on safe rat control to farmer groups</p>
<p>4. Chloritization has not been carried out routinely</p>	<p>1. Conduct routine chlorination Monitoring of chlorination</p>	<p>2. Conduct routine chlorination 3. Monitoring of chlorination</p>
<p>5. There is little health promotion about leptospirosis in schools</p>	<p>1. Education about leptospirosis in schools 2. Implementation of Healthy and Clean Lifestyle in schools for the prevention of leptospirosis</p>	<p>1. Education about leptospirosis in schools 2. Implementation of Healthy and Clean Lifestyle in schools for the prevention of leptospirosis</p>



Table 3. Action Plan

<b>STAGE 6-PLAN OF ACTION</b>			
<b>Action steps identified</b>	<b>Short-term</b>	<b>Medium-term</b>	<b>Long-term</b>
<b>1. Lack of case finding from the clinic</b> a. Socialization of early diagnosis of leptospirosis b. Monitoring and evaluating the detection of leptospirosis	√	√	
<b>2. There has been no coordination between the Community Health Center and the Extension Agency, the Technical Implementation Unit of the Education and Culture Office, the Office of Islamic Religious Education, Junior High Schools or Senior High Schools, Team for the Empowerment of Family Welfare in the District</b> a. Advocacy to the Head of Karangtengah District b. Forming a One Health Team for Leptospirosis Management c. Coordination through the OH Team whatsapp group d. Cross-sector monitoring e. Activity reports across sectors f. Evaluate the OH Team's activities g. OH Team Development with training	√	√ √ √ √	√
<b>3. There is no treatment in animals that cause leptospirosis</b> a. Extension of safe rat control to farmer groups by the Extension Agency b. Community rat eradication		√ √	



<p><b>4. Chloritization is not routine</b></p> <p>a. Chloritisation is scheduled regularly</p> <p>b. Chloritization monitoring</p>		<p>√</p> <p>√</p>	
<p><b>5. There is little health promotion about leptospirosis in schools</b></p> <p>a. Education about leptospirosis in schools</p> <p>b. Implementing a clean and healthy lifestyle in schools in a disciplined manner</p> <p>c. Installation of leptospirosis promotional media</p> <p>d. Monitoring the implementation of Clean and Healthy Behavior in schools</p> <p>e. Empowering Youth Health Cadres to monitor the implementation of Clean and Healthy Behavior in schools</p>		<p>√</p> <p>√</p> <p>√</p> <p>√</p>	<p>√</p>

## DISCUSSION

The essence of the one health approach is coordination, communication and collaboration across sectors, so that leptospirosis management must be carried out jointly and in collaboration. The strategy is to form a One Health (OH) team in Karangtengah sub-district with a Subdistrict Head Decree, as in Wawan Kurniawan's research (2019), the formation of an OH team to tackle Dengue Hemorrhagic Fever.

In Wawan Kurniawan's research (2019), he stated that with OH SMART, it produced a promotive and preventive model of dengue hemorrhagic fever control that was effective in increasing the knowledge, attitudes, and participation of elementary students in controlling the Dengue Hemorrhagic Fever vector in Majalengka Regency (Kurniawan W., 2019 ). While this research instills habits of clean and healthy living habits in elementary school students, junior high schools, high schools through education / counseling and discipline enforcement in behaving cleanly in school. Thus, it is hoped that students can apply a Clean and Healthy Life Behavior wherever they are. Likewise, the role of the Village Government is to motivate the community to live healthy, the existence of policies on waste management, the arrangement of a healthy village environment, chlorination, and so on.



To control leptospira reservoir animals is to eradicate rats in the fields. Usually the growing season is the breeding period for rats in the fields. In one growing season, female rats can give birth to 2-3 times with 6-18 tails once (Dinas Pertanian DIY, 2015). People who are members of farmer groups will be educated by agricultural extension agents on how to eradicate rats that are safe for the environment and prevent leptospirosis.

Socialization of leptospirosis diagnosis to the clinic is expected to increase early detection of leptospirosis. Likewise with the OH Team training, it can increase the capacity of officers, such as in Ahmad Mike Ariyanto's research, that by increasing the capacity of officers in detection, response and rapid reporting in cases of rabies transmitting animal bites, increased response to cases <24 hours, no one died. due to rabies, the distribution of Anti-Rabies Vaccine has decreased due to use as needed (Ariyanto AM, 2018)

Monitoring is important to see how an activity is carried out according to plan. Meanwhile, evaluation is to assess whether the strategy implemented is effective in reducing leptospirosis cases and deaths due to leptospirosis.

## **CONCLUSION AND RECOMMENDATION**

Leptospirosis can be overcome with a one health approach, which emphasizes coordination, communication and collaboration across sectors in Karangtengah District. The strategies are:

1. Advocacy to the Head of Karangtengah District to form a One Health Team for the Prevention and Control of Leptospirosis Karangtengah
2. Coordination and communication via the OH Team Group WhatsApp
3. All sectors involved must play a role in overcoming leptospirosis
4. Each sector must report the results of leptospirosis control activities to the OH Team
5. Improve health promotion in the community and schools
6. Chloritis regularly
7. Implementing a Clean and Healthy Life Behavior in schools and communities
8. Eradication of field mice
9. Activity monitoring to ensure that activities are carried out according to plan
10. Evaluation to assess whether activities are successful in reducing leptospirosis cases and deaths
11. Report the activities of the OH Team to the Head of Karangtengah District.



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