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# ANALYSIS OF MEASLES SURVEILLANCE BASED ON SYSTEM APPROACH IN BANGKALAN HEALTH OFFICE

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**Abstract**

Background: Measles and rubella are one of the VPDs that very contagious with the average number of secondary cases caused by people who transmit the disease in susceptible populations estimated at 12-18 cases. Measles and rubella are the highest number of VPD cases in Bangkalan, however the findings of secondary cases of measles and rubella did not reach the minimum estimated number. Purpose: To analyze the measles and rubella surveillance system at the Bangkalan Regency Health Office using a systems approach (input, process, output). Method: The design of this study was a descriptive qualitative study conducted at the Bangkalan Regency Health Office in January until February 2024. There were 4 respondents to this study including 1 Head of the Surveillance and Immunization Division, 1 Person in Charge of the Surveillance Program, and 2 staff members of the Surveillance and Immunization Division. Data was collected by conducting in-depth interviews and secondary document studies. Results: Active surveillance from the Bangkalan Health Office to visit hospitals is still carried out once a month and is not routine. Not all hospitals are routinely targeted by active surveillance. Conclusion: This study shows that the detection of suspected measles cases by active surveillance in Bangkalan Regency is not optimal.

**Keywords**: Measles, Surveillance, System

## Introduction

Agents of Vaccine Preventable Diseases (VPDs) will always exist and cannot be completely eradicated. What we can be done is to increase the body's immunity against the agents of VPDs (1). One of the best ways to prevent transmission and increase the body's immunity from VPDs by immunization (2). Immunization has been proven to prevent morbidity, death and disability against VPDs.

Measles and rubella are the most higest number of VPD prevalence in Indonesia (3). Measles and rubella remain serious challenges for the public health system (4). Measles and rubella are highly contagious diseases caused by viruses and can be fatal but can still be prevented with immunizatio(5). Increasing immunization coverage for measles and rubella is very important to reduce global morbidity and mortality rates, especially in Africa and Southeast Asia, including Indonesia (6).

Number of measles and rubella cases in Indonesia is reported every year. In 2022, the number of measles and rubella suspected cases was increase until 36 times than previous year. The Indonesian Ministry of Health reported that there were 4844 laboratory confirmed cases of measles and 839 cases of rubella during 2022 (3).


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In 2022, East Java Province is one of the regions that experienced an increase compared to the previous years. The number of suspected measles cases in East Java in was 510 cases (2018), 963 cases (2019), 223 cases (2020), 388 cases (2021), 2135 cases (2022), and 2592 cases (2023) reported (7)

More than last 5 years, Bangkalan has the lowest basic immunization and Universal Children Immunization (UCI) coverage in East Java. It has become commonplace that the prevalence of VPD is always increasing in Bangkalan, including measles and rubella. In the last 5 years, the number of measles and rubella suspected cases was 54 cases (2018), 42 cases (2019), 4 cases (2020), 6 cases (2021), 140 cases (2022), and 188 cases (2023) reported (8) (9).

Measles and rubella are one of the VPDs that very contagious with the average number of secondary cases caused by people who transmit the disease in susceptible populations estimated at 12-18 cases (10). Measles and rubella are the highest number of VPD cases in Bangkalan, however the findings of secondary cases of measles and rubella did not reach the minimum estimated number. This research needs to conduct to find out the problem Bangkalan Regency Health Office is facing.

**Method**

This research is a descriptive qualitative study with cross-sectional study design. This study was conducted using system approach (input, process, output). Data collection was carried out on January until February 2024 in Bangkalan Regency Health Office. The collected data was measles surveillance data throughout the year 2023. The data collected was both primary and secondary. Primary data came from indepth interview and direct observation. The secondary data came from document study. The instrument that used in this study is questionnaire, stationery, and audio recorder. The informants of this study are the Head of Surveillance and Immunization Division, Person in Charge of Surveillance Program, and 2 staffs of surveillance program. The results of this research were presented in the form of pie diagrams, coloumn graph and geographical mapping which are then explained using simple narratives. Analyzed data for this research used EpiInfo version 7.2.5.0 and Quantum GIS version 3.32.3. This research was certified to be ethically cleared by Universitas Airlangga Faculty of Dental Medicine Health Research Ethical Clearance Commission with number of certificate 1139/HRECC.FODM/X/2023.

**Result**

1. Input
    a. Man

There are 6 surveillance officers for measles and rubella at the Health Office of Bangkalan Regency. Their educational backgrounds are Master of Epidemiology (1 staff), one Bachelor of Epidemiology (1 staff), Bachelor's degrees in non-health-related fields (3 staffs), and Diploma of Environmental Health (staff)

The Minister of Health Regulation Number 1116/MENKES/SK/VIII/2003, mentioned that human resources required at the City/ Regency level to conduct health epidemiological surveillance consist of one expert epidemiologist (Masters level), two expert epidemiologists (Bachelor's level) or skilled individuals, and one general practitioner (11).

Based on the interview results, it is indicated that the implementation of measles and rubella surveillance at the Health Office of Bangkalan Regency still requires one more skilled or Bachelor's level epidemiologist and one general practitioner. However, overall, the surveillance activities for

measles and rubella at the Health Office of Bangkalan Regency can be carried out, and each officer can fulfill their responsibilities.

b. Money

The source of funds for the measles and rubella surveillance in the Bangkalan Regency Health Office comes from Indonesian goverment state budget and the local government budget. The funds were allocated for case investigation and deliver specimen to laboratorium.

The financing sources for the implementation of the Measles-Rubella Elimination Program surveillance system at the Health Office of Bangkalan Regency have been adequate accordance to Minister of Health Regulation Number 1116/MENKES/SK/VIII/2003, mentioned that the funding sources for the implementation of health epidemiological surveillance systems consist of the state budget, regency/city regional budget, provincial regional budget, foreign aid, national and regional aid, and community contributions (11).

c. Materials

Materials to support measles and rubella surveillance activities at the Bangkalan Regency Health Office is adequate, such as the availability stationery, Personal Protective Equipmnet (PPE), internet network, guidlines of Measles - Rubella Surveillance, computer application for data processing and analyzing, reporting and recording form packages, work space, meeting room and specimen storage room.

Materials and infrastructure to support measles and rubella surveillance activities at the Health Office of Bangkalan Regency have been in accordance to Minister of Health Regulation Number 1116/MENKES/SK/VIII/2003, involving 1 set of electronic media network, 1 set of guidelines for implementing epidemiological surveillance and computer application programs, 1 set of form package, 2 sets of epidemiological surveillance implementation equipment (11).

d. Machine

Machines to support measles and rubella surveillance activities at the Bangkalan Regency Health Office are adequate. it can support all of activities need to carry out surveillance. The available machines such as, a set of internet network hardware (wifi), printers, personal communication devices (smartphones), personal and office laptops. For transportation, mostly use private vehicle, but there was budget that has been allocated to purchase vehicle fuel.

The machine elements for the implementation of measles and rubella surveillance at the Health Office of Bangkalan Regency have been accordance to Minister of Health Regulation Number 1116/MENKES/SK/VIII/2003, involving 1 set of communication equipment (telephone, facsimile, and other telecommunications), 1 four-wheeled vehicle, 2 two-wheeled vehicles (11).

e. Methods

The implementation of measles surveillance system at the Health Office of Bangkalan Regency is indicator-based surveillance. It has been accordance to Minister of Health Regulation Number 45 of 2014 about Implementation of Health Surveillance (12). Indicator-based surveillance for measles involves monitoring specific indicators related to the disease, such as the number of reported suspected measles cases, discarded rate, suspected measles cases with IgM and virological adequate specimen to be tested, completeness and timeliness of report (3).

2. Process

a. Collecting Data

Measles-rubella surveillance data collection methods at the Bangkalan Regency health office include both active and passive approaches. Passive data collection involves surveillance officers receiving reports and data on measles-rubella cases from various sources, including health service facilities, the community, or other data sources. These reports are typically submitted to the health office without active solicitation from the surveillance officers themselves.

On the other hand, active data collection is conducted proactively by surveillance from Bangkalan Health Office visiting hospitals. However, this active surveillance activity doesn't cover all hospitals and private health facilities in Bangkalan Regency. As a result, cases that seek treatment directly at hospitals without visiting first-level health service facilities such as Puskesmas may not be captured through this method.

Analyzing Data

Data analysis carried out included completeness and timely of reports, descriptive analysis to obtain an overview of measles-rubella cases based on characteristics of people, place and time.

b. Interpretation of Data

The information that has been produced will be presented in the form of tables, graphs, diagrams and case distribution maps, then interpreted using a simple narrative.

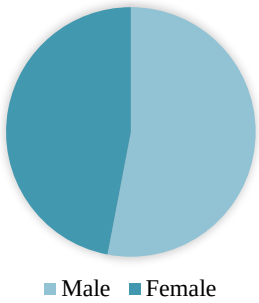
c. Information Dissemination

Information dissemination is carried out in the form of periodic reports to the East Java Provincial Health Office and data source units. The data source unit targeted for dissemination is only Puskesmas. This shows that the target for information dissemination does not yet cover all data source units such as hospitals and independent healthcare facilities.

3. Output

a. Gender

Gender proportion of measles cases in Bangkalan Regency was dominated by female, 99 cases (53%) and male, 89 cases (47%).

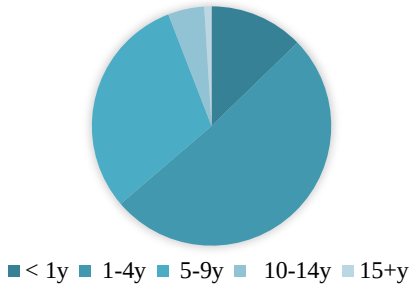



Source: Dinas Kesehatan Kabupaten Bangkalan, 2023

**Figure 1. Gender Proportion of Measles-Rubella Cases**

b. Ages chategories

Based on age categories, suspected cases of measles and rubella in Bangkalan Regency consist of children less than 1 year old (13%), 1-4 years old (52%), 5-9 years old (31%), 10-14 years old (5%), and more than 15 years old (1%).

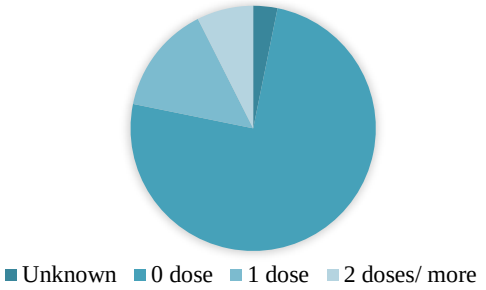



Source: Dinas Kesehatan Kabupaten Bangkalan, 2023

**Figure 2. Age chategory of Measles – Rubella Cases**

c. MR Immunization History

Based on dose of Measles-Rubella (MR) immunization history, suspected measles cases have unknown dose (3%), 0 dose (75%), 1 dose (14%), 2 doses or more (8%).

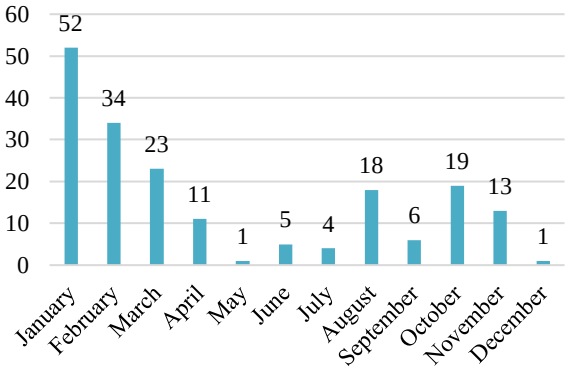



Source: Dinas Kesehatan Kabupaten Bangkalan, 2023

**Figure 3. History of Measles – Rubella Immunization**

d. Case finding per Month

Based on the findings of measles-rubella cases per month in Bangkalan Regency, the highest number of measles-rubella cases found in January (52 cases) and the lowest in May and December (1 case each).

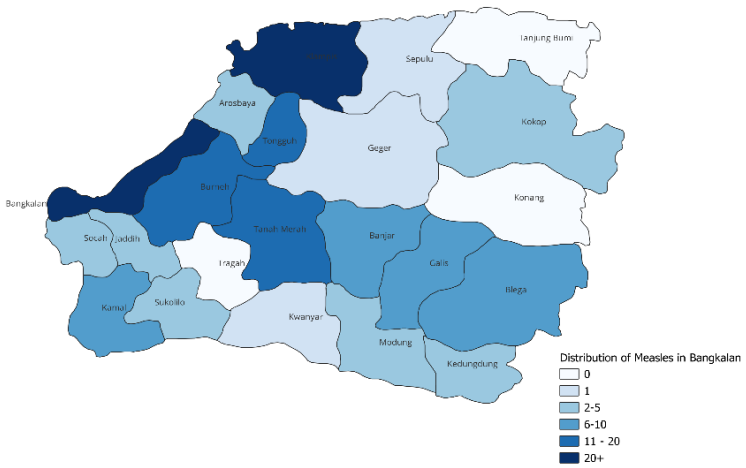



Source: Dinas Kesehatan Kabupaten Bangkalan, 2023

**Figure 4. Measles-Rubella Cases Finding per Month**

e. Distribution of Measles Cases

In Figure 5, the distribution of measles-rubella cases in Bangkalan Regency 2023 based on the working areas of community health centers (Puskesmas) is presented. Puskesmas Bangkalan and Puskesmas Klampis are the community health centers with the highest number of cases (more than 20 cases), while Puskesmas Tanjung Bumi, Tragah, and Konang reported zero measles cases.




Source: Dinas Kesehatan Kabupaten Bangkalan, 2023

**Figure 5. Distribution of Measles-Rubella Cases in Bangkalan Regency**

**Discussion**

We evaluated the measles case – based surveillance system to assess the cause of less secondary suspected measles case finding in Bangkalan Regency. We found that hospital active surveillance from Health Office have big role of case finding. Bangkalan health officers will visit hospital once a month. Ideally, every week, active surveillance from Health Office visit all hospitals in their jurisdiction (3). Without regular visits from health officials, there's a risk of delayed detection of emerging health threats such as infectious disease outbreaks. Timely detection is crucial for implementing control measures promptly and preventing further spread (13).

Bangkalan health officer as active surveillance regularly only visiting Regency General Hospital Syarifah Ambami Ratho Ebhu. In the other hand, there are still six other hospitals that have not been included in routine active surveillance from Bangkalan Health Office. This condition made the completeness and timelinesss of active surveillance report from Health Office could not be identified. Inadequate active surveillance leads to incomplete data collection, which can result in gaps in understanding disease patterns and trends (14). The lack of active surveillance increases the likelihood of outbreaks going unnoticed, allowing diseases to spread within the community unchecked(15). Inadequate active surveillance undermines the overall preparedness of the healthcare system to respond to health emergencies (16). Regular, routine and systematic surveillance efforts are essential for safeguarding public health and mitigating the impact of infectious diseases especially measles disease which has high transmission rate.

## Conclusion

The detection of suspected measles cases by active surveillance in Bangkalan Regency is not optimal. The active surveillance from Bangkalan Health Office activities are still not being conducted every week routinely, and not all hospitals have been included as targets. This situation poses significant challenges to effectively monitor and respond to potential measles outbreaks in the area

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