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Research Article

Examination of Influenza Samples at BLKM Manado in 2024

Budianna Tombi Langi[1], Uliadi Barrung Limbong[2], Fachri Latif[3], Helda Tangke Payung[4]

1. Balai Labkesmas Manado, Indonesia; budianna06@yahoo.co.id
2. BLKM Manado, Indonesia; adhyeleon86@gmail.com
3. BLKM Manado, Indonesia; fachrilatifblkmmanado@gmail.com
4. BLKM Manado, Indonesia; elabtklmdo@gmail.com

Corresponding Author, Email: budianna06@yahoo.co.id (Budianna Tombi Langi)

Abstract

Background: Influenza remains a major global respiratory infection and public health concern. In Indonesia, influenza surveillance is conducted through the Influenza-Like Illness (ILI) and Severe Acute Respiratory Infection (SARI) sentinel system. The BLKM Manado laboratory supports influenza surveillance in North Sulawesi and Gorontalo provinces.

Objective: This study aims to describe influenza sample examination results in 2024 at BLKM Manado to support early detection of potential outbreaks in its catchment area.

Methods: A retrospective descriptive study with a cross-sectional laboratory-based approach was conducted. Data were obtained from 102 samples collected from four ILI–SARI sentinel sites during January–December 2024. Examinations were performed using real-time PCR to detect influenza A/B and SARS-CoV-2.

Results: Out of 102 samples, 27 (26.5%) were positive for influenza, mainly from West Amurang Health Center (51.9%), Kabila Health Center (40.7%), and Ainun Habibie Hospital (7.4%). Identified viruses included influenza type B (56%) and type A (44%), while 12% were positive for SARS-CoV-2. Most cases occurred in the productive age group (19–59 years).

Conclusion: Both influenza A and B viruses were detected in the BLKM Manado working area throughout 2024, with type B predominating. These findings highlight

the need to sustain and strengthen the ILI–SARI sentinel surveillance system for early detection and laboratory-based control of respiratory infections in tropical regions.

Keywords: Influenza, ILI–SARI, PCR, sentinel surveillance

INTRODUCTION

Overview of Influenza Epidemiology

The Influenza A(H1N1) pandemic caused around 0.15–0.58 million deaths in the first year. In 2020, SARS-CoV-2 caused the coronavirus disease 2019 (COVID-19) pandemic. Although SARS-CoV-2 is highly contagious and dominant, Influenza circulation persists during the COVID-19 pandemic. Because of its ever-evolving nature and ability to evade the immune system, the vaccines available for this virus protect against severe illness but not infection. Given the similarities in the clinical presentation of both viruses and the need to monitor disease trends, the WHO released interim guidance in November 2020 recommending the use of the existing *Global Influenza Surveillance and Response System* (GISRS) for integrated surveillance of Influenza and SARS-CoV-2 (Potdar et al., 2023).

Globally, it is estimated that one billion people suffer from Influenza every year, even 3-5 million of which will develop into severe cases, with the highest case burden found in certain risk groups, namely children, the elderly, and people with chronic diseases (Susilarini et al., 2018; WHO, 2023). In the United States, it is estimated that up to 20% of the population will be infected with Influenza each year. Based on studies in the United States on a mixed population of vaccinated and unvaccinated populations, during 2010–2016, the incidence rate of influenza was 8% with variations ranging from 3% to 11% between seasons (Tokars et al., 2018). Similar to the United States, the annual incidence rate of influenza in Southeast Asian countries is also in the range of 10–22% of the population per year. Singapore recorded an Influenza-related pneumonia hospitalization rate of 28.3 per 100,000 people and Thailand had an Influenza-related pneumonia hospitalization rate of 83 per 100,000 people (Susilarini et al., 2018).

According to the WHO, the global death rate from Influenza is usually less than 0.1%. However, this number can increase significantly in high-risk groups, such as young children, the elderly, and individuals with chronic medical conditions. Worldwide, the majority of deaths in children under 5 years of age due to Influenza-related lower respiratory tract infections occur in developing countries. In the United States, the CDC estimates that between 12,000 and 61,000 influenza-related deaths have occurred each year in the past few decades. This number can fluctuate depending on the severity of the Influenza season and the success of vaccination (Adisasmito et al., 2019; Nguyen, 2023; Tokars et al., 2018).

In Indonesia, it is estimated that the incidence rate of *Severe Acute Respiratory Infection* (SARI) related to Influenza is in the range of 13 to 19 per 100,000 population. The highest incidence occurred in children in the age group of 0-4 years, which is 82-114 per 100,000 population (Potdar et al., 2023). Influenza positivity rate itself is proven to be higher in the rainy season than in the dry season. This indicates that the spread of Influenza infection in Indonesia is also influenced by the season. The majority of influenza cases in this study were experienced by children (Adisasmito et al., 2019). Indonesia itself as the largest country in Southeast Asia has an important surveillance role for avian influenza cases. Indonesia is an endemic country of avian pathogens Influenza A/H5N1 found in birds. Indonesia is the second most countries in the world in terms of cumulative human H5N1 cases, with a *Case Fatality Rate* of 83% (Adisasmito et al., 2019; WHO, 2023).

Purpose

The purpose of this activity is to provide information on the results of Influenza disease examination at the Manado BLKM Laboratory throughout 2024 based on samples received from the location of the ILI – SARI Sentinel in the target area, in the context of early awareness of the potential for disease transmission to cause Extraordinary Events/outbreaks and pandemics in the community that can spread in the districts/cities of the targeted areas.

LITERATURE REVIEW

Understanding

Influenza is a viral infection that attacks the respiratory system, namely the nose, throat, and lungs. The disease is caused by influenza viruses types A, B, and C. In many cases, Influenza may only cause mild symptoms, but in infants and toddlers, this virus can cause serious complications (Ministry of Health of the Republic of Indonesia, n.d.).

Cause

Some of the causes of Influenza include:

1) Influenza A: The most common cause of flu outbreaks and global pandemics. These subtypes of viruses, such as H1N1 and H3N2, change frequently, leading to different vaccine needs each year.
2) Influenza B: Generally causes more localized outbreaks and is usually milder compared to Influenza A.
3) Influenza C: The mildest cause of flu symptoms and does not cause an outbreak (Ministry of Health of the Republic of Indonesia, n.d.).

Symptom

Symptoms of Influenza generally include: sudden high fever, dry cough, sore throat, runny nose, headache, fatigue and weakness, muscle and joint pain and vomiting and diarrhea (although less common) (Ministry of Health of the Republic of Indonesia, n.d.).

Diagnosis

For the implementation of Influenza diagnosis, several things will usually be done such as:

1) Symptom History Interview: Ask about any complaints or symptoms experienced.
2) Physical Examination: Listening to breathing sounds and checking for other symptoms.
3) Supporting Examination: Taking a sample of mucus from the nose or throat for analysis in the laboratory (especially if flu symptoms have been more than 10 days) (Ministry of Health of the Republic of Indonesia, n.d.).

When influenza is spreading in the community, patients who are hospitalized with signs and symptoms of influenza should undergo examination using molecular tests with high sensitivity and specificity, for example using *reverse – transcription polymerase chain reaction* / RT-PCR. Self-testing for influenza is available for children from the age of 2, but data on its use in pediatric patients is still limited. The use of self-test results to determine the type of treatment should take into account the sensitivity and specificity of the tests used, the prevalence of influenza in the community, the presence and duration of symptoms, and the risk factors and individual comorbidities (Ministry of Health of the Republic of Indonesia, n.d.).

Treatment

Influenza treatment usually involves things in the form of:

1) Get enough rest: Typically, people with the flu only need rest and plenty of fluids to treat the flu. In general, the flu can heal on its own.
2) Some of the efforts that people with the flu can do to relieve their symptoms include washing their hands regularly to avoid spreading the flu virus to other objects or people; Using tissues to cover your mouth and nose when coughing or sneezing, keep your body hydrated by drinking plenty of fluids, such as water, fruit juice, or warm soups, to prevent dehydration.
3) Take pain relievers such as paracetamol, to relieve symptoms of fever and muscle pain.
4) Some types of flu viruses, such as bird flu, can cause severe symptoms that sufferers cannot handle independently. If symptoms do not improve and symptoms appear that need to be watched out, then an examination must be carried out immediately

to a doctor, if it is proven that they have bird flu, the sufferer will be treated in an isolation room and the doctor will give antiviral drugs such as oseltamivir or zanamivir. Antiviral drugs are useful for speeding up healing and preventing complications (Ministry of Health of the Republic of Indonesia, n.d.; Nguyen, 2023; Potdar et al., 2023).

Prevention

Some of the prevention efforts to be infected with the Influenza virus include:

1) Vaccination: Giving the annual flu vaccine is the main means of prevention.
2) Avoid contact with sufferers: Avoid areas with flu outbreaks.
3) Hand Washing: Make it a habit to wash your hands with soap and water to reduce the risk of transmission.
4) Avoid touching the face: Prevents the spread of the virus to the eyes, nose, and mouth (Ministry of Health of the Republic of Indonesia, n.d.).

Complications

Generally, a person with this disease can recover without complications. However, if not treated appropriately, it is possible to cause other health problems and even dangerous complications. Some of the complications caused by the flu include: asthma attacks, heart disorders, ear infections, pneumonia, bronchitis. If the symptoms go away but come back after a few days, it is possible to have a secondary infection. If this happens, then you should check yourself to make sure. Because if left untreated and causes pneumonia, this disorder can be fatal (Ministry of Health of the Republic of Indonesia, n.d.; Tokars et al., 2018).

Surveillance Sentinel

Sentinel surveillance is the implementation of surveillance in a limited population and area to get signals of health problems in a population or a wider area. Sentinel Surveillance is an activity that can provide detailed information over a long period of time with good data quality about the proportion of a disease observed. For influenza, sentinel surveillance can be used in the context of comprehensive monitoring of the clinical course and etiology of the disease in patients diagnosed with influenza, including disease history, clinical examination results, information on viral characteristics and mortality. The system is less than optimal in the early detection of Extraordinary Events (KLB) because its implementation only covers a small number of health facilities (Ministry of Health of the Republic of Indonesia, 2023).

METHODS

Research Materials

The research materials are in the form of VTM, glove, mask, *tissue*, for PCR you need *Viral Nucleic Acid Extraction Kit* II (Geneaid-VR300), absolute ethanol, *filter tips 0.5-10 uL*, *filter tips 10-100 uL*, *filter tips 100-1000 uL*, *microtube* 1.5 mL, PCR *tube* 0.2 mL and 8 well strip tube (*Bio-Rad Low Profile PCR Tube, white*) along with cap strips (*Bio-Rad Optical Flat 8-Cap Strips*).

Research Tools

The research tools used in this study include *the Bio Rad CFX 96 well real-time* PCR *system* (*Bio-Rad Laboratories, USA),* BSC Type II A, vortex, *microcentrifuge*, *spin down centrifuge*, rack PCR, 1-10 µL micropipettes, 10-100 µL micropipettes, and 100-1000 µL micropipettes. *Real-time* use PCR (q-PCR) is in accordance with the proper examination procedure with the standard operating examination.

Examination with *real-time* PCR

1. Viral Isolation *Nucleic Acid Extraction Kit* II (Geneaid-VR300)

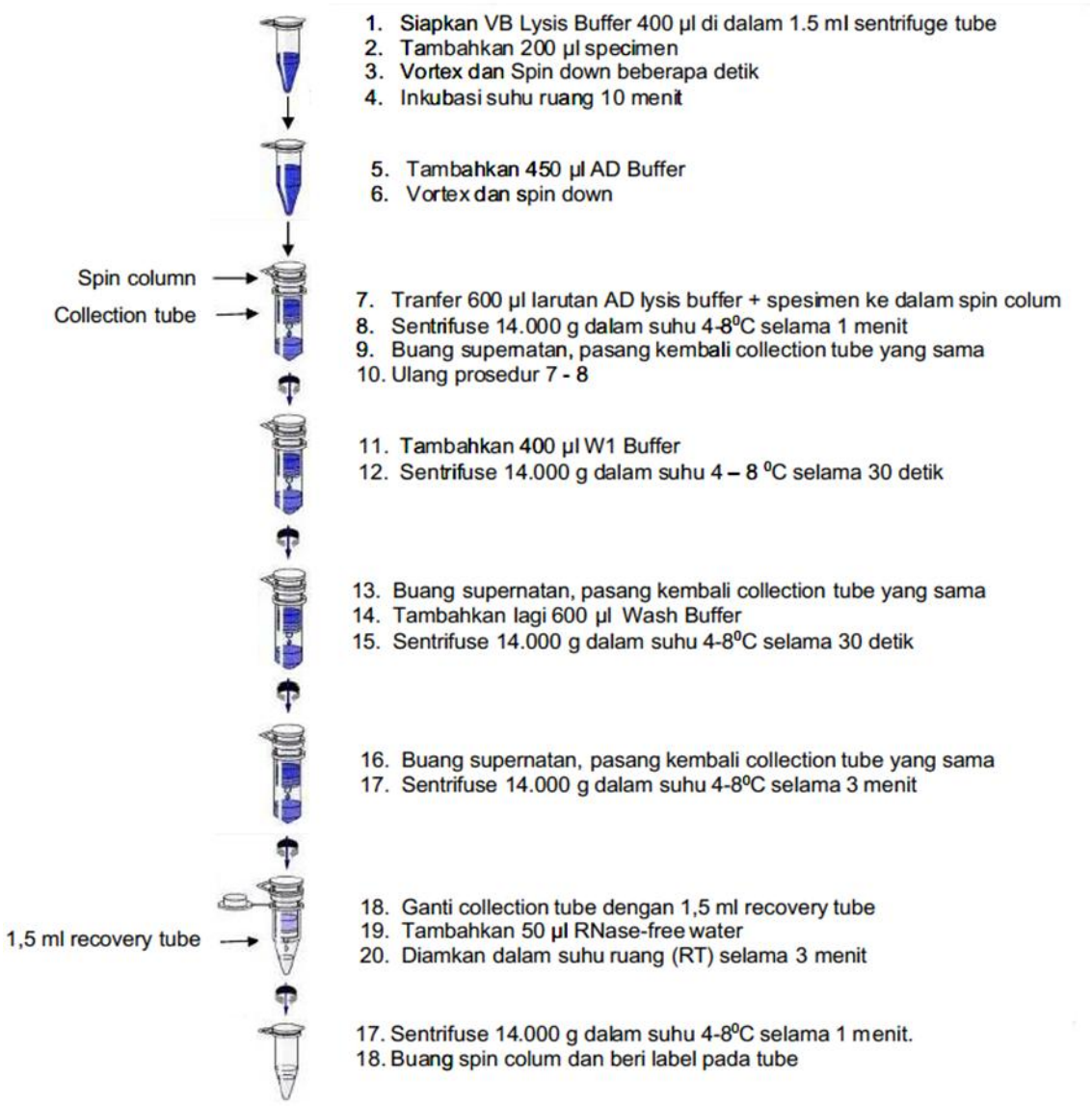


Figure 1. Step-by-Step Protocol for Sample Preparation and RNA Extraction Using VB Lysis Buffer and AD Buffer

2. RT-PCR amplification

Amplification, detection and analysis using *a real-time* CFX detection system (*Bio-Rad Laboratories, USA).* Two positive controls and 2 negative controls are included when amplification is performed. Positive and negative control using built-in control of INStestTM SARS-CoV-2 and Influenza A/B reagents. Prepare INStestTM SARS-CoV-2 and Influenza A/B Mix reagents by adding the following components in 2 sterile 1.5 ml test tubes marked:

Table 1. Composition and Description of Reagents for 50-Test Reaction Kit

Component	Total 50 Tests	Composition	Color Close
Reaction Mix	900 µL 1 vial	Buffer, dNTPs, Primers, Tests	White
Enzyme Mix	100 µL 1 vial	UDG, Reverse Transcriptase, Taq DNA polymerase	Yellow
Positive Control	250 µL 1 vial	RNA Pseudovirus Containing Target Gene	Red
Negative Control	250 µL 1 vial	DEPC-Treated Water	Green

Prepare the rRT-PCR mix reagent by adding the components below into a 1.5 ml tube according to the calculation of the number of reactions made at the preparation stage.

Table 2. Component Volumes for 20 µl Reaction Setup

Component	Volume (µl)
Reaction Mix	18
Enzyme Mix	2
Total	**20**

Mix all those components and centrifuge for a few seconds, then aliquot into *8-well strip* tubes of 20 µl each. Add 5 µl of nuclease free water to the well *Negative Template Control* (NTC). Cover the plate with aluminum foil, then take it to the test material addition room. Addition of RNA test and positive control materials:

- Add 5 µl of RNA to each well according to the test material map that has been created
- Cover the plate with *an 8-optical cap strip*, then take it to the machine room

- Add 5 µl of positive control
- Cover the tube with *sealer* or *strip cap* tightly, so that no bubbles and gaps open to avoid evaporation and contamination
- Spindown for 30 seconds

The PCR condition consisted of 15 minute reverse transcription at $50^{oC,}$ 4 min predenaturation at 95^{oC} followed by 40 cycles with 10 second PCR amplification at $95^{oC, and}$ 6 second extension at $60^{oC.}$

3. Detection based on the curve of RT-PCR amplification results.

Test *Real*-Time PCR is positive when the amplification curve goes up across the line *Threshold* with a Cq/Ct value. Samples are declared negative if the amplification curve does not rise and does not cross the line *Threshold* until the end cycle, the value of Cq/Ct = N/A (Llewellyn et al., 2016). Perform the following reading of the flourofor settings:

Table 3. Fluorescent Reporters and Quenchers for Target Detection

No.	Name	Reporter	Quencher
1	Influenza A	FAM	None
2	Influenza B	VIC	None
3	SARS-CoV-2	Cy5	None
4	IC	TEX	None

View results and check CT values as well as Amplification curves, analyst settings for baseline and thresholds are set manually or automatically.

Table 10. Quality Control Table

Control type	Influenza A	Influenza B	SARS-CoV-2	IC	The value of Ct Expected
Positive	+	+	+	+	< 38 for Influenza B/Vic and Influenza B/Yam
Negative	-	-	-	-	Undetectable

Table 11. Results Interpretation Table

Influenza A	Influenza B	SARS-CoV-2	IC	Interpretation of Results
+	-	-	+	Influenza A Positive

+	+	-	+	Influenza A and Influenza B Positive
+	-	+	+	Influenza A Positive and Positive SARS-CoV-2
-	+	-	+	Influenza B Positive
-	+	+	+	Influenza B Positive and Positive SARS-CoV-2
+	+	+	+	Positive for Influenza A, Influenza B and SARS-CoV-2
-	-	+	+	SARS-CoV-2 positive
-	-	-	-	Invalid

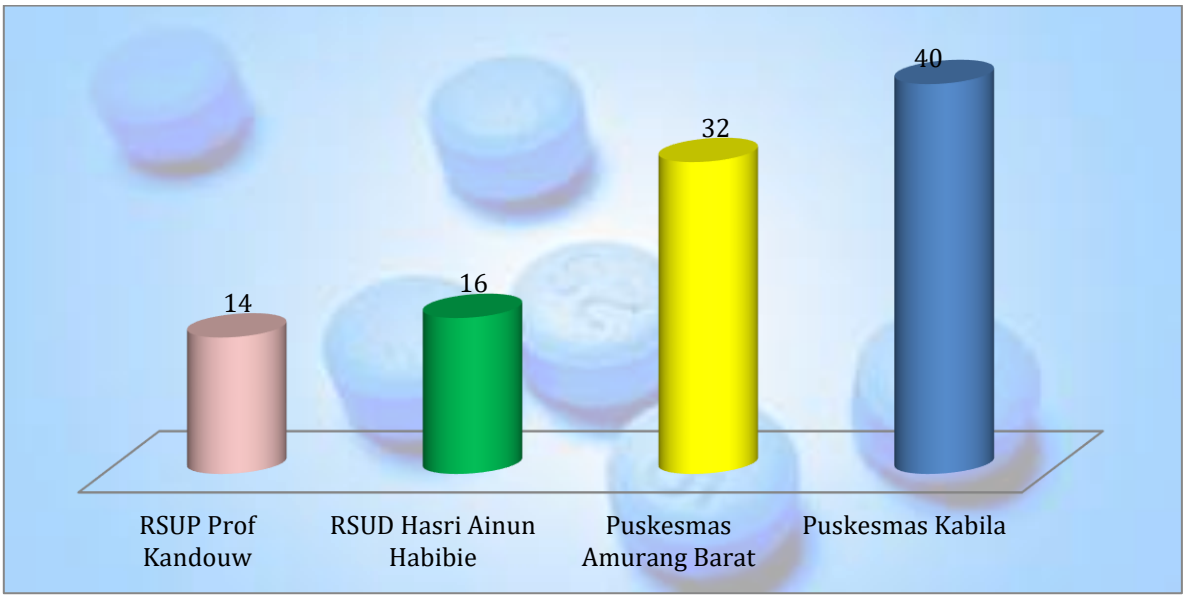
RESULT AND DISSCUSSION

The type of disease observed according to the samples entered at the Manado BLKM is Influenza cases, including ILI or *Influenza-Like-Illness*. *Influenza-Like Illness* (ILI) is clinically defined as an upper respiratory tract infection (ISPA) by a virus with the main symptoms being tuberculosis, fever (about 38.5°C), excessive fatigue and possibly accompanied by other symptoms, such as muscle pain (myalgia), chills, fever, headache, sore throat (Riyadi, n.d.). During influenza season, the number of cases usually increases sharply, with peaks of activity occurring within a few weeks to a few months. High-risk groups, such as young children and the elderly, tend to be more susceptible to serious infections and complications. In addition, influenza virus mutations require annual vaccine updates to remain effective and involve constant monitoring of circulating virus types (Ramanda & Reren, n.d.).

Influenza manifestations are often non-specific and are a collection of symptoms known as ILI. Recent research in Southeast Asian countries shows that seasonal influenza causes severe illness and has a disease burden or even greater than countries with warmer or colder temperatures. This condition is generally aggravated by other diseases that make patients more susceptible to severe respiratory infections (Riyadi, n.d.).

In tropical countries such as Indonesia, the incidence of influenza can last throughout the year, with the highest incidence of influenza in Indonesia at the age of 0–4 years (82–114 per 100,000 population) followed by children aged 5–14 years (22–36 per 100,000 population). Groups of individuals who are particularly at high risk of developing ILI such as children, the elderly, pregnant women as well as people with underlying medical conditions such as diabetes and heart disease (Riyadi, n.d.).

The following are some graphs of the results of data analysis on the examination of Influenza samples received and examined at the BLKM Manado laboratory throughout 2024:



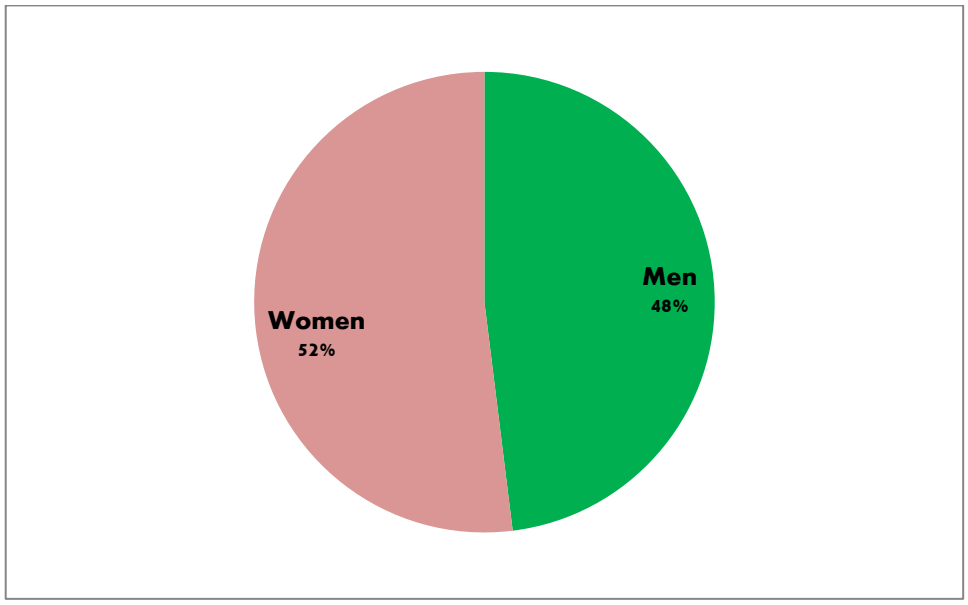
Source: Manado BLKM Laboratory Data, 2024

Graph 1. Sample Distribution of Influenza at the BLKM Manado Laboratory Based on Healthcare Facility Origin in 2024

Graph 1 shows the distribution data of the results of the Influenza Sample examination received by the Manado BLKM from the Sentinel Health Facility in the assisted areas during 2024. It can be noted that there are 4 health facilities that are ILI-SARI Sentinels in the fostered areas that during 2024 have sent samples for examination, namely from Prof. DR. Kandouw Manado Hospital (Sentinel SARI-North Sulawesi Province), Hasri Ainun Habibie Hospital (Sentinel SARI-Gorontalo Province), Kabila Health Center (Sentinel ILI – Gorontalo Province) and West Amurang Health Center (Sentinel ILI-Gorontalo Province). From the graph, it can be seen that the most samples came from the Kabila Health Center, which was 40 samples, then from the West Amurang Health Center as many as 32 samples, Hasri Ainun Habibie Hospital as many as 16 samples and Prof. Kandouw Hospital as many as 14 samples. The total number of influenza samples received from sentinel locations throughout 2024 is 102 samples.

In the reporting system related to ILI-SARI, there is an Online System for Reporting ILI-SARI and COVID-19 surveillance, namely reports on the implementation of ILI-SARI surveillance at sentinel sites and laboratories which aims to facilitate and accelerate data analysis, performance monitoring tools, and is a means of sharing information between sentinel sites in the national network. The existence of the ILI-SARI sentinel location in the target area can support the

implementation of the ILI-SARI Sentinel Surveillance system so as to minimize the impact of diseases caused by influenza through efforts to provide useful information for health authorities to be able to plan appropriate prevention and control efforts through interventional measures, allocate health resources, and make case management recommendations.



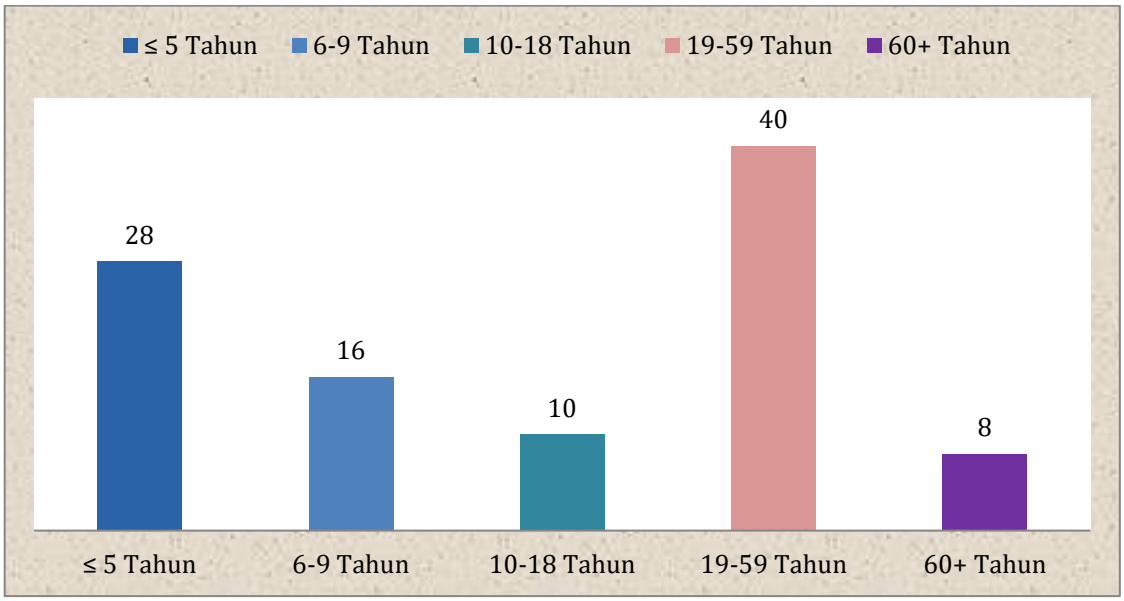
Source: Manado BLKM Laboratory Data, 2024

Graph 2. Distribution of Influenza Samples at the Manado BLKM Laboratory by Gender in 2024

Graph 2 shows the distribution of Influenza samples by gender at BLKM Manado in 2024. The proportion of male and female samples is 48%: 52% (49 males and 53 females) so it can be said that during the period of 2024 influenza samples obtained from sentinel locations are more samples of female influenza suspect respondents. However, there was no significant difference in the sex of the incoming samples.

A study in India conducted in 2023 found that comorbid patients infected with Influenza and COVID-19 as well as pregnant women were found to be more susceptible to hospitalization, ICU treatment, and ventilator support. Although no gender disparity was found in the severity of the disease, the findings stated that women infected with Influenza were more likely to be admitted to the ICU. In total, 19,530 (57%) cases were male and 14,705 (43%) were female. The distributions of ILI and SARI were 56% and 44% for males and 58 and 42% for females, respectively. Positive tests in men and women were comparable, namely 13% and 12.6%, respectively, with the same influenza positive of 7.5% and 7.4%, respectively. The distribution of influenza-positive males and females from ILI specimens was 3.7% and 3.8% respectively while from SARI specimens was 3.7%, respectively. SARS-CoV-2

positivity in the ILI and SARI groups was 3.4% and 2.2% for men and 3.4% and 1.9% for women, respectively (Potdar et al., 2023).

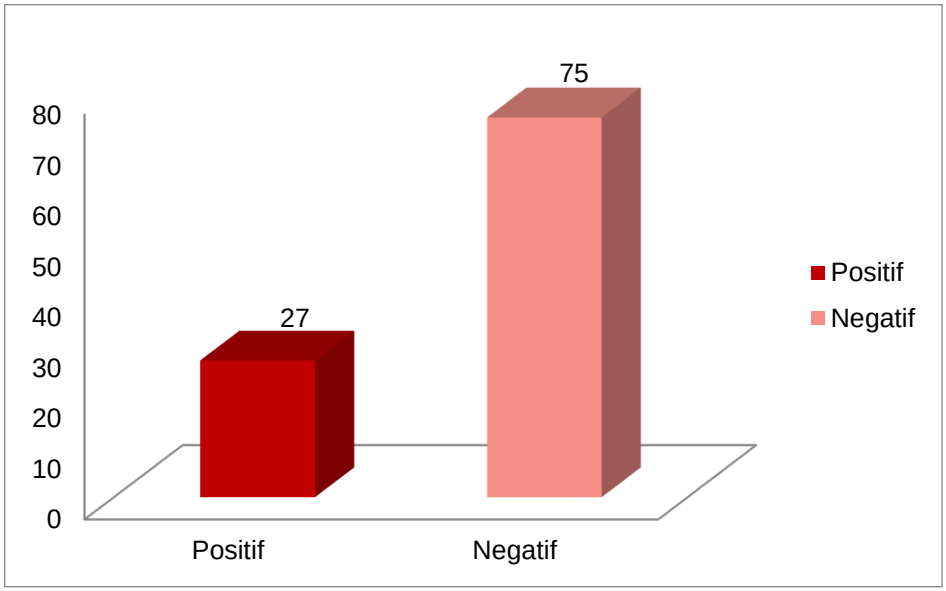


Source: Manado BLKM Laboratory Data, 2024

Graph 3. Distribution of Influenza Samples at the Manado BLKM Laboratory by Age Group in 2024

The distribution of Influenza samples according to the age group examined at the Manado BLKM laboratory for the 2024 period as seen in graph 3, shows that there are 5 age group categories in the examined samples, namely ≤5 years, 6 – 9 years, 10 – 18 years, 19 – 59 years and over 60 years old. The most samples examined were in the productive age group, namely 19-59 years with a frequency of 40 people (39.21%). The productive age group is an age category that actively carries out activities outside the home so that the potential for exposure to the influenza virus is quite large. Children under the age of 6 are more at risk of catching colds and flu, especially if they are in *daycare* or school. Adults over 65 or older are also more susceptible to the flu and related complications. But even so, productive people who are generally in their best shape can contract the flu virus because of the many activities they do and the places they go to every day (O'Leary et al., 2023).

Various theories state that the group of individuals who are at high risk of developing ILI include children, the elderly, pregnant women and people with underlying medical conditions such as diabetes and heart disease. This is of course related to a person's immune ability and exposure to various risk factors that increase the potential for influenza virus infection. In tropical countries such as Indonesia, the incidence of influenza can last throughout the year, with the highest incidence of influenza in Indonesia at the age of 0–4 years (82–114 per 100,000 population) followed by children aged 5–14 years (22–36 per 100,000 population) (Riyadi, n.d.).



Source: Manado BLKM Laboratory Data, 2024

Graph 4. Distribution of Influenza Sample Examination Results at the Manado BLKM Laboratory in 2024

Table 12. Distribution of Influenza Sample Examination Results by Sentinel Location at the Manado BLKM Laboratory in 2024

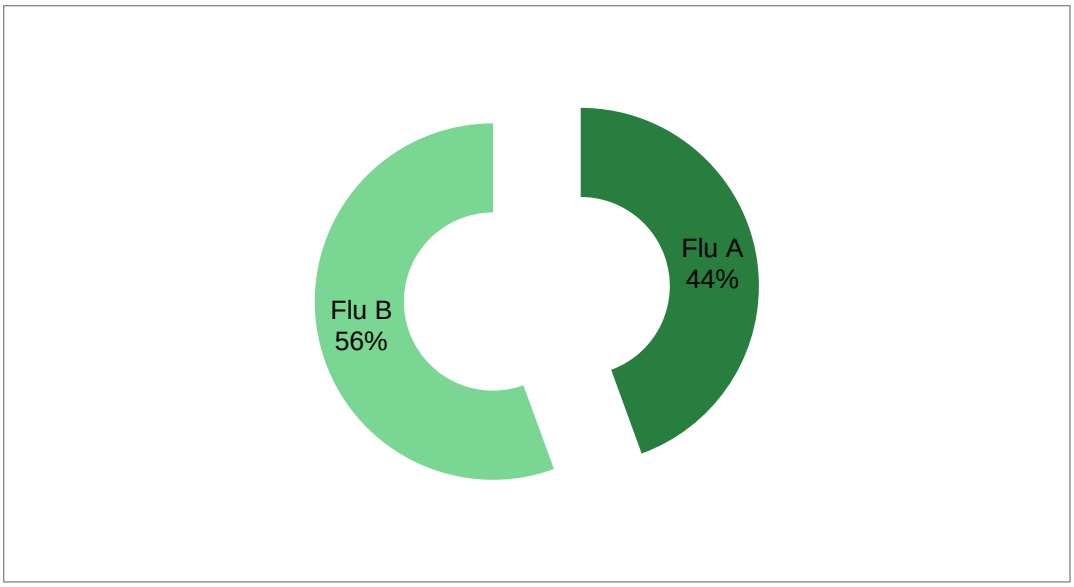
Sentinel Location	Influenza Positive	Percent
Ainun Habibie Hospital	2	7,4
West Amurang PKM	14	51,9
PKM Kabila	11	40,7
Total	**27**	**100**

Source: Manado BLKM Laboratory Data, 2024

Laboratory examinations of people with Influenza aim to diagnose Influenza, monitor potential flu outbreaks, identify the type/type of flu virus that causes infection, and facilitate the development of appropriate treatments. Graph 4 shows that out of a total of 102 samples examined during 2024 at the Manado BLKM laboratory, there were 27 samples (26.5%) that were found to be positive for the Influenza virus. In addition, according to table 1 data, it shows that of the 27 positive Influenza samples found, the most came from the sentinel location of the West Amurang Health Center, North Sulawesi Province, which was as many as 14 positive cases (51.9%). The remaining 11 positive cases (40.7%) from the sentinel of the Kabila

Health Center in Gorontalo Province and 2 positive cases (7.4%) from the sentinel of Ainun Habibie Hospital.

The location of the Sentinel in the assisted area of the Manado BLKM is a location determined by the Ministry of Health of the Republic of Indonesia to diagnose the *Influenza Like Illnes* (ILI) Sentinel Surveillance which actively identifies and reports influenza cases, thus allowing the data collected to be more complete and accurate compared to other locations that do not have a similar surveillance system. The West Amurang Health Center and the Kabila Health Center are the 2 sentinel locations that send the most samples throughout 2024 so that it can be found that more positive cases are found from these two locations, in addition to being influenced by the factor of the rate of patient visits to health facilities and the rainy season factor in the area. Seasonal and environmental factors, such as temperature, sunlight, rain, wind and humidity have a direct relationship with the increasing number of infectious diseases. Environmental factors affect a person's susceptibility to infectious diseases, as a result of seasonal changes in host and cellular immune function, or due to direct environmental (Sarmin et al., 2020).



Source: Manado BLKM Laboratory Data, 2024

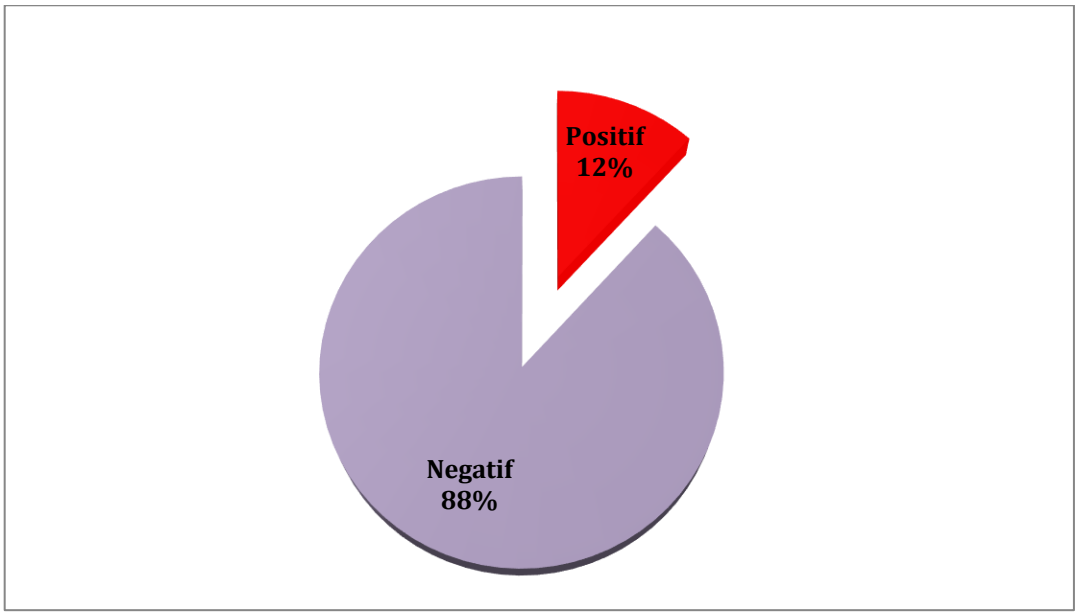
Graph 5. Distribution of Influenza Types at the Manado BLKM Laboratory in 2024

Graph 5 shows the identification results using PCR to find out the type or type of influenza being examined. From a total of 27 positive influenza samples, it was identified that 56% (15 people) of them were influenza type B viruses and 44% (12 people) were type A viruses. Prabu in Sarmin, et.al (2020) stated that there are two main types of influenza viruses that attack humans, namely virus A and virus B. This virus is circulating around the world and can affect people regardless of age and gender. The influenza virus type A is the virus that causes influenza that most often

causes influenza pandemics. The first influenza pandemic was the "*Spanish Flu*" caused by the H1N1 subtype influenza A virus in 1918 in Spain, the second was the "*Asian Flu*" caused by the H2N2 virus in 1957, and the third was the "*Hong Kong Flu*" caused by the H3N2 virus in 1968. The next influenza pandemic is still unpredictable, but it is feared that a new pandemic by the H5N1 virus will occur (Sarmin et al., 2020).

Influenza Like Illness (ILI) is caused by infection with influenza viruses that are part of the family Orthomyxoviridae. Influenza viruses are divided into three types: A, B, and C. Each has different characteristics and different treatments. To find out the level of danger and the proper way to handle it. Type B influenza virus is a virus that is only found in humans. Type B has a lower danger level than A, but still has the possibility of developing into a deadly virus. This type of influenza is classified as having no potential to become an outbreak (Aceh, n.d.).

Type A influenza is a virus that is able to attack animals. However, often this type of influenza virus also affects humans and can cause serious damage to the respiratory system. Poultry animals are the main spreaders of this virus in other animals and humans. Type A influenza is an influenza virus that is often an outbreak in tropical countries because it is able to spread not only through poultry, but also through human-to-human contact (Riyadi, n.d.). An Influenza surveillance study in the province of Bali reported that there were 2,077 reports of cases with Influenza-like clinical manifestations. Of these cases, 291 cases (14%) of which were proven to be infected with the Influenza type A virus, from the isolation of Influenza type A, the dominant type (61.2%) was type A/H3N2, followed by A/H1N1-pdm09 (26.1%) (Ramanda & Reren, n.d.).



Source: Manado BLKM Laboratory Data, 2024

Graph 6. Distribution of Covid-19 Integrated Influenza Sample Examination at the Manado BLKM Laboratory in 2024

Every Influenza sample sent by the ILI-SARI Sentinel to the Manado BLKM laboratory is carried out an integrated Covid-19 examination, namely a test with the PCR (*Polymerase Chain Reaction*) examination method to detect the presence of the Influenza virus and Covid-19 at the same time. This test is important because the symptoms of Covid-19 and Influenza often have similarities such as fever, cough and shortness of breath. With integrated examination, a person can be diagnosed with either type of virus or not infected at all and this helps in determining the right treatment faster. Graph 6 shows that of the 102 total influenza samples received and examined by the Manado BLKM laboratory, as many as 12% (12 samples) of them were found to be positive for Covid-19.

Influenza epidemics are estimated to result in approximately 3-5 million cases of severe disease, and 250,000-500,000 deaths globally each year, with the burden of severe disease occurring in certain high-risk groups (children, the elderly, and chronic diseases). Increasing awareness of influenza in Indonesia and other tropical countries has highlighted the need for surveillance to provide timely and high-quality epidemiological and virological data to enable seasonal monitoring of influenza, identify and monitor high-risk groups, establish baseline levels of influenza activity, facilitate vaccine administration, *strain* selection, and determining the burden of influenza as a guideline for policymakers. Although influenza surveillance for ILI in outpatients is widespread, SARI-based influenza surveillance in inpatients has increased globally over the past decade, particularly in low-income countries and tropical regions. In Indonesia, the SARI surveillance system was established in 2013 through a collaboration between the National Health Research and Development Agency (IAARD) and the Directorate General of Disease Control and Prevention (Subdirectorate of Acute Respiratory Infections (ISPA)), called the Indonesian Severe Acute Respiratory Infection Surveillance (SIBI). The system provides comprehensive epidemiological and virological data for acute respiratory disease hospitalization (Potdar et al., 2023).

Indonesia continues to prepare for the threat of the virus pandemic by mitigating the impact and controlling emergencies. One of the preparedness is to build an Influenza Surveillance system through the *World Health Organization* (WHO) *Global Influenza Surveillance and Response System* (GISRS) since 1952. This system functions to monitor and *risk assessment* the Influenza *virus*; laboratory diagnosis, support vaccine availability, conduct *capacity building*, communicate and form a cooperation network. The Director of Infectious Disease Prevention and Control said that during the COVID-19 pandemic, Indonesia has adopted WHO

guidelines to use *Influensa Like Illness* (ILI) – *Severe Acute Respiratory Infection* (SARI) sentinels in monitoring COVID-19 other than Influenza. WHO has designated GISRS as one of the *platforms* in the implementation of Influenza and COVID-19 Surveillance. Through this GISRS, epidemiological and virological information on influenza, as well as laboratory-based COVID-19 will be obtained for early detection and response to support disease prevention and control programs in Indonesia. ILI-SARI Sentinel Surveillance is to minimize the impact of diseases caused by Influenza through efforts to provide useful information for health authorities to be able to plan appropriate prevention and control efforts through intervention measures, allocate health resources, and make case management recommendations (Aceh, n.d.).

Every person in charge of filling out disease reports on the SKDR website, especially ILI diseases, needs to regularly report the disease situation in their area. This aims to prevent and overcome the early warning system of potential outbreak diseases/KLB which may also have the potential to become a pandemic. In various districts/cities that have high case reports, it is necessary to actively assess the local area and analyze disease data to find the right solutions in reducing cases and making efforts to prevent the disease more widely.

CONCLUSION

During 2024, the Manado BLKM laboratory received and examined a total of 102 Influenza samples from four sentinel locations: Kabila Health Center (40 samples), West Amurang Health Center (32 samples), Hasri Ainun Habibie Hospital (16 samples), and Prof. Kandouw Hospital (14 samples). The majority of the samples examined were from the productive age group, specifically those between 19-59 years, accounting for 40 individuals (39.21%). Out of the total samples, 27 (26.5%) tested positive for the Influenza virus, with the highest number of positive cases coming from the West Amurang Health Center sentinel, which reported 14 positive cases (51.9%). The remaining 11 positive cases (40.7%) came from the Kabila Health Center sentinel in Gorontalo Province, and 2 positive cases (7.4%) were found at Ainun Habibie Hospital. Among the 27 positive Influenza samples, 56% (15 individuals) were identified as Influenza type B, and 44% (12 individuals) were type A viruses. Additionally, an integrated Covid-19 examination was conducted on all ILI-SARI samples, revealing that 12% (12 samples) were positive for Covid-19. In response to this, the Indonesian Ministry of Health has developed an Influenza disease surveillance system known as the ILI-SARI sentinel, which also monitors Covid-19 and is based on the WHO's guidelines.

Recommendations

Coordination and technical guidance are provided periodically to the four ILI-SARI sentinel locations in the BLKM Manado assisted area regarding sample delivery, addressing any obstacles encountered during the implementation of activities, and ensuring the completeness of data needed for reporting, such as patient forms. For patients with positive Influenza and Covid-19 specimens identified through PCR tests in the laboratory, treatment should be based on the existing symptoms, and local

health facilities must remain vigilant to detect early signs of transmission and a potential increase in Influenza cases in their areas. Active Close Contact Epidemiological Investigation is conducted for Covid-19 cases to track and control the spread. Additionally, the ILI-SARI Surveillance program is being strengthened through a timely SKDR data reporting system. Accurate data collection requires the active participation of the person in charge of ILI-SARI in each district or city, including the analysis of disease data reported by each health center.

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