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# The Development of Cases of Acute Respiratory Infections (ARI) in the Mining Environment of PT. Antam Kumoro Village Pomalaa District 2019-2021

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### ABSTRACT

**Introduction:** The mining industry not only has a positive impact on the regional economy but also has an impact on decreasing air quality, which triggers an increase in the incidence of acute respiratory infections (ARI). This study aims to examine the development of ARI cases in the mining environment of PT Antam, Kumoro Village, Pomalaa District in 2019-2021.

**Method:** The research design used is descriptive research with a time series approach. The population and research sample are secondary data on ARI cases in Kumoro Village, Pomalaa District in 2019-2021.

**Results:** The number of ARI cases in 2019 was 179 cases, in 2020 there were 43 cases, and in 2021 there were 70 cases.

**Conclusion:** During 2019-2021, cases of ARI in Kumoro Village, Pomalaa District fluctuated caused of the impact of mining activities

### Introduction

Acute Respiratory Infection (ARI) is still one of the public health problems that are important to pay attention to because it is an acute disease and can even cause death in children under five in various developing countries including Indonesia.<sup>[1]</sup> Acute respiratory infections caused by viruses or bacteria, this disease begins with fever accompanied by one or more symptoms: sore

throat or painful swallowing, runny nose, dry cough or phlegm.<sup>[2]</sup>

World Health Organization stated that of the 56.9 million deaths worldwide, 54% of them were caused by the 10 biggest diseases, where ARI is one of the diseases that account for the largest mortality for the infectious disease group, namely 3 million deaths. Meanwhile, case data in 2018,

found approximately 960,000 children under five who died and this was caused by ARI.<sup>[3]</sup>

Based on the results of Riskesdas (2018), the prevalence of ARI in Indonesia is 9.3%, of which 9.0% are male and 9.7% are female. The highest prevalence of ARI occurred in the one to four-year age group, which was 13.7%.<sup>[4]</sup>

In general, there are 3 (three) risk factors for the occurrence of ARI, namely environmental factors, individual child factors, and behavioral factors, environmental factors include air pollution in the house, the physical condition of the house, housing density, individual child factors include child's age, birth weight, and nutritional status. While behavioral factors such as the practice of handling ARI in the family, whether carried out by the mother or other family members. Environmental factors can also be caused by air pollution in the house such as cigarette smoke, smoke from the kitchen due to cooking with firewood, and the habit of using mosquito coils inside the house.<sup>[5]</sup>

The mining industry and all of its activities are closely related to the surrounding environment. One of the problems that are usually faced by the community around mining areas is health risks such as the declining health status of residents around the mine due to road dust that is passed by heavy equipment vehicles and cars when hauling mining products (hauling). The process of transporting mining products from the location or dredging area to the port of transportation can disrupt public health, especially dust problems that can interfere with respiratory health.<sup>[6]</sup>

Air pollution due to dust can cause ARI.<sup>[7]</sup> Likewise, dust on the haul road for mining

products can affect health problems such as ARI if directly exposed and inhale the dust, it can even cause lung problems.<sup>[8]</sup>

One of the mining companies located in Pomalaa District, Kolaka Regency is PT. Antam's mining products are nickel ore. Mining area of the Nickel Mining Business Unit (UPBN) PT. Antam covers an area of ±7500 Ha.<sup>[9]</sup> In addition to having a positive impact on the regional economy, several research results show that the mining process in an area has an impact on decreasing air quality, which triggers an increase in the incidence of acute respiratory infections (ARI).<sup>[10]</sup>

## Method

The research design used is descriptive research with a time series approach, intending to see an overview of the development of ARI cases in the mining environment of PT Antam, Kumoro Village, Pomalaa District in 2019-2021. The population and research sample are ARI cases in Kumoro Village, Pomalaa District in 2019-2021. Research variables is the incidence of ARI in Kumoro Village. Data collection using secondary data, then presented in the form of graphs and narratives.

## Result

Kumoro Village, Pomala District, with a population of more than 3.448 people. Based on table 1 shows that the number of ARI sufferers in 2019 there were 179 cases, in 2020 there were 43 cases and in 2021 the latest there were 70 cases.<sup>[11]</sup>

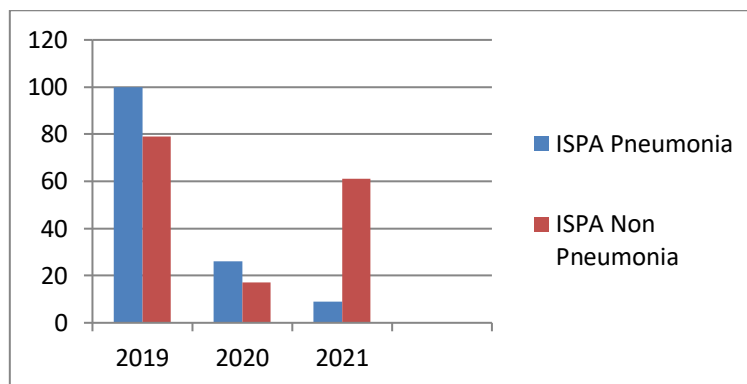
**Table 1. Development of ARI Cases in Kumoro Village, Pomalaa District in 2019-2021**

ARI type	Year		
	2019	2020	2021
Pneumonia	100	26	9
Non Pneumonia	79	17	61
Total	179	43	70

Source: secondary data, 2022

Based on graph 1, shows that in 2019 cases of ARI Pneumonia and Non-Pneumonia respectively amounted to 100 cases and 79 cases. Meanwhile, in 2020 there was a decrease in cases of pneumonia and non-pneumonia ARI, namely 26 and 17 cases. Then there was an increase in 2021 for cases of ARI Non-Pneumonia, namely 61 cases, while ARI Pneumonia decreased by 6 cases.

**Figure 1. Diagram of the Development of ARI Cases in Kumoro Village, Pomalaa District in 2019-2021**



## Discussion

Industrial activities are the second-largest emitter after motor vehicles. Mining and panning are one of the industrial activities that contribute to the largest pollutant a cause of air pollution among all industrial activities. Pollutants produced can be in the form of smoke and dust that enter the air, which contains harmful chemicals. This is very influential on health, especially on the human respiratory system, which can cause poisoning due to pollutants that cannot be accepted by the body.<sup>[12]</sup>

Kumoro Village is an area located in Pomalaa District, Kolaka Regency with a total population of approximately 3.448 people. Kumoro Village is the closest area to PT Antam's mining smelter. One source of air pollution is waste from processing in the smelter, where we know that the polluted waste generated from processing raw materials by the smelter is directly discharged into the air so that it will be carried away by the wind. The most common pollutant produced by nickel mining is sulfur dioxide (SO<sub>2</sub>).

According to the ATSDR (Agency for Toxic Substance and Disease Registry), Acute exposures can be caused by Sulfur dioxide (SO<sub>2</sub>) in the

respiratory tract, namely: sneezing, sore throat, wheezing, shortness of breath, chest tightness, and a feeling of suffocation. Reflex laryngeal spasm and edema can cause acute airway obstruction. Bronchospasm, pneumonitis, and pulmonary edema may result from acute SO<sub>2</sub> exposure. As for chronic exposure that can be caused by SO<sub>2</sub>, namely: susceptibility to respiratory tract infections, chronic symptoms of bronchitis, and accelerated decline in lung function. Chronic exposure may be more serious for children because of the potential for a longer life span. After serious exposure, damage to the lungs can occur, causing asthma, pneumonia, and bronchitis. Permanent damage to the lungs is possible. And for now, there is no antidote for SO<sub>2</sub> poisoning, there is only supportive therapy for breathing.<sup>[13]</sup>

Based on the results of the study, it is known that the case of ARI is fluctuating and it is very likely that the cause is air pollution, namely SO<sub>2</sub> which is released in the air from nickel processing activities in mining smelters. In 2019, data on ARI cases were obtained from as many as 179 cases consisting of 100 cases of ARI Pneumonia and 79 cases of ARI non-Pneumonia. The high incidence of ARI is caused by the impact of mining activities near Kumoro Village, namely

the emergence of dust and pollution which is then carried by the wind to residential areas and inhaled into the respiratory tract. Moreover, at that time many people did not wear masks daily.

However, in 2020, the number of ARI cases decreased, as many as 43 cases consisting of 26 cases of ARI Pneumonia and 17 cases of ARI non-Pneumonia. This is due to the ongoing Covid-19 pandemic. And certainly that the nickel mining and processing activities will decline because that year also WFH (Work from Home) and PSBB (Large-Scale Social Restrictions) and the Covid-19 death rate at that time was at its peak. With the implementation of PSBB, the habit of people who are often outside the home can be reduced so they are not exposed to dust. During the Covid-19 pandemic, people are advised to stay at home and not to do activities outside the home if it is not something important.<sup>[14]</sup> This is one of the factors that enable people in Kumoro Village to avoid exposure to dust and air pollution which causes a decrease in cases. ARI in Kumoro Village, Pomalaa District

Meanwhile, in 2021, the number of cases has increased again, where the cases reached 70 cases consisting of 9 cases of ARI Pneumonia and 61 cases of ARI non-pneumonia. If we look at 2021, ARI cases will increase again as restrictions on activities or social activities outside the home are relaxed, thus confirming that if ARI cases obtained by the community are not caused by air pollution due to SO<sub>2</sub>, they should increase in 2020 because in 2020 there is also a massive Covid-19 transmission infection, but what has happened is the opposite has decreased.

In 2021, when Covid-19 cases began to experience a significant decline, ISPA cases began to increase to 70 cases, although not as many as in 2019 as many as 179 cases in the Kumoro Village area, where mining and processing activities at the smelter in 2021 began slowly massive returns as the rules for restricting activities or activities outside the home are loosened.

Therefore, the government urges the public to avoid going out of the house to wear respiratory

protective equipment such as using masks correctly and consistently.<sup>[15]</sup> So that people not only prevent themselves from transmitting Covid-19 but also avoid exposure to dust and air pollution as an impact of mining activities.

## Conclusion

Based on the data above, it can be concluded that during 2019-2021, cases of ARI in Kumoro Village, Pomalaa District fluctuated caused by the impact of mining activities near Kumoro Village. The more massive mining and processing activities are in the smelter led to the higher the number of ARI cases in Kumoro Village also experienced an increase, so it is suspected that the increase in cases of ARI that occurred one of the main causes was air pollution due to the release of SO<sub>2</sub> from processing waste at PT Antam's smelter.

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