Formosa Journal of Science and Technology (FJST)
Vol. 4, No. 4, 2025: 1087-1100

# Evaluation of the Pulmonary TB Program in the Central Health Center of Mimika District, Central Papua Province

Annisa Anggun Wahdini[1], Rosmin M. Tingginehe[2*], Hasmi[3], Sarce Makaba[4], Semuel Pitar Irab[5], Muhammad Akbar Nurdin[6]
Department of Public Health Sciences, Faculty of Public Health, Cenderawasih University
**Corresponding Author:** Rosmin M. Tingginehe, rosemariati16@gmail.com

ARTICLEINFO

*Keywords:* Program Evaluation, Tuberculosis, Health Centers, Systems Approach

*Received : 25, March*
*Revised : 8, April*
*Accepted : 22, April*



ABSTRACT

This research aims to evaluate the Pulmonary TB program at the Pasar Sentral Health Center, Mimika Regency. This research is qualitative research with a case study design. Data collection was carried out through in-depth interviews with a number of informants. Data analysis was carried out using a systems approach which included input, process and output of the TB program. The research results show that in the input component, the number of human resources in quantity is sufficient but there are no special TB surveillance officers and PMOs from health workers. The basic budget comes from the BOK but is not enough to support active screening activities. Facilities and infrastructure are inadequate, such as the unavailability of TCM equipment and special TB isolation rooms. In the process component, program implementation still tends to be passive, with planning not fully based on previous achievement data. Recording is carried out manually and digitally (SITB), and monitoring and evaluation are carried out routinely by the Health Service. In the output component, suspect screening only reached 63% of the target, the proportion of BTA+ was 11.6%, CNR was 59.6%, and treatment success was only 52.7%. So it is necessary to strengthen the surveillance system, add infrastructure, and increase community involvement to increase the coverage and success of the program.

ISSN-E: 2964-6804
DOI: https://doi.org/10.55927/fjst.v4i4.62
https://traformosapublisher.org/index.php/fjst

## INTRODUCTION

Tuberculosis (TB) is one of the 10 highest causes of death worldwide and the main cause of death from infectious agents. Tuberculosis (TB) remains a major global health problem. Pulmonary tuberculosis (lung infection) is the most common form of tuberculosis, as well as the most contagious caused by Basil Mycobacterium tuberculosis which spreads when TB sufferers expel bacteria into the air (for example through coughing) (Global TB Report, 2023).

It is estimated that as many as 1 billion deaths occurred due to TB globally in the last 200 years. In 2023, it is estimated that 10.8 million people will be sick with TB and 1 million people will die from TB. India is one of the countries that contributes the largest number of TB cases with an estimated case of 2.8 million cases (25.8%), and Indonesia is ranked 2nd after India with TB cases of 1,090,000 cases (10.1%) with a death rate of 125,000 people. China is the next country contributing the most cases, namely 741,000 cases (6.8%) (Global TB Report, 2024).

The trend of TB cases in Indonesia is increasing from year to year. In 2021, 443,235 TB cases were found. Then these cases increased in 2022, namely 724,309 cases. The next finding of TB cases in 2023 will be an increase of 820,789 cases. Based on data from the Indonesian Ministry of Health, in 2024 the estimated TB cases will be 1.1 million, where this figure is estimated to increase by around 13% compared to cases in the previous year (Ministry of Health, 2024).

WHO has set a target to end the global TB epidemic by 2035 which includes reducing TB deaths by 95%, TB incidence by 90%. However, achieving this target faces many emerging challenges such as drug-resistant TB, TB and HIV co-infection, lack of medical equipment, and lack of funding and political commitment for TB control (Ayenew et al., 2024). At the national level, Presidential Regulation (Perpres) no. 67 of 2021 concerning TB control targets the elimination of TB by 2030, namely reducing the TB incidence rate to 65 cases per 100,000 population and the death rate to 6 people per 100,000 population (Perpres, 2021).

Based on data on the achievement of TB cases at the Mimika Regency Central Health Center in 2024, it is estimated that the target number of people with suspected TB will be 1,998 cases (100%) but the achievement obtained is 1,266 cases (63%), which is still not optimal for achieving the target set by the Timika Regency Central Health Center. Meanwhile, the target number of people with TB was estimated to be 370 cases (100%) but 314 cases were obtained (85%) (Central Community Health Center Data, 2024). So it can be categorized as not having achieved the Puskesmas target and also not meeting the National target of 80% incidence rate in 2025 and SDG's target of 90% in 2035.

Based on preliminary studies, the implementation of the TB program at the Pasar Sentral Community Health Center still faces various challenges in efforts to control TB in its working area. One of the main problems found was the unavailability of TCM (Rapid Molecular Test) diagnostic tools, apart from that the distribution of TB prevention drugs at the Pasar Sentral Health Center was still limited, and there were still many TB patients who experienced drug

withdrawal or lost follow-up because most of them feel they have recovered so they stop taking the drug before it is finished.

To overcome these various challenges, it is necessary to carry out an evaluation using a systems approach that includes input, process and output to ensure that the pulmonary TB program can run effectively and efficiently. This research aims to evaluate the pulmonary TB program at the Pasar Sentral Health Center, Mimika Regency in 2025.

## THEORETICAL REVIEW

Research on the Evaluation of the Pulmonary TB Program at the Mimika Regency Central Health Center uses a systems approach as the basis for the conceptual framework. The systems approach is an analytical method that examines phenomena as an integrated whole, with components that interact with each other. In this context, the evaluation of the pulmonary TB program is analyzed through three main components, namely input, process and output, which systematically describe the flow of implementation of the tuberculosis control program.

The input component represents the resources that are the foundation for program implementation, including Human Resources (HR), budget, and infrastructure. Human Resources covers aspects of the quantity and quality of health workers involved in the TB program, including competency, participation in training, and the presence of a Medicines Monitoring Supervisor (PMO). The budget describes the availability and adequacy of funds to support program implementation, both sourced from Health Operational Assistance (BOK) and other funding sources. Facilities and infrastructure include the availability of diagnostic tools such as Rapid Molecular Tests (TCM), special rooms for TB patients, availability of TB drugs and preventive drugs, as well as adequate laboratory facilities.

The process component describes a series of activities carried out in implementing the pulmonary TB program. Planning includes setting targets and work programs that are prepared systematically based on situation analysis. Implementation includes screening activities, contact investigation, diagnosis, treatment management, and patient education as interventions to achieve program goals. Recording and reporting describes the documentation system used, both electronically through the Tuberculosis Information System (SITB) and manually. Monitoring and evaluation is a periodic monitoring mechanism to identify achievements, gaps and challenges in program implementation.

The output component represents the results achieved from program implementation, measured through specific performance indicators. The TB Suspect Screening Rate illustrates the effectiveness of efforts to detect TB cases early in the community. The proportion of BTA+ indicates the percentage of cases with bacteriological confirmation which is the main diagnostic parameter. Case Notification Rate (CNR) is an indicator that shows the number of TB cases detected and reported from the total population. The Treatment Success Rate reflects the effectiveness of TB case management, including patient compliance and the quality of health services.

Implementation of the Pulmonary TB program does not take place in a vacuum, but is influenced by various external factors. TB Program Policies at the national and regional levels provide the basis for regulation and standardization of services. TB patient characteristics, including socio-economic aspects, level of education, and understanding of the disease, influence treatment seeking behavior and compliance. Cross-sector support and community involvement contributed to the effectiveness of the intervention, while geographic conditions and accessibility of health services influenced program reach.

Through this conceptual framework, the research aims to comprehensively and integratively analyze the implementation of the Pulmonary TB program at the Mimika Regency Central Health Center. Evaluation of the interrelationships between system components will identify aspects that are running optimally and areas that require strengthening. This will provide an empirical basis for strategic recommendations to increase the effectiveness of tuberculosis control programs, thereby contributing to achieving the national TB elimination target.

## METHODOLOGY

Provide This research uses a qualitative approach with a case study design to gain an in-depth understanding of the evaluation of the Pulmonary TB program at the Central Health Center of Mimika Regency, Central Papua Province. A qualitative approach was chosen because it allows a comprehensive exploration of complex phenomena in their natural context, taking into account the perspectives of stakeholders involved in program implementation. The case study design allows researchers to conduct intensive investigations of the pulmonary TB program as a system with clear boundaries, including input, process and program output.

### *Research Location and Time*

The research was carried out in the work area of the Mimika Regency Central Health Center, Central Papua Province. The location selection was based on the consideration that the Central Health Center is one of the first level health facilities with a significant burden of TB cases but program achievements have not been optimal. Data collection was carried out during the period 13-25 March 2025, with a sufficient time span to obtain data saturation.

This research used a purposive sampling technique involving 8 informants consisting of three key informants (Person in Charge of P2PM Mimika District Health Office, Head of the Central Health Center, and Person in Charge of the Community Health Center Program), two main informants (Person in Charge of P2TB Community Health Center and Integrated Disease Surveillance Officer), and three supporting informants (two TB patients under treatment and one TB patient who was declared cured). Inclusion criteria for informants include willingness to participate through informed consent, capacity to provide relevant information, and for health workers to have worked for at least one year in the relevant program.

Data collection was carried out through in-depth interviews using semi-structured guidelines (duration 45-60 minutes), review of TB program

documents, and non-participatory observation of program facilities and implementation. The researcher acts as the main instrument (human instrument), supported by validated interview guidelines, observation and document review sheets, recording equipment, and field notes.

Data analysis uses a thematic analysis approach which is carried out simultaneously with data collection, including data reduction (coding transcripts and categorization), presenting data in the form of a thematic matrix, as well as drawing conclusions that are verified through triangulation of sources and methods. The analysis was organized based on the input, process and output components of the TB program according to the research conceptual framework.

***Informant Characteristics***

This research involved 8 informants consisting of various stakeholders in the Pulmonary TB program at the Mimika Regency Central Health Center. This research involved 8 informants consisting of various stakeholders in the Pulmonary TB program at the Mimika Regency Central Health Center. Research informants included the Head of P2 Mimika District Health Office ($I_1$) with the initials OT, a 45 year old man; Head of Central Market Health Center ($I_2$) with the initials PL, a 46 year old woman; Central Market Community Health Center Program PJ ($I_3$) has the initials BL, a 36 year old woman; and PJ P2TB Central Market Health Center ($I_4$) with the initials DT, a 40 year old woman. This research also involved informants from among TB patients, namely two TB patients under treatment: MA ($I_5$), a 60 year old woman, and CR ($I_6$), a 39 year old woman; and a TB patient who was declared cured ($I_7$) with the initials NB, 23 year old woman. The diversity of informant characteristics allows comprehensive data collection from various perspectives for evaluating the pulmonary TB program. The research results are presented based on a systems approach including input, process and output components of the Pulmonary TB program at the Central Health Center of Mimika Regency.

## RESEARCH RESULTS

***Human Resources (HR)***

The results of in-depth interviews revealed that the number of health workers at the Central Health Center was sufficient in quantity, although there were still obstacles in terms of quality and distribution of tasks. All informants from the health officer element emphasized that there were no special surveillance officers for the TB program. The person in charge of P2PM at the District Health Service stated that although special training had been provided and the number of officers was sufficient, program management was not yet optimal due to the absence of special TB surveillance officers. The Head of the Community Health Center acknowledged the need for additional surveillance personnel specifically for TB, considering that the existing officers must cover all programs. The informant also revealed that there was no special Medication Monitoring Officer (PMO) among the health workers, so that the function of monitoring medication was delegated to the patient's family. This statement was confirmed by TB patients who explained that they did not receive direct

supervision from health workers; only given information when to return to control and take medication. Document review shows that the health workers involved in the pulmonary TB program consist of 1 doctor, 2 nurses as TB interpreters, and 1 person in charge of the program, with only 2 of them having attended TB management training in the last 2 years.

***TB Program Budget***

Funding for the Pulmonary TB program at the Central Community Health Center comes entirely from Health Operational Assistance (BOK) funds, which are considered sufficient for routine activities but not sufficient for epidemiological investigations and active surveillance. The person in charge of P2PM stated that more funds were needed to increase the intensity of epidemiological investigations and active surveillance in an effort to catch TB cases. The Head of the Community Health Center and the Person in Charge of the Program also confirmed the adequacy of the budget for routine activities, noting that the additional budget could be used for infrastructure development such as special TB rooms and TB booths. Based on a document review, the 2024 TB program fund allocation of IDR 58,500,000 is distributed for case finding (45%), treatment (30%), recording and reporting (15%), and monitoring and evaluation (10%), without any special allocation for infrastructure development or procurement of diagnostic tools.

***Facilities and Infrastructure***

Research reveals that there are limited facilities and infrastructure supporting the Pulmonary TB program at the Central Health Center. All health worker informants stated that the community health center did not yet have a Rapid Molecular Test (TCM) device and a special room for TB services. The person in charge of P2PM explained that the TCM equipment was still in the procurement process, while a special TB room was not yet available due to limited building space. The Head of the Community Health Center emphasized that limited space was the main obstacle, including the unavailability of TCM equipment because the laboratory space did not meet standards. Regarding drug availability, the availability of first-line Anti-Tuberculosis Drugs (OAT) is always guaranteed, however there are obstacles in the availability of Tuberculosis Preventive Therapy (TPT). The person in charge of the program added that apart from not having TCM, the puskesmas also does not have a special TB booth for removing phlegm, as well as a special TB room which should be separate considering the contagious nature of the disease. Observations confirmed that TB services were still integrated with general polyclinics, laboratories were only equipped with microscopes for BTA examination without TCM equipment, and patients were directed to collect sputum outside the puskesmas building due to the unavailability of special booths.

## DISCUSSION

The research results show that the number of human resources at the Central Health Center is sufficient in quantity, but there are limitations in terms of quality and distribution of tasks. The absence of special TB surveillance officers

and Medicine Monitors (PMO) from health workers is an obstacle in optimizing the TB program. This finding is in line with research conducted by Putri et al. (2020) which states that the health workers implementing the TB program at the Bandarhajo Community Health Center are sufficient but there are still health workers who carry out double duties with other programs. Double jobs or double workloads can cause fatigue and reduce the quality of services provided.

The absence of special PMO officers from the health workforce is also an important note in implementing the DOTS (Directly Observed Treatment Short-course) strategy. The DOTS strategy emphasizes direct supervision of drug ingestion as a crucial component to ensure patient compliance and prevent drug resistance (Indonesian Ministry of Health, 2020). Chomaerah's research (2020) confirms that the availability of sufficient human resources both in quantity and quality will increase the program's success target.

This research also found that only a portion of officers had received TB management training in the last two years. This creates a competency gap that can affect service quality. In accordance with research by Marhamah et al. (2022), adequate training for TB officers is an important investment to increase the capacity of TB control programs. Training not only increases technical knowledge but also motivates officers in program implementation.

Funding for the TB program at the Central Health Center, which comes from Health Operational Assistance (BOK), is considered sufficient for routine activities, but not sufficient for epidemiological investigation and active surveillance activities. This finding is in line with research by Marhamah et al. (2022) which states that the budget received by the Ie Mirah Community Health Center is still insufficient to fulfill the implementation of P2TB program activities.

Limited budget for active screening and surveillance activities has the potential to hamper efforts to find cases early. According to the Indonesian Ministry of Health (2021), active case finding is a key strategy in accelerating TB elimination. However, this strategy requires adequate financial support for implementation in the field.

Yanti et al. (2021) emphasize that effective budget management and flexibility in fund allocation are very important to align with program priorities. In the context of Central Health Centers, budget reallocation to strengthen active case detection and patient monitoring needs to be considered as a strategic effort to improve program achievements.

Limited facilities and infrastructure for the TB program at the Central Health Center, especially the unavailability of Rapid Molecular Testing (TCM) equipment and special TB rooms, are significant obstacles in implementing the program. This finding is in line with research by Deswinda et al. (2019) who found that the facilities and infrastructure of the P2TB program at the Sijunjung Regency Health Center were still inadequate, such as the absence of a phlegm room and a laboratory room that did not meet standards.

The absence of TCM equipment at the Central Health Center requires referral of specimens to other health facilities, which has the potential to slow down diagnosis and initiation of treatment. This is in line with research by Sulistyoningtyas et al. (2022) who reported that the Putri Ayu Community Health

Center also did not have TCM equipment so they had to send samples to other community health centers. In fact, fast and accurate diagnosis is the key to breaking the chain of TB transmission.

The guaranteed availability of first-line TB drugs at Central Health Centers is a positive aspect in program implementation. However, frequent shortages of preventive drugs (TPT) are an obstacle in implementing TB prevention strategies. According to the Indonesian Ministry of Health (2020), TB preventive therapy is an important intervention to prevent the progression of latent TB infection to active TB, especially in high-risk groups such as household contacts and HIV patients. The absence of a special TB room and booth for collecting sputum has the potential to increase the risk of nosocomial transmission in the community health center environment. According to Hariswan (2021), adequate TB service facilities including special TB rooms and sputum collection sites are important components in efforts to control TB infection. The absence of these facilities not only affects the quality of services but also the safety of health workers and other patients.

***Process in Pulmonary TB Program Evaluation***

TB program planning at the Central Health Center has considered resource needs and achievement targets, but has not been fully based on evaluation of previous year's achievements. According to Zulaikha (2023), data-based planning is an important foundation in health program management, enabling appropriate resource allocation and the establishment of relevant strategies.

These findings indicate the need to strengthen the situation analysis aspect as a basis for planning. A comprehensive planning process should include an in-depth analysis of previous achievements, identification of challenges and obstacles, and the establishment of specific strategies to overcome existing gaps (Ministry of Health of the Republic of Indonesia, 2020).

The work plan for the Central Health Center TB program which contains quantitative targets needs to be strengthened with concrete operational strategies. This is in line with Putri's (2021) research which found that the effectiveness of TB program planning is very dependent on the accuracy of strategies that are adapted to the local context and available resources.

Furthermore, the implementation of the TB program at the Central Health Center which includes screening activities, contact investigations and patient education has not been implemented optimally due to limited resources. This finding is in line with Putri's research (2021) which states that the TB program at the Sigambal Community Health Center has carried out activities according to the guidelines, but some activities such as health promotion are still not optimal.

The dominance of the passive approach in finding TB cases at the Central Health Center is an important note in this research. National Tuberculosis Control Guidelines (Ministry of Health, 2021) emphasize the importance of balancing passive and active approaches in case finding. Astuti (2020) in evaluating the TB program at the Tanah Kalikedinding Community Health Center, Surabaya, also stated that implementation which includes contact investigations and patient education is an effective strategy in increasing community awareness and involvement in TB control.

Limited TB education for patients visiting community health centers without active outreach in the community is also a weakness in program implementation. This is congruent with the findings of Naibaho et al. (2022) that a community-based educational approach is more effective in increasing public awareness about TB and encouraging appropriate treatment-seeking behavior.

The TB program recording and reporting system at the Central Health Center uses an online Tuberculosis Information System (SITB) which is supported by manual recording. This is in line with research by Sulistyoningtyas et al. (2022) and Noveyani & Martini (2020) which highlight the importance of electronic information systems in increasing the efficiency and accuracy of TB program data.

The dual recording (manual and electronic) implemented at the Central Health Center is an adaptive strategy to anticipate technical obstacles such as network disruptions. According to the National Tuberculosis Control Guidelines (Ministry of Health, 2021), data integration through electronic systems is an important component in strengthening health information systems, but still requires a backup system to ensure data availability.

Incomplete data on several forms, especially the contact investigation and treatment monitoring forms, indicates challenges in implementing the recording and reporting system. This is in line with research by Ratnasari et al. (2021) who found that data quality in TB information systems is very dependent on officers' compliance in completing documentation and technical competence in using electronic systems.

Regular monitoring and evaluation of the TB program at the Central Community Health Center with the support of the Health Service is a positive practice in program implementation. However, the implementation of recommendations resulting from the evaluation is not yet optimal, indicating that there is a gap between problem identification and follow-up.

This finding is in line with research by Supriyanti et al. (2024) who emphasize that the effectiveness of monitoring and evaluation does not only lie in the frequency of implementation, but also in the ability to integrate findings into the program planning and implementation cycle. According to Zulaikha (2023), a good monitoring and evaluation system must be able to identify challenges and opportunities for program improvement in a timely manner.

Efforts to prevent patients lost to follow-up through telephone communication and home visits show attention to continuity of treatment. However, the high number of patients who dropped out of medication (28.3%) indicated that the strategy implemented was not completely effective. This is in line with research by Noveyani & Martini (2020) which found that patient compliance in TB treatment is influenced by various complex factors that require a comprehensive approach, not just relying on telephone communication.

***Output on Evaluation of the Pulmonary TB Program***

The output of the Pulmonary TB program at the Central Community Health Center which has not met the target indicates that there are systemic challenges in program implementation. The TB suspect screening rate has only reached 63% of the target, indicating that case finding efforts have not been optimal. This is in line

with Putri's (2021) research which found that the number of suspect screenings at the Sigambal Community Health Center had not yet met the target, indicating the need to strengthen case finding strategies, including door-to-door screening.

The low proportion of BTA+ (11.6%) indicates challenges in the process of diagnosis and bacteriological confirmation. This finding is congruent with research by Kasim et al. (2020) who found obstacles in efforts to screen suspects and contacts to find BTA+ patients, including limited laboratory facilities and staff competency.

The Case Notification Rate (CNR) of 59.6%, which is still far from the target, illustrates the gaps in the TB case surveillance and reporting system. According to the Indonesian Ministry of Health (2020), a low CNR can indicate under-reporting or under-diagnosis of TB cases in an area. This requires strengthening case detection and reporting systems, including increasing laboratory capacity and surveillance networks.

The treatment success rate of only 52.7% is a serious finding that requires special attention. This finding is in line with research by Putri et al. (2020) and Noveyani & Martini (2020) who found that treatment success rates in several community health centers were still below the national target. Factors that contribute to this low number include the perception of early recovery by patients, untreated side effects of medication, challenges with geographic accessibility, and limitations in the medication monitoring system.

The high rate of patients lost to follow-up (28.3%) is the main contributor to the low success of treatment. According to the Indonesian Ministry of Health (2021), patients who do not complete treatment are not only at risk of experiencing recurrence but also have the potential to develop drug resistance and become a source of infection in the community. Therefore, comprehensive strategies to improve treatment adherence, including strengthening the PMO system and psychosocial support for TB patients, need to be developed.

## CONCLUSIONS AND RECOMMENDATIONS

Provide Evaluation of the Pulmonary TB program at the Mimika Regency Central Health Center revealed significant gaps in the three system components studied. In the input component, even though the number of human resources is sufficient in quantity, the absence of special TB surveillance officers and drug taking supervisors from health workers is the main obstacle. The BOK budget does not yet support active screening activities and epidemiological investigations, while limited infrastructure, especially the unavailability of TCM equipment and TB isolation rooms, hampers the process of diagnosis and prevention of transmission. In the process component, program planning is not yet fully data-based, the implementation of screening and education activities is still passive, recording is carried out using a dual system but with data completeness that is not yet optimal, and monitoring and evaluation are not yet effective in following up on findings. This has a direct impact on the output component with achievements far from the target, where suspect screening only reached 63%, the proportion of BTA+ was 11.6%, CNR was 59.6%, and treatment success was only 52.7% with a high rate of patients lost to follow-up reaching 28.3%.

The systems approach in this evaluation emphasizes the close interconnection between pulmonary TB program components, where weaknesses in one component have a systemic impact on other components, creating a cycle of interrelated challenges. Strengthening the program requires comprehensive and integrated interventions across all components, with a priority on increasing human resource capacity through specific training, development of a community-based PMO system, procurement of TCM tools for fast and accurate diagnosis, as well as active strategies to increase treatment adherence and prevent drug withdrawal. Achieving the national TB elimination target will depend on the ability of the health system at the primary level to identify and address gaps in program implementation, taking into account local context and region-specific characteristics. The implications of this research emphasize the importance of strengthening a patient-focused health system, with cross-sector coordination and active community involvement as a catalyst for the success of TB control programs in the era of elimination.

This research evaluating the Pulmonary TB program at the Central Health Center of Mimika Regency has several methodological limitations that need to be considered in interpreting the results. First, the qualitative research design with a case study approach, although it allows for in-depth exploration of program implementation, has limitations in terms of the generalization of the findings. The results of this research are contextual and specific to Central Community Health Centers, so application of the findings in different settings needs to consider local characteristics and the local health system. Second, the perspective in this research is dominated by informants from health workers and TB patients who can be reached, while the perspectives of the general public, community leaders and patients lost to follow-up who cannot be traced have not been fully accommodated.

## FURTHER STUDY

Based on the findings and limitations of this research, several further research agendas are recommended to deepen understanding of tuberculosis control programs. First, a mixed-methods approach that integrates quantitative analysis of determinants of treatment success with qualitative exploration of patient experiences can provide a comprehensive perspective on program effectiveness. Second, longitudinal studies with longer observation periods to track the patient journey from diagnosis to completion of treatment are needed to identify factors influencing adherence and withdrawal prevention strategies. Third, a comparative evaluation of various models of Medication Monitoring (PMO)—both from health workers, cadres, and families—needs to be carried out to determine the most effective approach in the geographic and socio-cultural context of Central Papua. Fourth, a health economic analysis that examines the cost-effectiveness of various TB diagnostic and treatment strategies, including a cost-benefit analysis of procuring Molecular Rapid Testing equipment at the community health center level, will provide an empirical basis for making more efficient resource allocation decisions.

**ACKNOWLEDGMENT**

The authors would like to thank the participants involved in this study. In addition, the authors would like to thank the research support from the Faculty of Public Health, Cenderawasih University.

**REFERENCES**

Ayenew, B., Belay, D. M., Gashaw, Y., Gimja, W., & Gardie, Y. (2024). WHO's end of TB targets: unachievable by 2035 without addressing under nutrition, forced displacement, and homelessness: trend analysis from 2015 to 2022. *BMC Public Health*, *24*(1), 961. https://doi.org/10.1186/s12889-024-18400-5

Chomaerah S. (2020). Program Pencegahan dan Penanggulangan Tuberkulosis di Puskesmas. *Higea Journal of Public Health*, *4*(3), 398–410.

Data Puskesmas Sentral. (2024). *File SPM Lintas Sektor 2024*.

Deswinda, D., Rasyid, R., & Firdawati, F. (2019). Evaluasi Penanggulangan Tuberkulosis Paru di Puskesmas dalam Penemuan Penderita Tuberkulosis Paru di Kabupaten Sijunjung. *Jurnal Kesehatan Andalas*, *8*(2), 211. https://doi.org/10.25077/jka.v8i2.994

Global TB Report. (2023). Report 20-23. In *January: Vol. t/malaria/* (Issue March).

Global TB Report. (2024). *2024 Global tuberculosis report*.

Hariswan. (2021). *Evaluasi Program Pengendalian Tuberkulosis dengan Strategi Directly Observed Observed Treatment Short-course (DOTS) dalam Upaya Menurunkan Angka Kejadian TB Paru di Wilayah Kerja Puskesmas Kenali Besar Kota Jambi*. 6.

Kasim, F., Soen, M., & Hendranata, K. F. (2020). *Observed Treatment Shortcourse Sebagai Upaya Penanggulangan Tuberculosis Di Puskesmas Yang Berada*. *01*(03), 134–143.

Kemenkes. (2021). Pedoman Nasional Pelayanan Kedokteran Tata Laksana Tuberkulosis. *Procedia Manufacturing*, *1*(22 Jan), 1–17.

Kemenkes. (2024). *Update Situasi dan Kebijakan TBC RO serta Perkembangan Implementasi BPaL/M di Indonesia*.

Kemenkes RI. (2020). Strategi Nasional Penanggulangan Tuberkulosis di Indonesia 2020-2024. *Pertemuan Konsolidasi Nasional Penyusunan STRANAS TB*, 135.

Kementerian Kesehatan. (2020). *Pedoman Nasional Pelayanan Kedokteran Tata Laksana Tuberkulosis*. 6

Laporan TB Nasional. (2024). *Arahan dan Update Kebijakan Program TBC Tahun 2024*. *November*, 2–5.

Marhamah et al. (2022). Evaluasi Pelaksanaan Program Penanggulangan Tuberculosis Paru (P2TB) di Puskesmas Ie Mirah Kecamatan Babahrot Kabupaten Aceh Barat Daya Tahun 2020. *Jurnal Mahasiwa Kesehatan Masyarakat*, *2*(2), 26–32. https://doi.org/10.36984/jkm.v5i2.307

Noveyani, A. E., & Martini, S. (2020). Evaluasi Program Pengendalian Tuberkulosis Paru Dengan Strategi DOTS Di Puskesmas Tanah Kalikedinding Surabaya. *Jurnal Berkala Epidemiologi*, *2*(2), 251–262.

Permenkes. (2014). Peraturan Menteri Kesehatan Republik Indonesia Nomor 45 Tahun 2014. *Procedia Manufacturing*, *1*(22 Jan), 1–17.

Permenkes. (2016). Peraturan Menteri Kesehatan No. 67 Tahun 2016. *Dinas Kesehatan*, 163.

Permenkes. (2019). Peraturan Menteri Kesehatan RI No 43 tahun 2019 tentang Puskesmas. *Peraturan Menteri Kesehatan RI No 43 Tahun 2019 Tentang Puskesmas*, *Nomor 65*(879), 2004–2006.

Perpres. (2021). Peraturan Presiden Nomor 67 tahun 2021 tentang Penanggulangan Tuberkulosis. *Kementerian Kesehatan Re*, *67*(069394), 107.

Profil Puskesmas. (2023). *PROFIL PKM PS 2023*.

Putri. (2021). *Evaluasi Program Pengendalian TB di Puskesmas Sigambal Kecamatan Rantau Selatan Kabupaten Labuhanbatu*.

Putri, F. A., Suryawati, C., & Kusumastuti, W. (2020). Evaluasi Pelaksanaan Program Penanggulangan Tuberkulosis Paru (P2Tb) Di Puskesmas Bandarharjo Kota Semarang. *Jurnal Kesehatan Masyarakat*, *8*(3), 311–322. http://ejournal3.undip.ac.id/index.php/jkm

Ratnasari, Y., Sjaaf, A. C., & Djunawan, A. (2021). Evalusi Sistem Pencatatan dan Pelaporan Kasus Tuberculosis di Rumah Sakit Syarif Hidayatullah. *Jurnal Manajemen Kesehatan Yayasan RS.Dr. Soetomo*, *7*(1), 115. https://doi.org/10.29241/jmk.v7i1.608

Sulistyoningtyas et al. (2022). Evaluasi Program Pengendalian Tuberkulosis Paru Dengan Strategi Dots. *Peran Mikronutrisi Sebagai Upaya Pencegahan Covid-19*, *12*(Januari), 75–82.

Supriyanti, S., Pohan, T. F., & Siregar, K. N. (2024). Sistem Monitoring dan Evaluasi Serta Perkembangan Program Pencegahan dan Pengendalian Penyakit Tuberkulosis di Dinas Kesehatan Kota Depok. *Jurnal Biostatistik, Kependudukan, Dan Informatika Kesehatan*, *4*(2), 83. https://doi.org/10.51181/bikfokes.v4i2.7664

World Health Organization. (2022). *Global Tuberkulosis Laporan 2022*.

Yanti, S., Syamsualam, & Ahri, R. A. (2021). Efektifitas Strategi Directly Observed Treatment Shortcourse (DOTS) dalam Penanggulangan Penyakit Tubercolosis. *Journal of Muslim Community Health (JMCH)*, *3*(1), 33–42. https://doi.org/10.52103/jmch.v3i1.784JournalHomepage:https://pasca-umi.ac.id/index.php/jmch

Zulaikha, et al. (2023). Manajemen Program Pencegahan dan Pengendalian Tuberculosis Saat Pandemi Covid-19 di Puskesmas Mangunharjo. *Jurnal Bidang Ilmu Kesehatan*, *13*(2), 130–144. https://doi.org/10.52643/jbik.v13i2.2236