



Infectious Disease Risks and Human Security in the Skouw Border Area, Jayapura, Papua

Melyana Ratana Pugu*

Universitas Cenderawasih,
Indonesia

Mariana Erny Buiney

Universitas Cenderawasih,
Indonesia

Jose Jordan Imbiri

Universitas Cenderawasih,
Indonesia

***Corresponding author:**

Melyana Ratana Pugu, Universitas
Cenderawasih, Indonesia.

✉ puguratana@yahoo.com

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Abstract

Background: The Skouw border area in Jayapura City is a highly mobile Indonesia-Papua New Guinea crossing point that is vulnerable to infectious disease transmission. Ecological conditions, cross-border mobility, limited health-seeking behavior, and institutional constraints create multidimensional threats to human security.

Objective: This study analyzes ecological, social, and institutional factors associated with infectious disease risks, assesses local health service and surveillance capacity, and formulates human security-based interventions for the Skouw border area.

Methods: An exploratory qualitative study with a descriptive-exploratory case study design was conducted through observation, in-depth interviews with health and border stakeholders, and document analysis. Data were analyzed using open, axial, and selective coding and validated through source and method triangulation.

Results: The main infectious disease risks were malaria and acute respiratory infections (ARI), with 34 cases recorded in one quarter, comprising 17 malaria cases and 15 ARI cases. Cross-border mobility was reflected in 121 clinic visits, including 15 foreign nationals, while patients aged 19–59 years predominated, indicating potential impacts on economic security. Local health services, screening, environmental surveillance, laboratory services, and referral mechanisms were operational, but gaps remained in active surveillance, treatment adherence, community participation, data integration, and cross-sectoral coordination.

Conclusion: Strengthening community-based early detection, malaria vector control, treatment adherence, inclusive border health services, risk communication, integrated health data, and cross-sectoral coordination is essential to building adaptive and resilient border health governance.

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INTRODUCTION

The Skouw border in Jayapura City is one of the important mobility corridors in Papua, connecting Indonesian and Papua New Guinean communities through trade activities, social visits, and border crossings. The development of the Skouw Cross-Border Post (PLBN) has intensified cross-border trade, border tourism, and sociocultural relations between Papua and Papua New Guinea. This dynamic is also reflected in the increasing number of cross-border travelers. From January to May 2024, 76,041 Foreign Travel Passengers (PPLN) from Papua New Guinea entering Indonesia through the Skouw PLBN were recorded, increasing by 32% to 100,143 people during the same period in 2025. Such mobility creates opportunities for social and

economic interaction but also increases the potential for infectious disease transmission across administrative boundaries. The health situation is particularly important because Papua continues to face infectious diseases such as malaria, tuberculosis, HIV/AIDS, and leprosy. From January to May 2025, 98 travelers from Papua New Guinea were identified as ill at the Skouw border. Of these, 44 cases (44.9%) involved infectious diseases, consisting of 29 acute respiratory infection (ARI) cases, 9 malaria cases, and 6 cases of acute diarrhea. These conditions indicate that high levels of cross-border mobility must be accompanied by effective early detection, surveillance, and response capacity.

The public health challenges at Skouw are influenced by the specific characteristics of the border environment. Unlike ordinary administrative areas, Skouw functions simultaneously as a border crossing point, trading area, social interaction space, and basic service point for border communities. Infectious disease risks therefore emerge from the interaction of ecological, social, and institutional conditions. Ecologically, environmental conditions, stagnant water, mosquito vectors, sanitation, and settlement quality may increase the risk of vector-borne diseases such as malaria. Socially, cross-border mobility, family and economic relationships, health-seeking behavior, and cultural practices may influence exposure and treatment-seeking patterns. Institutionally, the capacity of health facilities, surveillance systems, referral mechanisms, and coordination among health, immigration, security, and border management agencies determines the ability to detect and respond to health threats. These characteristics make the Skouw border different from areas where population movement and access to health services are relatively stable.

The theoretical foundation of this study is the human security framework developed by the United Nations Development Programme ([Programme, 1994, 2022](#)), which identifies seven dimensions of security: economic, food, health, environmental, personal, community, and political security. Within this framework, infectious diseases are not merely medical events but threats that can disrupt livelihoods, productivity, mobility, social cohesion, and community safety. This perspective is particularly relevant to border communities whose daily activities depend on cross-border mobility. The human security framework is complemented by the International Health Regulations (IHR) framework, which emphasizes the capacity to detect, assess, report, and respond to public health threats, including those associated with international movement. The integration of these perspectives provides an analytical basis for examining how infectious disease risks and health system capacity influence broader human security at the Skouw border.

Sociocultural and institutional conditions further complicate infectious disease control in the area. Language diversity, traditional healing practices, social norms, and perceptions of illness can influence how communities recognize symptoms, seek treatment, and comply with health interventions. Previous studies have shown that health interventions that do not adequately consider local cultural contexts may encounter resistance, misinformation, or low adherence ([Huang et al., 2022; Sineri et al., 2023](#)). In addition, health facilities in border areas may face limitations in trained personnel, laboratory capacity, rapid diagnostic services, referral mechanisms, and coordination with immigration and security institutions ([Fadly et al., 2025; Jatmika & Iskawati, 2022](#)). In Skouw, the health system already includes the PLBN Quarantine Clinic and Skouw Health Center, but the existence of these facilities does not necessarily ensure effective early detection and response. The capacity of the system also depends on community participation, treatment adherence, active surveillance, data reporting, and cross-sectoral coordination.

Previous studies have examined infectious disease dynamics, health access, mobility, and health security in border settings, but their analytical emphases remain relatively fragmented. International studies and reports have emphasized health and border mobility management and the importance of surveillance and response along mobility corridors ([Europe, 2024; Migration, 2021; Organization, 2022](#)). Studies in Indonesia have addressed health access in border areas ([Jatmika & Iskawati, 2022](#)), immigration and cross-border risks ([Sineri et al., 2023](#)), and the relationship between human security and health interventions ([Pratama & Bachtiar, 2022](#)). These studies provide important foundations for understanding health risks in border regions; however, they generally examine epidemiological threats, health services, mobility, or human security as separate dimensions. Consequently, limited attention has been given to how ecological, social, and

institutional factors interact with local surveillance capacity to shape infectious disease threats in a specific Indonesian border context.

This gap is particularly relevant in Skouw because its epidemiological and social characteristics cannot be fully explained by a single-sector perspective. High cross-border mobility occurs alongside environmental risks, differences in access to health services, low health-seeking behavior among some community members, and institutional coordination challenges. Existing research has provided valuable evidence on individual aspects of border health, but an integrated empirical analysis linking infectious disease risk factors, health service and surveillance capacity, and human security remains limited in the Skouw context. Therefore, the novelty of this study lies in integrating the human security framework with an empirical analysis of ecological, social, and institutional infectious disease risk factors and local surveillance capacity in an Indonesian border region. This integration connects epidemiological, community, and governance dimensions within a unified analytical framework and provides a basis for developing context-specific interventions for border health governance.

Based on this research gap, this study aims to analyze the ecological, social, and institutional factors that increase the risk of infectious disease emergence and transmission in the Skouw border area; assess the capacity of local health services, epidemiological surveillance, and cross-sectoral coordination for early detection and response; and formulate human security-based interventions to strengthen early detection, risk mitigation, and community resilience. By addressing these objectives, the study is expected to contribute empirical evidence for strengthening adaptive, inclusive, and context-sensitive health governance in Indonesia's border regions.

METHOD

This study employed an exploratory qualitative approach to explore experiences, practices, perceptions, and institutional dynamics related to infectious diseases and human security at the Skouw border in Jayapura. A descriptive-exploratory case study design was used because the research focused on understanding infectious disease risks, health service capacity, surveillance practices, and human security within the specific context of the Skouw border (Almli & Næs, 2026; Taherdoost, 2022; Yin, 2018).

The research was conducted at the Skouw border in Muara Tami District, Jayapura City. The location was selected because of its characteristics as an Indonesia–Papua New Guinea border area with dynamic cross-border mobility. Data were collected through observation, in-depth interviews, and document analysis. Observation focused on health service activities, border crossings, and interactions among communities in the Skouw border area. In-depth interviews involved relevant stakeholders, including officials at the Skouw Pos Lintas Batas Negara (PLBN), medical personnel at the Skouw Health Center, and local community members, to obtain perspectives on infectious diseases and mechanisms for their control and coordination. Document analysis involved the collection and examination of policies, activity reports, epidemiological reports, and other documents relevant to the research topic.

The interview guidelines were developed thematically based on the research focus, covering system readiness and institutional capacity, cross-sectoral coordination, mobility and risk points, and human security dimensions. The guidelines were designed to obtain contextual information concerning surveillance preparedness, referral mechanisms, access barriers, and the socioeconomic implications of infectious disease threats. Linguistic appropriateness and cultural sensitivity were considered in preparing the interview questions. The available research description does not provide sufficient information to specify a formal instrument-validation procedure; therefore, no additional validation procedure is stated.

Field observations were supported by field notes and photographic documentation to record relevant conditions and activities at the research location. The collected qualitative data were analyzed through open, axial, and selective coding. Open coding was used to identify initial concepts and relevant patterns in the collected data. Axial coding was then used to relate and group the identified concepts into categories, particularly those associated with ecological, social, and institutional factors. Selective coding was used to identify the central category and integrate the related themes into an analytical narrative concerning infectious diseases and human security

at the Skouw border. Data reduction was conducted by retaining information relevant to the research objectives, while the identified themes were synthesized to formulate the findings and conclusions.

Data validity was strengthened through source and method triangulation by comparing information obtained from interviews, observations, and documents, including epidemiological reports and local policies. The comparison of information across these sources was used to identify consistencies and differences and to strengthen the credibility of the interpretation. Informant responses were also verified to assess the accuracy of the information obtained.

Research ethics were addressed by obtaining informed consent from informants and maintaining the confidentiality of their identities. Participation was voluntary, and informants were provided with information concerning the objectives of the research. Coordination with relevant local stakeholders was also undertaken to support community safety and acceptance during the research process.

RESULTS AND DISCUSSION

Results

Ecological, Social, and Institutional Factors Increasing the Risk of Infectious Diseases in the Skouw Border Area

The Skouw border area has different characteristics from ordinary administrative regions because it functions as a cross-border mobility space, a trade space, a social interaction space, and a basic service point for border communities. In the context of infectious diseases, Skouw's position as an Indonesia–Papua New Guinea border crossing makes it an area with dynamic health risks. These risks arise not only from diseases carried by individuals but also from environmental conditions, mobility patterns, community behavior, and institutional preparedness for disease detection and control. Therefore, discussions on infectious diseases in Skouw need to be placed within the framework of human security because disease threats can affect the safety, productivity, mobility, and well-being of border communities.

Based on interviews conducted at the Skouw PLBN Health Quarantine Clinic, the most frequently treated infectious diseases are acute respiratory infections (ARIs), followed by malaria. Among Papua New Guinean citizens who enter or are active in the border area, the most common diseases identified are malaria and ARIs, accompanied by several cases of skin diseases. This condition shows that the infectious disease threat in Skouw is not singular but includes environmentally based diseases, respiratory diseases, and diseases potentially associated with cross-border population mobility.

Clinic data for the quarter showed 34 cases of infectious diseases, consisting of 17 cases of malaria and 15 cases of ARIs. These figures are important because they show that malaria and ARIs are the two dominant diseases that need to be prioritized in the disease control system at the Skouw border. Malaria is associated with ecological factors, such as the presence of mosquito vectors, environmental conditions, stagnant water, and settlement quality. Meanwhile, ARIs can be associated with geographical conditions, air quality, the density of social interactions, housing quality, and community clean and healthy living behavior.

Ecological factors are among the important determinants of infectious disease risk in Skouw. Clinic efforts, including adult mosquito surveys, mosquito larval surveys, Abate distribution, and food-processing site surveys, show that the environment around the border presents potential risks that need to be monitored periodically. The use of adult mosquito and larval surveys indicates that malaria is understood not only as a clinical problem but also as an ecological problem requiring environmental control. Thus, the risk of infectious diseases in Skouw cannot be separated from sanitation conditions, water management, environmental cleanliness, and the quality of community living spaces.

In addition to ecological factors, social factors also play a major role in increasing the risk of disease transmission. Clinic visit data show that in the first quarter, there were 121 visitors, consisting of 106 Indonesian citizens (WNI) and 15 foreign nationals (WNA). In April alone, out of 60 visitors, 51 were WNI and 9 were WNA. The presence of WNA in the health service data shows that the border clinic serves not only the local Indonesian community but also cross-border travelers and people from Papua New Guinea who are active in the border area. This situation

indicates that cross-border mobility is a social factor that needs to be considered in infectious disease risk analysis.

Table 1

Clinic Visitor Data (First Quarter)

Month	Total Visitors	WNI	WNA
February	51 people		
March	19 people		
April	60 people	51 people	9 people
Total Quarter	121 people	106 people	15 people

Source: Interview with Health Worker at Skouw PLBN Quarantine Center, 2026

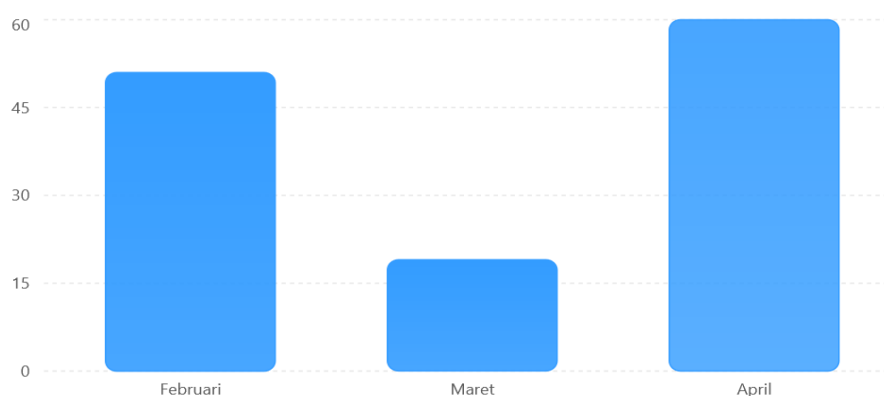


Figure I. Number of Clinic Visitors per Month Feb-April 2026

Source: Processed Primary Data, 2026

The data presented above reveal several analytically significant patterns. The dominance of ARI (15 cases) alongside malaria (17 cases) suggests a dual epidemiological burden: vector-borne disease linked to environmental conditions and respiratory infection associated with high-density cross-border social interaction. The notable spike in clinic visitors in April (60 persons, up from 19 in March) corresponds with increased cross-border trade activity, suggesting that mobility patterns directly modulate infectious disease risk exposure at the Skouw border. From a human security perspective, these fluctuations in disease burden imply that surveillance systems must be adaptive and responsive to seasonal and event-driven mobility rather than operating on fixed protocols. The fact that 15 WNA (12.4% of total quarterly visitors) accessed clinic services underscores the cross-border dimension of health service demand and the inadequacy of citizenship-based service framing in favor of a mobility-inclusive health governance model.

Community mobility at the border cannot always be understood solely as formal entry and exit activities. In areas like Skouw, mobility can also occur due to family ties, trade, work, social visits, and health service needs. Therefore, the risk of infectious disease transmission needs to be viewed in the context of cross-border community and social relations. If a sick person continues activities such as selling goods, traveling, or interacting in public spaces, the potential for transmission to other community members increases. This is evident from the clinic's advice for malaria patients to rest and refrain from activities such as selling goods to avoid transmitting the disease to others.

Patient age-range data also show that the majority of clinic service users are in the productive-age group of 19–59 years. In January, 40 people were recorded in this age group, followed by 37 in February, 14 in March, and an increase to 45 in April. The predominance of the productive-age group indicates that infectious diseases at the border can directly affect economic activities, employment, trade, and community mobility. If the productive-age group is vulnerable to diseases such as malaria and acute respiratory infections (ARIs), the impact is not limited to individual health but can also affect family income, cross-border activities, and the socioeconomic resilience of the community.

Table 2*Patient Age Range Data*

Month	< 5 years	6–10 years	11–18 years	19–59 years	> 60 years
January	6	1	2	40	2
February	4	3	5	37	2
March	1	3	1	14	
April	7	3	3	45	3

Source: Interview with Health Worker at Skouw PLBN Quarantine Center, 2026.

The age distribution data carries significant public health implications beyond mere demographic description. The consistent dominance of the 19–59 productive-age group across all four months (averaging 34.0 individuals per month) indicates that infectious diseases disproportionately affect economically active individuals, translating the disease burden directly into economic vulnerability for border households. This pattern aligns with human security theory's economic security dimension: when income-generating individuals are incapacitated by illness, the cascading effects include reduced cross-border trade activity, decreased household income, and weakened community resilience. The relatively elevated number of pediatric cases among children under 5 years of age in April (7 cases) may reflect seasonal environmental factors affecting child health, warranting targeted maternal and child health interventions at border health posts. These patterns collectively suggest that infectious disease surveillance at Skouw must incorporate age-stratified risk profiling to enable more targeted preventive interventions.

Another important social factor is low awareness among some community members regarding the importance of seeking health check-ups. Interviews at the Skouw Health Center (Puskesmas) show that some community members rarely seek check-ups at health facilities. Many cases are identified when health teams conduct examinations directly in the field. This demonstrates that the risk of infectious diseases is determined not only by the presence of disease but also by health-seeking behavior. If people are reluctant to seek treatment, are unwilling to disclose relevant information to health workers, or are uncooperative during examinations, the process of early detection may be delayed.

From an institutional perspective, disease risk is also influenced by the capacity of health institutions and border agencies to establish a coordinated disease-control system. The Skouw PLBN Clinic has established a service pathway for cross-border travelers, including the requirement to present identification, a non-tax state revenue (*Penerimaan Negara Bukan Pajak* [PNBP]) payment of Rp20,000 for PNG citizens, and access to medical services, including physician consultations, laboratory examinations, and medications. This system demonstrates the existence of a formal service mechanism for cross-border travelers but also highlights the need for stronger border health governance, particularly because foreign nationals (*Warga Negara Asing* [WNA]) seeking treatment do not have health insurance.

Thus, ecological, social, and institutional factors are interrelated in shaping the risk of infectious diseases in Skouw. Ecological factors are evident in the predominance of malaria and the need for vector control; social factors are evident in cross-border mobility, the dominance of the productive-age group, and low awareness among some community members regarding the importance of health check-ups; while institutional factors are evident in the need for accessible services, referral mechanisms, surveillance, and cross-sectoral coordination. These three factors demonstrate that infectious diseases at the Skouw border constitute a threat that is not always directly visible but can undermine human security if not managed systematically.

Discussion

Local Health Service Capacity, Epidemiological Surveillance System, and Cross-Sectoral Coordination in Early Detection and Response to Infectious Diseases

To illustrate the interrelationship between key determinants of infectious disease risk at the Skouw border, a conceptual model is proposed (Figure 1). The model positions ecological, social, and institutional factors as three interacting determinants that collectively shape infectious disease risk. Ecological factors (vector presence, environmental sanitation, and stagnant water) directly create biological conditions conducive to disease transmission. Social factors (cross-

border mobility, low health-seeking behavior, and cultural practices) modulate individual exposure and transmission pathways. Institutional factors (health service capacity, surveillance systems, and cross-sectoral coordination) determine the system's ability to detect, contain, and respond to disease threats. The human security framework functions as the overarching lens, connecting these determinants to the seven dimensions of human security (health, economic, community, environmental, personal, food, and political security). This integrated model distinguishes the present study from single-sector analyses in previous literature and provides the analytical basis for the eight proposed interventions.

The capacity of local health services is a key element in addressing infectious disease threats in the Skouw border area. In the context of border areas, health facilities function not only as places for treatment but also as points for early detection, case-reporting centers, health education spaces, and coordination hubs among communities, health workers, and other agencies. The Skouw PLBN Health Quarantine Clinic and the Skouw Health Center play important roles because both are located in areas directly affected by the mobility of local communities and border crossers (Hartati, 2024; Sande, 2021).

The Skouw PLBN Health Quarantine Clinic has a service flow for crossers seeking treatment. Crossers are required to present identification, while WNA patients are charged a PNPB fee of Rp20,000, which covers physician services, laboratory tests, and medicines. This flow shows that the clinic has established basic health service mechanisms for cross-border travelers. This is important because health services at the border must be able to reach individuals with different citizenship backgrounds, social statuses, and health care needs.

Regarding referrals, the clinic has a referral mechanism for WNA patients to hospitals in Jayapura City. Interview notes indicate that patients have been referred to Bhayangkara Hospital and that the clinic has memoranda of understanding (MoUs) with several hospitals in Jayapura for WNA patient referrals. Meanwhile, WNI patients are referred to Ramela Koya Hospital. These data demonstrate the existence of institutional capacity to connect border health services with more comprehensive referral facilities. However, this referral system still requires transportation support, financing, administrative coordination, and rapid communication to ensure an effective response to high-risk cases.

The human resource capacity at the Skouw PLBN Health Quarantine Clinic consists of six ASN personnel, including health workers, nurses, laboratory analysts, and one physician. The clinic's facilities are considered relatively complete. This composition indicates that the clinic has the basic human resources and infrastructure required for clinical and laboratory services. However, in the context of infectious diseases in border areas, the adequacy of health workers needs to be assessed not only by their numbers but also by their capacity to conduct surveillance, health education, specimen collection, data recording, rapid reporting, and coordination with other agencies.

The Skouw Health Center has greater health workforce capacity, with three general practitioners and 12 nurses divided into several service shifts. Additionally, specialist physicians scheduled by the health office visit the facility, including obstetricians and pediatricians every month, as well as internists, dermatologists, and other specialists every six months. These data show that the Skouw Health Center serves as the main health facility for the surrounding community, including residents of Mosso Village, which comprises Indonesian and Papua New Guinean populations. Thus, the Skouw Health Center holds a strategic position in providing health services to border communities.

In terms of service volume, the Skouw Health Center receives an average of approximately 13 patients per day on holidays and can receive around 40 patients per day on working days. These figures indicate a relatively high service intensity, particularly on working days. This service volume needs to be considered in relation to the ability of health workers to detect infectious diseases early. If the number of visits is relatively high while community awareness of routine health checkups remains low, the health center needs to be more active in providing outreach services, conducting field visits, and undertaking case finding and contact tracing.

The epidemiological surveillance system in Skouw appears to operate through examinations, screening, case recording, and field activities. On May 29, for example, tuberculosis screening was conducted among 28 people and included HIV and syphilis testing, as well as

sputum examination. Although all screening participants were initially classified as having presumptive tuberculosis, follow-up examination results showed that all tested negative. These data reveal that early detection activities have been conducted but also highlight the importance of follow-up examinations to confirm disease status and avoid premature conclusions regarding suspected cases.

Surveillance activities are also evident in mitigation efforts carried out by the clinic, such as adult mosquito surveys, mosquito larval surveys, ABATE distribution, and surveys of food-processing locations. These activities show that surveillance is conducted not only among humans as potential cases but also in the environment as a source of risk. In the context of malaria, adult mosquito and larval surveys are important for detecting potential increases in vector populations. Meanwhile, surveys of food-processing locations can support the prevention of foodborne and environmentally mediated diseases.

Although service and surveillance capacity is available, challenges remain in early detection. Interviews at the Skouw Health Center indicate that some community members rarely visit health facilities for health checkups. Many disease cases are identified only when health teams conduct direct field visits. Additionally, in tuberculosis cases, some patients who have been diagnosed and started on treatment often do not return to continue treatment through completion. This condition indicates a gap between available service capacity and community utilization of health services. Early detection cannot rely solely on health facilities; it must be strengthened through community-based approaches.

From a critical human security perspective, the weaknesses of the Skouw surveillance system can be attributed to three structural gaps. First, the passive surveillance model dependent on patient self-presentation at health facilities is ill-suited to a border context in which highly mobile populations may not follow predictable health-seeking patterns, leaving significant transmission events undetected ([Migration, 2016, 2021; Schriever, 2025](#)). Second, cross-sectoral coordination remains largely reactive rather than institutionalized; the absence of a formal Border Health Security Committee means that information sharing among health, immigration, and security agencies occurs informally, increasing the risk of delayed responses to emerging threats. Third, the human resource composition of the PLBN Clinic (six ASN personnel) is inadequate relative to the volume and diversity of health needs generated by cross-border mobility, particularly for specialized functions such as outbreak investigation, contact tracing, and community health education. These gaps collectively represent systemic vulnerabilities that, if unaddressed, undermine the health security dimension of human security for both resident and transient populations at the Skouw border.

Cross-sectoral coordination is an important requirement in the context of infectious diseases at the border. Service data show that the clinic handles both WNI and WNA patients, has a referral system to several hospitals, and serves communities associated with PLBN activities. This means that disease control cannot be carried out by the health sector alone. Cooperation is needed with immigration authorities, PLBN management, security agencies, district government, village government, and community leaders. Cross-sectoral coordination is necessary to ensure that at-risk crossers can be identified, patients can be referred promptly, case data can be shared appropriately, and communities receive accurate health information.

Overall, the capacity of local health services in Skouw has a relatively strong foundation through the existence of the PLBN clinic, Skouw Health Center, health workers, laboratory services, referral systems, screening activities, and environmental surveys. However, the effectiveness of this system remains influenced by community awareness, treatment adherence, the sustainability of surveillance activities, and cross-sectoral coordination. Therefore, capacity strengthening needs to be directed not only toward adding facilities and health workers but also toward improving reporting systems, risk communication, community engagement, and integrated coordination mechanisms in the border area.

These findings align with and extend the existing literature on border health governance. Consistent with Gostin and Wiley (2016), adaptive public health systems capable of combining cross-sectoral monitoring with community engagement are essential in high-mobility border areas ([Wiley & Gostin, 2025](#)). However, the Skouw context demonstrates that such adaptability is constrained by resource limitations specific to remote eastern Indonesian border regions, a

challenge not fully captured in global health security frameworks. In contrast to studies from more resource-rich border settings (Huang et al., 2022), the Skouw case highlights that digital health information systems and risk-mapping technologies remain aspirational rather than operational, necessitating community-based surveillance as the primary detection mechanism. Pratama and Bachtiar (2022) similarly emphasize that human security in health contexts requires social protection mechanisms beyond clinical services; this study confirms that such mechanisms remain critically underdeveloped at the Skouw border.

Human Security-Based Interventions for Strengthening Early Detection, Risk Mitigation, and Community Resilience Against Infectious Diseases at the Skouw Border

The human security approach places humans at the center of protection against infectious disease threats (Ahsan et al., 2025; Pratama & Bachtiar, 2022). In the context of the Skouw border area, infectious diseases are not only a medical problem but also a threat to human security because they can disrupt health, livelihoods, mobility, income, social relations, and community safety. Therefore, the required interventions should not be limited to treatment but should also include prevention, early detection, community empowerment, and cross-sectoral coordination.

The first important intervention is strengthening community-based early detection. Interview data from the Skouw Health Center indicate that some community members rarely seek checkups at health facilities, so many new cases are identified only when health teams conduct field visits. This finding shows that early detection cannot depend solely on people coming to health centers or clinics. An active system is needed that involves health cadres, community leaders, religious leaders, customary leaders, and village officials so that symptoms of infectious diseases can be recognized at an early stage.

Community-based interventions are also important because prevalent diseases, such as malaria and acute respiratory infections (ARI), are closely connected to people's daily lives. Malaria is associated with environmental conditions, housing, mosquito vectors, and personal protection practices, while ARI is influenced by geographical conditions, indoor environmental quality, and patterns of social interaction. Therefore, health education should be simple, contextual, and aligned with the local language and culture. Education is insufficient if it is delivered only through formal socialization activities; it needs to be conducted repeatedly through field visits, integrated health posts (posyandu), schools, places of worship, markets, and other community gathering points.

The second intervention is strengthening malaria risk mitigation through vector control and household protection. Data from the clinic and health center show that malaria is one of the most prevalent diseases in the area. Existing efforts include the distribution of insecticide-treated mosquito nets, mosquito control activities such as fogging, distribution of larvicides such as ABATE, adult mosquito surveillance, and larval surveys. These interventions should be continued periodically and guided by risk mapping, particularly in areas with stagnant water, high settlement density, or a history of high malaria incidence. The human security approach requires that malaria mitigation be not only technical but also community-based, with residents actively involved in environmental management and the consistent use of mosquito nets.

The third intervention is strengthening treatment adherence, particularly for diseases such as tuberculosis (TB). Interview results indicate that TB is a major concern, and some patients who have been diagnosed and initiated on treatment do not return for follow-up and fail to complete the prescribed treatment regimen. This condition increases the risk of poorer health outcomes, continued transmission, and the development of drug-resistant TB. Therefore, a community-based patient-support system should be established, for example through TB cadres, medication reminders, home visits, and family involvement in supporting patients throughout the treatment period.

The fourth intervention is strengthening health services that are accessible and responsive to border crossers. Clinic data indicate that there were 15 WNA visits during the quarter, while in April there were 9 WNA among a total of 60 visitors. The clinic also has a PNB mechanism for PNG citizens and a referral system to hospitals in Jayapura. These conditions demonstrate that border health services need to be designed inclusively. Border crossers, including PNG citizens, should have access to information about treatment procedures, service

costs, referral mechanisms, and infectious disease prevention without experiencing stigma or unnecessary social barriers.

The fifth intervention is establishing a risk communication system at points of high population mobility, such as the PLBN, markets, transportation routes, trade locations, and settlements around the border. Risk communication is needed so that people understand when to seek medical attention, how to recognize symptoms of malaria, ARI, TB, HIV infection, syphilis, skin diseases, and other infectious diseases, and how to prevent transmission in public spaces. This communication should be delivered in easily understood language, through appropriate communication media, and with the involvement of trusted community figures. In this way, community members become not only recipients of information but also active components of the early warning system.

The sixth intervention is strengthening data integration among the PLBN clinic, Skouw Health Center, Health Office, referral hospitals, and border agencies. Currently available data already include records of clinic visits, disease types, WNI/WNA status, age groups, and emergency referrals. However, these data need to be integrated so that they can serve as a basis for risk mapping. For example, malaria and ARI case data can be linked to place of residence, border-crosser status, age, time of visit, and activity history. Such data integration is important for generating risk analysis reports and strengthening the overall disease surveillance system.

The seventh intervention is strengthening cross-sectoral coordination through a border health forum. This forum could involve the Skouw PLBN Health Quarantine Clinic, Skouw Health Center, Health Office, immigration authorities, security agencies, PLBN management, district government, village government, community leaders, and community representatives. The forum could be used to discuss disease trends, service barriers, logistics needs, referral cases, health education activities, and response simulations in the event of an increase in cases. With regular forums, coordination would not occur only during crises but would become an integral part of border health governance.

The eighth intervention is developing a package of policy recommendations based on human security. These recommendations could include strengthening active surveillance, improving health services for border crossers, enhancing malaria vector control, expanding ARI and TB education, supporting patients at risk of treatment interruption, and integrating health and mobility data. These policies need to be contextualized to the conditions of Skouw because border areas have dynamics that differ from those of ordinary urban areas. Policies that are overly administrative and fail to address the social realities of the community will be difficult to implement effectively.

Thus, the most relevant human security-based interventions for Skouw are those that combine health protection, community empowerment, service strengthening, and cross-sectoral coordination. Field data show that prevalent diseases such as malaria and ARI, concerns regarding TB, low health-seeking behavior among some community members, and the mobility of both WNI and WNA require a comprehensive approach. The ultimate goal is not only to reduce the number of infectious disease cases but also to build community resilience so that border communities can recognize risks, access health services, adhere to treatment, and cooperate with institutions to maintain shared health security.

CONCLUSION

This study concludes that infectious disease threats at the Skouw border constitute a multidimensional human security challenge shaped by interacting ecological, social, and institutional factors. Malaria and acute respiratory infections (ARI) represent the dominant infectious disease burden, while environmental conditions, cross-border mobility, the predominance of patients of productive age, and low health-seeking behavior increase vulnerability. Although the Skouw PLBN Health Quarantine Clinic and Skouw Health Center provide basic health services, screening, laboratory support, vector control, and referral mechanisms, gaps remain in active surveillance, treatment adherence, community engagement, data integration, and cross-sectoral coordination. These findings demonstrate that infectious disease governance in a dynamic border area requires an integrated approach that connects health protection with economic, community, environmental, and mobility-related security.

Based on these findings, strengthening community-based active surveillance, malaria vector control, treatment adherence, inclusive health services for border crossers, risk communication, integrated health data, and routine cross-sectoral coordination is essential to improve early detection, risk mitigation, and community resilience. The study contributes an integrated human security perspective that links ecological, social, and institutional determinants with local surveillance capacity in an Indonesian border setting. Practically, the proposed interventions provide a basis for policymakers, health authorities, and border governance agencies to develop adaptive and context-sensitive health governance. Future research should use mixed-methods and longitudinal designs to quantify intervention impacts, compare other Indonesian border regions, and assess the potential of digital health technologies for strengthening surveillance in remote border areas.

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AUTHOR CONTRIBUTION STATEMENT

Melyana Ratana Pugu, Mariana Erny Buiney, and Jose Jordan Imbiri contributed to the conceptualization and design of the study, data collection, data analysis and interpretation, and preparation of the manuscript. All authors reviewed and critically revised the manuscript, approved the final version, and agreed to be accountable for all aspects of the work.

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