Comment

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Two Nations, One Front: Indonesia and Papua New Guinea forge a One-Island approach to fight persistent malaria on New Guinea

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Despite decades of effort, New Guinea remains one of the malaria last frontiers. But the elimination is within reach. Bold leadership, united cross-border action, empowered communities, and smarter surveillance can end malaria, if we choose urgency towards One Island strategy.

Epidemiological realities at malaria hotspot in Asia-Pacific

The island of New Guinea is a global epicentre of biological and cultural richness. Home to ~16 million people and more than 1000 distinct languages and cultural groups, it is a place of profound biological and linguistic diversity[1]. Evidence suggests human settlement here dates back over 50,000 years[2]. Yet, for all its richness, New Guinea continues to grapple with one of the world's most stubborn public health crises: malaria.

Colonial borders imposed in 1899 split the island along the 141° East Longitude, carving out what are today known as Indonesian Papua and Papua New Guinea (PNG)[3]. Despite this artificial divide, the island remains a single epidemiological unit. Shared ecology, geography, and human movement ensure that malaria thrives on both sides. The mountainous interiors, swampy lowlands, and dense rainforests create ideal conditions for vector proliferation which has stalled progress in reducing incidence.

As the world's second-largest island (785,000 km^2), the island is one of the major strongholds of malaria transmission in the Asia-Pacific region with levels of transmission similar to those prevalent in Africa (Fig. 1), but with the complication of high prevalence of both *Plasmodium falciparum* and *P. vivax*[4]. Together, these parasites are estimated to contribute 2–3 million suspected cases annually[5]. In some villages, malaria incidence can exceed 500 per 1000 people each year.

In Papua New Guinea, from 2008–2009 to 2013–2014, national malaria prevalence plummeted from 11% to 0.9%, especially in lowland areas, where P. falciparum and P. vivax rates fell by 12- and 6-fold respectively, but by 2017, prevalence resurged to ~7.1%, an 8.6-fold increase. The rebound has been attributed to reduced funding and political commitment, waning effectiveness of Long-Lasting Insecticidal Nets (LLINs), declining access to diagnostics and treatment, and growing challenges within a decentralized health system. Transmission hotspots expanded, exacerbated by environmental risk factors like outdoor and early-evening mosquito biting, and persistent asymptomatic infection reservoirs. Currently, nine provinces in the lowlands and coastal areas collectively account for 88% of the national malaria burden.

As in Africa, children under five and pregnant women are disproportionately affected[6]. Delays in accessing care due to distance, undetected infections, weak health systems and suboptimal management, or lack of awareness lead to severe complications and deaths[7,8]. In recent years, progress in malaria control has stalled, driven by the inherent protective limitations of existing interventions exacerbated by medical supply shortages, logistical challenges, and difficulties in maintaining effective vector control coverage. The recent reduction in the global funding landscape points to the need for stronger leadership, greater collaboration, improved management, additional interventions and optimal resource utilization.

Addressing outdoor transmission and local vector diversity

Both countries face a common threat: members of *Anopheles punctulatus* sibling species group, including *An. punctulatus*, *An. koliensis*, the *An. farauti* complex types 1-8; *An. bancroftii* complex, *An. longirostris* complex, and *An. karwari*[9,10]. The most dangerous malaria vectors of the *An. punctulatus* group are highly anthropophilic in their biting preferences, leading to high rates of transmission. They also show tendencies for outdoor biting, early evening biting, and outdoor resting behaviour[11]. Vector dominance varies greatly at the local level, even among nearby communities[12]. These vectors breed in a wide range of aquatic habitats, from river edges, brackish lagoons, and swamps to artificial containers and puddles formed during seasonal rains[13]. Current vector control strategies in both countries rely heavily upon LLINs, which have impact on transmission, despite the prevalence of outdoor transmission driven by outdoor evening human activities and vector behavior. Issues related to LLIN quality in PNG[14] and Indonesia[15] contribute to erosion of the impact of this intervention. As in Africa, LLINs in lowland Papua reduce but do not halt transmission.

Gaps in protection by LLINs highlight the need for tailored interventions that align with local daily routines. Effective and sustainable malaria control must consider both human and mosquito behaviour. For outdoor transmission, community-based larval source management led by local communities would reduce adult vector populations, hence combat transmission both indoors and outdoors. Community-led efforts to increase timely case detection and treatment would further reduce the human reservoir of parasites and hence human-to-mosquito transmission. These interventions should be co-designed with communities.

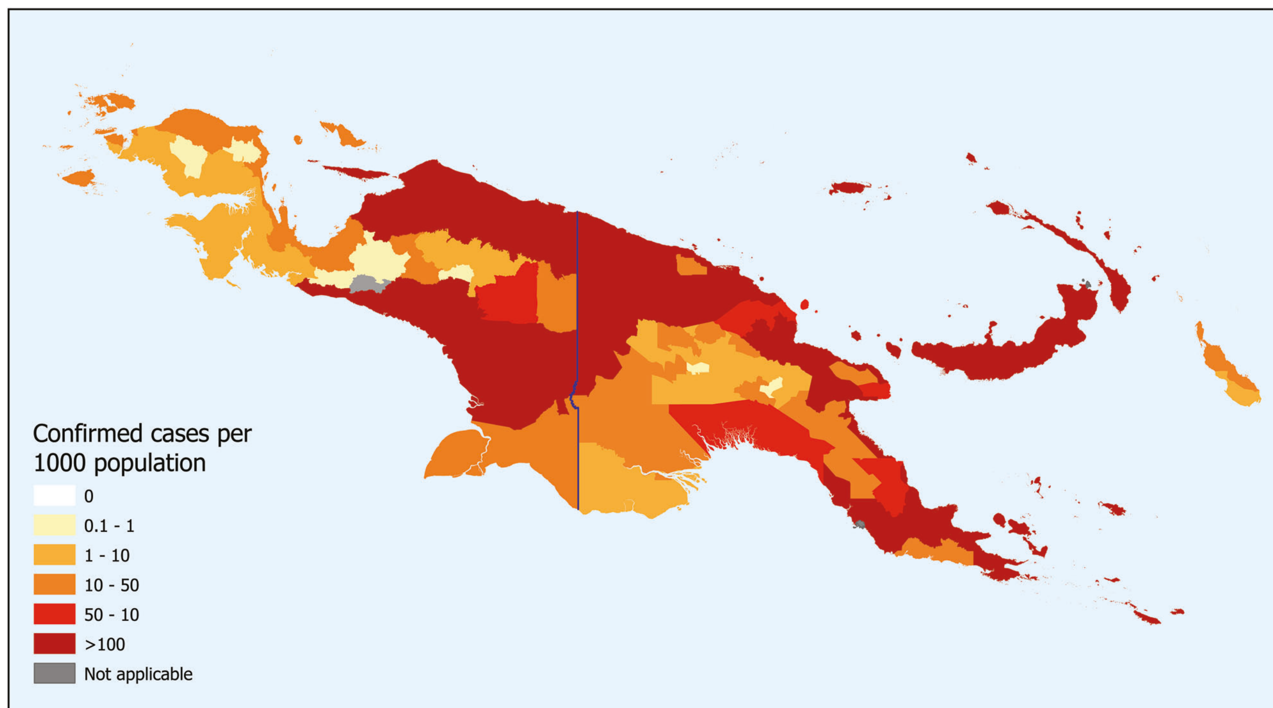

Fig. 1 | Geographical distribution of confirmed malaria cases per 1000 population in the countries of Indonesian and Papua New Guinea. Malaria data for Indonesia were obtained from the Indonesian Malaria Surveillance and Information System, whereas data for Papua New Guinea were obtained from the Papua New Guinea Ministry of Health. Shape file was from: (https://data.humdata.org/dataset/cod-ab-idn) for Indonesia and (https://data.humdata.org/dataset/cod-ab-png) for Papua New Guinea.

Towards one island strategy

Indonesia has made remarkable progress in malaria elimination. Despite a burden of malaria in 2024, with 527,381 confirmed cases, 93 percent of which originated from Papua Island, 407 out of the country's 514 districts had achieved malaria-free status. Notably, of the 42 districts in Indonesian Papua, three districts: South Sorong, Arfak Mountain, and Maybrat, were officially declared malaria-free by the Ministry of Health. This achievement was due to good surveillance and response in districts with inherently lower transmission than in other parts of the islands, but nonetheless offers optimism that malaria elimination is attainable even in higher transmission areas.

In Papua New Guinea, there is ample opportunity to reinvigorate elements of the Healthy Island Concept, which was launched 30 years ago by the Pacific Health Ministers in Fiji in 1995. This settings-based community led model, aligned with the Ottawa Charter, integrates water, sanitation, hygiene, vector control, health schools and marketplaces, and local governance rather than disease-specific, top-down programs. The concept has been localized in some areas such as in and around the Lihir Island Mining Zone in New Ireland province through participatory planning in villages and islands though the scale remains limited. The progress on non-malaria disease elimination in Papua New Guinea remains modest, albeit with some success with yaws, trachoma and lymphatic filariasis.

Despite sharing continuous parasitological, entomological, and environmental conditions, Indonesia and Papua New Guinea remain insufficiently connected in their malaria control efforts. Malaria does not recognize borders, and the porous land boundary, stretching over 800 kilometres, facilitates frequent cross-border movement driven by family ties, trade, and migration. For example, Jayapura (Indonesia) and Vanimo (PNG) are provincial hubs that can be leveraged in a coordinated manner for cross-border malaria efforts. Without coordinated action, ongoing transmission in one country will lead to reintroduction of cases in the other. A joint response is crucial to harmonize surveillance systems, standardize treatment protocols, share entomological and epidemiological data, and strengthen coordination. The role of regional and global partners is pivotal. Multilateral platforms such as the Asia Pacific Leaders Malaria Alliance (APLMA), WHO Western Pacific Regional Office (WPRO), and key donors must catalyse efforts to secure sustained financing and provide coherent and focused technical support tailored to the Papuan context.

The 9th Asia Pacific Leaders' Summit on Malaria Elimination, held in June 2025 in Bali, Indonesia, following the 8th Summit in Port Moresby, Papua New Guinea in 2024, has strengthened collaboration between the two countries. These consecutive malaria Summits across the island of New Guinea show tangible progress to build upon bilateral cooperations agreements initiated by Former President Joko Widodo and Prime Minister James Marape in July 2023. The most recent Ministerial-level commitments signed in June 2025 support joint programmatic actions and a shared operational research agenda. Stakeholders from Indonesia and Papua New Guinea aim to align around shared priorities, including joint entomological surveillance, real-time data sharing and monitoring, vector control tailored to local ecologies, exploration of innovative technologies, and monitoring and mapping of antimalarial drug and insecticide efficacy. A Memorandum of Understanding, Joint Action Plan, and Steering Committee have

Table 1 | Proposed Joint Action Plan and Work Programme for Cross-Border Collaboration on Malaria Control and Elimination between Indonesia and Papua New Guinea, 2025–2030

Form of cooperation	Project and activities	Expected Outputs
Priority 1. Financing and resource mobilization		
Health financing research study	1. Conduct health financing system assessment and policy analysis 2. Organize stakeholder consultation and policy dialogue on health finance reforms 3. Build capacity for health budget planning, execution, and monitoring	Study research on health financing for malaria elimination in the border districts of Indonesia and Papua New Guinea
Diversify funding resources	Mobilize new forms of private sector capital	Leveraging public and philanthropic funding to attract additional private capital
Priority 2. Information sharing and capacity building		
Governance and coordination	1. Establish a cross-border committee with representative from both countries to oversee implementation and resource mobilization 2. Hold annual joint review and technical challenge to assess progress, the best practices and adapt the action plan as needed	Establish a steering committee
Establishment of regional data platform	Build a secure, real time data sharing platform for malaria between Indonesia and Papua New Guinea	1. Data sharing platform 2. Improve connectivity through innovative and established technologies 3. Strengthen GIS for mapping disease cases and identify areas receptive to transmission
Enhance data sharing	1. Conduct data flow analyses, establishing contractual limitations, and utilizing secure transmission platforms 2. Maintaining accurate surveillance records and support rapid response supports	Implementing best practices for cross-jurisdictional data sharing
Enhance information sharing	1. Sharing experiences in dealing with malaria cases and the determinant risk factors 2. Participation of experts in meetings and conferences held by either party	1. Online consultation/coordination 2. Joint conference and training for experts from both countries.
Joint capacity building and workforce mobility	1. Capacity building of community health workers and malaria volunteers 2. Capacity building of medical professional 3. Activate community mobilization	1. Joint training for community health workers, malaria volunteers, local leaders and medical professionals 2. Malaria trainings co-hosted by Indonesia and PNG National University
Priority 3. New tools and innovative approaches		
Cross-country patient pathway	Cross-country patient referral, evacuation process, treatment, financing, supervision, specimens, etc.	Technical agreement on cross-border referral system
Targeted vector control approaches	1. Collaborate with civil engineering and agricultural sector for habitat reduction 2. Initiate dual operational research on innovative vector control for outdoor- biting vectors 3. Share findings and adapt strategies across the region	Joint research and scale-up interventions
Develop and standardize laboratory networks	1. Joint procurement of essential laboratory consumables 2. Facilitate knowledge exchange and training of laboratory staff 3. Harmonize laboratory protocols and quality standards across the network 4. Establish dual laboratory quality assurance and proficiency testing program 5. Build a resilient regional infrastructure network of laboratories and support systems	1. Training programs of laboratory staff 2. Joint laboratory protocols and quality standards
Pilot project cooperation	1. Launch intensive intervention packages (testing, treatment, vector control, surveillance) in selected high-burden border districts/areas 2. Pilot joint intervention in shared border zones with operational research and lessons learned shared regionally 3. Deploy sensitive, case-based surveillance and rapid response team 4. Establish elimination verification mechanism and maintain zero case status 5. Dissemination of key findings from joint cooperation in high endemic and low-endemic pilot	1. High-endemic pilot areas 2. Low-endemic pilot areas 3. Joint operation
Public health emergencies preparedness and response, including surveillance	Cross-border meeting technical arrangement on case management during public health emergencies and outbreaks	1. Training 2. Table top exercise

The Joint Action Plan is designed to operationalize the Memorandum of Understanding on Cooperation in the Field of Health between the Ministry of Health of the Republic of Indonesia and the Ministry of Health of the Independent State of Papua New Guinea, signed in Bogor on 15 July 2024. Building on this bilateral framework, the Joint Action Plan, endorsed in Bali in 16 June 2025, provides a structured mechanism to advance cross-border collaboration in malaria control and elimination over the period 2025–2030. Both countries agree to monitor and evaluate the implementation of the Joint Action Plan every six months.

been established (Table 1). Discussions to seek funding for a "One Island" approach to malaria control and elimination are in progress. Though the PNG-Indonesia collaboration is in early stages, there is promising momentum.

The success of Regional Artemisinin Initiative (RAI) in the Greater Mekong Sub Region is a potent example of sub regional cooperation in Asia Pacific. For the Indo Pacific, eliminating malaria and other vector-borne diseases through Enhanced Regional Partnerships (EDEN)

Initiative, launched in June 2024 by health ministers from Indonesia, Papua New Guinea, Timor Leste, Solomon Islands and Vanuatu represents a substantive commitment to malaria elimination. In a sub-region where the malaria burden is the region's highest, this collaboration aims to channel financial and technical resources to address escalating challenges posed by both climate volatility and constrained funding. Supporting a cross-border "One Island" strategy within the EDEN framework presents a vehicle for donors and implementers to demonstrate a commitment to country-led, regionally coordinated solutions. As former President Yudhoyono of Indonesia noted at the 9th Asia Pacific Leaders' Summit in Bali in June 2025, "Malaria does not recognize borders. It does not stop at coastlines. And so, neither can we. We must embrace a 'One Island' approach. This is the essence of the EDEN call to action: to rise to the occasion, to take ownership, and to lead with courage and clarity". Malaria elimination in New Guinea will not be achieved in isolation, but it can be accomplished through cross border collaboration and a recognition that we are inextricably connected links in a chain.

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Author contributions

H.D.P. and J.K. were the principal leads of this program, who were responsible for the national programmes. H.D.P., H.S., R.I, D.S., J.K., P.M., J.B.K., T.A.G., D.S.Y., E.N., I.I., F.F., F.P., N. C, N.F.L., E.D.W., F.J.L., S.D., W.A.H., I.R.F.E. had full access to all the data in the program and take responsibility for the integrity of the data and the accuracy of the data analysis. H.D.P., R.I, J.K., P.M., J.K.B., T.A.G., D.S.Y., and N.F.L. contributed to data collection and verification. W.A.H., N.F.L. and I.R.F.E. contributed to data analysis and visualisation, with guidance from H.D.P. and J.K. I.R.F.E., W.A.H., N.F.L., S.D., and E.N. drafted the paper. All authors critically revised the manuscript for important intellectual content and all authors gave final approval for the version to be published. The work represents the personal opinion of the authors and not that of the organization for whom they work.

Competing interests

The authors declare no competing interests.

Additional information

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