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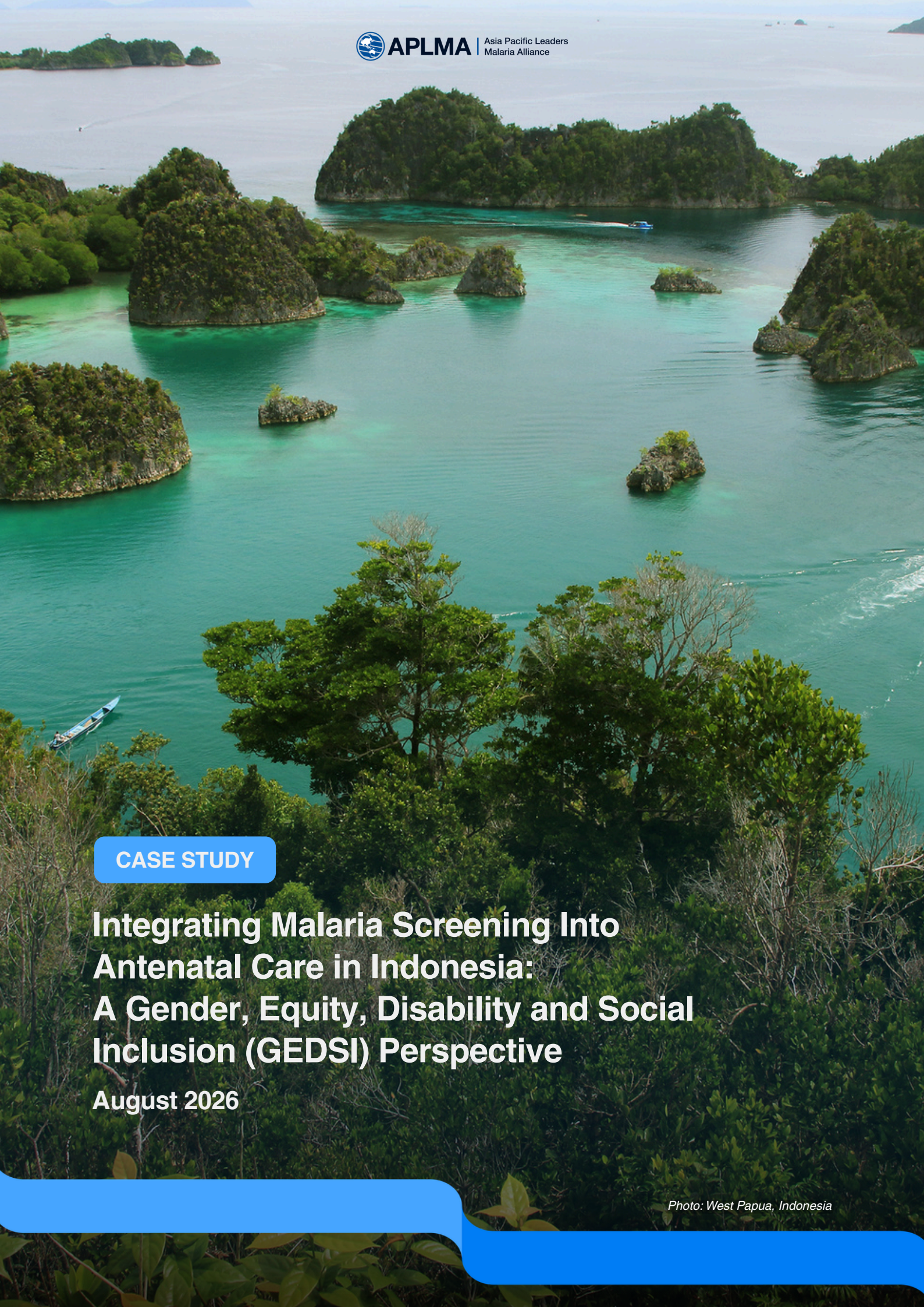

CASE STUDY

Integrating Malaria Screening Into Antenatal Care in Indonesia: A Gender, Equity, Disability and Social Inclusion (GEDSI) Perspective

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Photo: West Papua, Indonesia

Executive Summary

Malaria in pregnancy remains a significant public health challenge in the Asia Pacific, where nearly 70% of pregnancies at risk of malaria occur. In Indonesia, the burden has historically been concentrated in eastern Indonesia, especially Papua and East Nusa Tenggara, where co-endemic *Plasmodium falciparum* and *Plasmodium vivax* contribute to maternal anaemia, low birth weight, and adverse neonatal outcomes.

Indonesia introduced the Single Screening and Treatment (SST) policy in 2012, integrating malaria screening into routine antenatal care (ANC) at the first visit. This marked a significant shift toward proactive case detection for malaria in pregnancy and has proven feasible and acceptable at scale. However, implementation gaps, such as inconsistent screening coverage, diagnostic limitations, and the inability of one-time screening to detect asymptomatic or recurrent infections, have constrained its effectiveness, particularly in high-transmission settings. Evidence from recent studies, including trials of intermittent screening of malaria (IST) in pregnancy and intermittent preventive treatment of malaria in pregnancy (IPTp), demonstrates that these approaches can substantially reduce malaria infection during pregnancy, though challenges around acceptability and adherence persist.

This case study considers a differentiated, two-tiered national strategy to tackle malaria in pregnancy. SST and the sustained use of long-lasting insecticidal nets (LLINs) could be strengthened and maintained in low-to-moderate transmission settings, while targeted introduction of IPTp-DP in high transmission areas can provide both treatment and prophylactic protection.

Embedding gender, equity, disability, and social inclusion (GEDSI) principles, alongside sustained community engagement, will be critical to improving uptake and ensuring equitable access. Indonesia's experience offers an important model for the region, highlighting the need for adaptive, context-specific strategies that integrate biomedical effectiveness with social and health system realities to accelerate progress toward malaria elimination.

Malaria Cadre at forest camp in East Kalimantan forest, Indonesia
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Background

Malaria in pregnancy (MiP) is a significant global public health concern, particularly in malaria-endemic regions like sub-Saharan Africa and the Asia-Pacific, where pregnant women face heightened biological vulnerability to infection and its complications. Globally, MiP is associated with substantial maternal and neonatal morbidity, including maternal anaemia, placental infection, low birth weight, and increased infant mortality (1).

Close to 70% of the 125 million pregnancies in malaria endemic regions occur in the Asia-Pacific region (2). While much of the global evidence and policy guidance on malaria in pregnancy has historically been shaped by data from sub-Saharan Africa, the epidemiology in the Asia-Pacific region is distinct and comparatively under-recognised. Globally, most pregnant women at risk of *P. vivax* infection reside in the Asia-Pacific, where heterogeneous transmission patterns, co-endemicity of *P. falciparum* and *P. vivax*, and multidrug resistance complicate prevention and case management strategies (3).

Despite this, malaria in pregnancy is not recognised as a priority by many policy makers and funders in this region (3). Control strategies in the region have historically relied primarily on passive case detection rather, despite antenatal care (ANC) platforms being increasingly recognised as critical and cost-effective entry points for surveillance, early diagnosis, and management of malaria among pregnant women in endemic settings (4).

Indonesia's Single Screen and Treatment (SST) Policy

In the early 2000s, malaria posed a substantial but under-recognised burden among pregnant women in Indonesia, particularly in eastern high-transmission areas such as Papua, Maluku, and parts of Nusa Tenggara where both *P. falciparum* and *P. vivax* were co-endemic.

Facility-based studies from Papua in the mid-2000s showed that malaria infection during pregnancy was common and clinically significant. Research in Timika documented frequent maternal malaria episodes and demonstrated that both *P. falciparum* and *P. vivax* infections contributed to maternal anaemia and adverse birth outcomes, highlighting the dual-species burden unique to Indonesia's eastern settings (5). A demographic study from 2007 found Indonesia to be among the top five countries with the highest number of pregnancies at risk of *P. falciparum* and *P. vivax* malaria in the world (6).

Therefore, while geographically concentrated, the risk of malaria in pregnancy in Indonesia, has been epidemiologically significant and characterised by recurrent infections, high rates of maternal anaemia, and elevated risks of low birth weight and preterm delivery in endemic provinces, with the true burden likely underestimated due to limited systematic screening in antenatal services at the time.

In 2012, Indonesia became the first country in the Asia-Pacific region to introduce a national policy of malaria screening at the first ANC visit in malaria-endemic areas in 2012, known as single screening and treatment (SST). Under this policy, pregnant women are screened for malaria at their first ANC visit with either microscopy or a rapid diagnostic test (RDT) regardless of symptoms, followed by the treatment of test-positive cases with the recommended anti-malarial (2). An LLIN is also provided to the pregnant woman at the time of screening, whether test-positive or not. Subsequent testing is only conducted if women present with symptoms of malaria.

SST is delivered through routine ANC platforms in all health facilities operating ANC services in malaria-endemic regions, including hospitals, health centres, and community health posts, and services are provided free of charge to pregnant women (2).

Since its implementation in 2012, evaluations of the SST policy suggest that the integration of malaria screening into routine ANC acceptable to both providers and pregnant women and feasible, with high provider compliance, particularly in areas of the country where ANC attendance is high (2, 6).

Despite this, implementation studies show suboptimal adherence to screening guidelines, with large variations in screening coverage at first ANC visit across districts and facility types, indicating health system bottlenecks and inconsistent delivery (5).

A key limitation is that the SST policy relies on a single screening event followed by symptom-based testing, which risks missing asymptomatic and incident infections later in pregnancy and does not provide protection against reinfection. Diagnostic constraints further compound these gaps, as conventional RDTs and microscopy may have limited sensitivity for detecting low-density and asymptomatic infections common in pregnant women (7). Furthermore, the presence of peripheral parasitaemia is not well corelated with placental parasitaemia. Indonesia's heterogeneous transmission patterns and decentralised health system create operational challenges for consistent implementation across endemic provinces, particularly in high-burden regions such as Papua (8).

Collectively, these shortcomings have prompted ongoing research and policy discussions on complementary strategies, including intermittent preventive treatment and enhanced screening approaches, to strengthen the control of malaria in pregnancy within Indonesia's evolving elimination agenda.

Alternative Strategies: Intermittent Screening & Intermittent Preventive Treatment in Pregnancy

An alternative strategy to the SST is one of intermittent screening and treatment in pregnancy (IST/ISTp), which involves screening asymptomatic pregnant women for malaria at every ANC visit, not just the first one, followed by the treatment of those who test positive (9) and may be more effective than one-time screening alone in detecting malaria and reducing malaria-related morbidity.

Intermittent preventive treatment in pregnancy with sulfadoxine–pyrimethamine (IPTp-SP) or intermittent preventive treatment in pregnancy with dihydroartemisinin–piperaquine (IPTp-DP), which involves administering therapeutic doses of sulfadoxine-pyrimethamine (SP) or dihydroartemisinin–piperaquine (DP) at scheduled ANC visits regardless of infection status, has been shown in multiple studies to be more effective than screening-based strategies including SST and IST, especially in moderate-to-high transmission settings (9). The World Health Organization (WHO) recommends IPTp-SP as the primary strategy for preventing malaria in pregnancy in areas of moderate to high *P. falciparum* transmission. IPTp-DP is often used in epidemiological settings where resistance to SP is high or where *P. vivax* contributes substantially to malaria transmission, although WHO continues to recommend the use of IPTp-SP in areas of moderate to high *P. falciparum* transmission, even in many settings with high SP resistance.

IPTp provides both treatment of existing infections, including those that might have gone undetected, as well as a period of post-treatment prophylaxis to protect pregnant women from new malaria infections in between ANC visits. IPTp significantly reduces the risk of maternal malaria infection, placental parasitaemia, maternal anaemia, and low birth weight compared with case management or screening-based approaches alone (10).

Therefore, while SST strategy has been maintained as a core national approach to malaria in pregnancy in Indonesia, IPTp-DP has been explored in high-endemic settings like Papua (11).

Between 2013 and 2016, a clinical trial comparing SST, IST and IPTp was conducted in Sumba Island and Papua Province in Indonesia. The primary outcome showed that there was a 41-44% relative reduction of any malaria infection at delivery in women received IST or IPTp compared with SST.

The administration of IPT-DP as part of this study was the first trial for IPT-DP for malaria in pregnancy in the Asia Pacific region. Adherence to the protocol was high, with 87% of participants completing all three doses of DP. The drug was generally well tolerated; however, dropout rates were higher in the IPT-DP group (14%), particularly in Papua, primarily due to refusals. These refusals were linked to community perceptions and circulating rumours, as well as safety of taking medication during pregnancy in the absence of illness and fears of potential harm to the fetus. These findings highlight the importance of incorporating cultural and contextual considerations when developing recommendations for malaria prevention and treatment. Despite this, IPTP-DP in Papua substantially reduced malaria infection during pregnancy and prevalence at delivery by approximately 50% (12).

Recommendations: A Two-Tiered National Strategy for Malaria in Pregnancy in Indonesia

To address the persistent gaps in the SST approach for detecting and managing malaria in pregnancy, while accounting for Indonesia's epidemiological diversity and health system realities, a differentiated, two-tiered national strategy should be considered.

1. Maintain and strengthen SST in low-transmission and elimination settings

In areas approaching malaria elimination or with low transmission, SST remains an appropriate and resource-efficient strategy. However, its effectiveness can be significantly enhanced through strengthening adherence to first-visit screening protocols across all facilities and facility types, improving the quality and availability of diagnostics, including more sensitive tools for detecting low-density infections, enhancing health worker training and supervision to ensure consistent implementation and integrating malaria indicators into routine ANC monitoring systems to improve accountability.

A GEDSI lens should ensure that all pregnant women, including those in remote, marginalised, and underserved populations, can equitably access high-quality ANC services and malaria screening.

2. Introduce targeted IPTp-DP in moderate- to high-transmission settings

In high-burden regions such as Papua and other parts of eastern Indonesia where recurrent and asymptomatic infections are common, SST alone is insufficient. Evidence supports the introduction of IPTp-DP as a complementary or alternative strategy. The deployment of IPTp-DP should be targeted geographically based on transmission intensity and burden of disease and delivered through routine ANC platforms to maximise coverage.

3. Embed GEDSI principles in policy design and program implementation

The higher refusal rates observed in IPTp-DP trials highlight the importance of addressing social, cultural, and gender-related barriers. Communities should be engaged early to build trust and address misconceptions around taking medication during pregnancy and communications should be tailored to local beliefs, languages, and literacy levels. Male partners or key decision-makers in the community could be included in awareness building efforts. Finally, programs and communications should be designed to include all women, including those with disabilities or facing geographical or financial barriers.

4. Strengthen community engagement and demand generation

Improving acceptability of malaria interventions in pregnancy requires sustained community engagement. This includes leveraging community health workers and village health posts to promote ANC attendance and malaria prevention, addressing rumours and misinformation through trusted local channels and framing malaria prevention as part of broader maternal and child health protection.

Conclusion

Indonesia's experience integrating malaria screening into ANC represents a critical and often under-recognised example of how routine maternal health platforms can be leveraged to address malaria in pregnancy in the Asia Pacific. The introduction of SST policy marked an important shift from symptom-based case detection to systematic malaria screening at the first ANC visit, demonstrating both feasibility and acceptability within routine ANC services. However, more than a decade since its implementation, evidence indicates that SST alone is insufficient to address the complex and heterogeneous epidemiology of malaria in pregnancy across the country, particularly in high-transmission settings where asymptomatic and recurrent infections are common.

While SST remains appropriate in low and moderate settings, complementary approaches such as IST and IPTp-DP have shown potential in reducing malaria infection during pregnancy in higher-burden areas. At the same time, the mixed acceptability of preventive treatment observed in trials highlights that biomedical efficacy alone is not sufficient: social, cultural, and behavioural dimensions play a critical role in uptake and adherence. Addressing malaria in pregnancy in Indonesia, therefore, is not only a technical challenge but also a question of equity and inclusion.

Looking ahead, Indonesia is well positioned to lead the Asia Pacific region in advancing a more nuanced, evidence-based approach to malaria in pregnancy, one that is adaptive to transmission intensity, embedded within strong ANC systems, and responsive to the lived social, cultural and inclusion contexts of pregnant women.

Ultimately, accelerating progress toward malaria elimination will depend on ensuring that no pregnant woman is missed, whether due to geography, health system limitations, or social exclusion. Integrating equitable, context-sensitive malaria interventions into antenatal care is not only essential for improving maternal and newborn health outcomes, but also for advancing Indonesia's broader malaria elimination goals.

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