Thematic Feature

CROSS-BORDER MALARIA ELIMINATION ALONG THE INDIA-BHUTAN AND INDIA-NEPAL BORDERS

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Cross-border Malaria Challenges in the Asia Pacific Region

The Asia Pacific region has made great progress in reducing the malaria burden over the past decade. Countries such as Nepal and Bhutan are close to the elimination target with only a few hundred cases being reported each year. More recently, Bhutan reported zero indigenous cases in 2022. Most of these remaining cases are found along international borders and particularly near India, a high-endemic country for malaria. This poses a persistent risk of imported malaria cases and potential re-establishment of transmission in malaria-free areas. Other cross-border challenges include inadequate surveillance, migration tracking, inconsistent vector control and treatment, and limited health infrastructure. Cross-border collaboration is crucial to tackling these last-mile elimination challenges given the inevitable movement of humans, vectors, and parasites across international borders.

The World Health Organization's (WHO) Global Technical Strategy (GTS) 2016-2030(1) for Malaria Elimination emphasizes the need for regional cooperation to manage cross-border malaria effectively. Cross-border malaria is a complex issue, and countries pursuing elimination certification should prioritize addressing cross-border malaria early in their elimination efforts. The WHO-GTS recommends tailored approaches for managing cross-border malaria, including cross-border coordination and collaboration, emphasizing practical implementation.
The following country experiences reveal key insights into current joint efforts to combat cross-border malaria:

**India-Bhutan Border**

Bhutan is part of WHO’s E-2025 initiative and aims to eliminate malaria by 2025, hence the critical need for Bhutan to strengthen their last-mile elimination efforts—particularly on transmission of malaria in the bordering areas where majority of remaining cases are reported. Of the total malaria cases reported in Bhutan over the past four years, the majority were imported cases (Figure 2).

**Imported and Indigenous Malaria Cases in Bhutan (2019-2022)**

![Imported and Indigenous Malaria Cases in Bhutan (2019-2022)](image)

*Figure 2. Proportion of imported and indigenous malaria cases in Bhutan (2019-2022).*

*Source: Southeast Asia Regional Coordination Mechanism Forum, 25-24 August 2023*
The prevalence of imported malaria cases from Assam underscores the heightened risk of malaria resurgence in Bhutan. Therefore, urgent and targeted interventions are needed to mitigate transmission risks and maintain progress towards malaria elimination goals.

To achieve this, cross-border collaboration has been strongly called out in the national strategic plans of Bhutan as a step towards sustained elimination and prevention of re-establishment.

Since November of 2019, WHO and the Southeast Asia Regional Coordination Mechanism Forum (SCRMF) have facilitated cross-border collaboration meetings between India and Bhutan to identify joint challenges and opportunities in addressing malaria across borders. Enhanced surveillance, real-time data sharing, border district population screening, cross-national diagnosis, and treatment were identified as key components through this collaboration, however, implementation of these components for cross-border malaria efforts remains limited. Yet efforts towards strengthening this collaboration have been bolstered by regular coordination meetings, data sharing, health facility mapping, and targeted screening of migrant populations—primarily of Indian nationals on the Bhutan side of the border.

There are ten districts in Bhutan which share borders with Indian states including West Bengal, Assam, Arunachal Pradesh, and Sikkim. While the eastern and southwest borders of Bhutan, adjoined to Arunachal Pradesh and Sikkim in India, are designated as malaria-free zones, there are seven southern districts in Bhutan, adjoined to Assam and West Bengal in India, which are considered malaria-endemic districts: Chukha, Dagana, Jongkhar, Pemagatshel, Samdrup, Sarpang, Samtse, and Zhemgang. These districts are characterized by porous borders that facilitate population movements. Although the burden of malaria has decreased significantly in Bhutan over the past few decades, the risk of malaria outbreaks and resurgence remains high in the aforementioned districts. This is due to continued receptivity in these areas coupled with increased frequency and volume of movement in migrant populations between highly malaria-endemic states in India like Assam to malaria-free or low-burden districts in Bhutan. This poses a considerable risk of re-establishment of the malaria parasite in Bhutan.
India-Nepal Border

Nepal, like Bhutan, is actively engaged in WHO’s E-2025 initiative, with a goal to eradicate malaria by 2025. Therefore, Nepal must bolster their efforts in the final stages of elimination, particularly concentrating on malaria transmission in bordering regions, where a significant portion of cases are still detected. Over the past five years, reported malaria cases in Nepal have primarily been imported (Figure 4).

Nepal shares its borders with China to the north and several Indian states—Uttar Pradesh, Bihar, Sikkim, West Bengal, and Uttarakhand—on its southern, eastern, and western sides (Figure 5). These border areas are characterized by porous boundaries, allowing for significant population movement. Between January and June of 2023, around 98 percent of Nepal’s reported malaria cases were imported, indicating the impact of cross-border transmission(2). Nepal monitors 13 Points of Entry (PoEs) along the India border and conducted 67,301 rapid diagnostic tests (RDTs) from March 2021 to August 2023, identifying 12 malaria cases. Most cases occurred at Trinagar (6 cases) and Jamunaha (4 cases) PoEs, bordering Uttar Pradesh. Of the 476 imported cases in 2022 and 232 cases in the first half of 2023, 87 percent and 75 percent respectively originated from India, with Maharashtra (58 percent) and Gujarat (25 percent) being major sources(3).

PoE Map of Nepal (Mar 2021 - Aug 2023)

![PoE Map of Nepal](image)

In the bordering states and union territories along the India-Nepal border, evidence reveals a low Annual Blood Examination Rate (ABER), with rates less than 5 percent in Nepal districts bordering Uttar Pradesh, Bihar, and Sikkim in India. This indicates gaps in screening and early diagnosis, which can lead to complacency in surveillance and control measures further affecting the cross-border malaria surveillance.
Significant strides have been made in implementing effective cross-border interventions to eradicate malaria along the Indo-Nepal borders. Focal points in both countries, coordinated through the SRCMF Secretariat, facilitate streamlined communication. Regular local and district coordination meetings assess progress and adapt strategies as needed. Efforts are underway to harmonize diagnosis, treatment, and case management systems for a unified approach. Emphasis is on sharing case information, vector control measures, and fever screening logistics to accelerate malaria elimination.

**Microstratification of Malaria in Nepal 2022**

![Map of Microstratification of Malaria in Nepal 2022](Image)

*Figure 6. - Microstratification of malaria in Nepal. Source: Epidemiology and Disease Control Division, Government of Nepal*
Despite considerable progress in enhancing coordination between the countries, challenges persist in the joint implementation of cross-border malaria control measures along the India-Nepal and India-Bhutan borders.

These countries share common challenges, particularly the lack of effective joint surveillance. This is reflected in the absence of a standardized joint data-sharing mechanism or other potential efforts such as joint community engagement and joint vector surveillance, including coordinated distribution of Long-Lasting Insecticidal Nets (LLINs) and Indoor Residual Spraying (IRS).

Geographical challenges such as porous borders and high population mobility further complicate surveillance and screening efforts. Inadequate data standardization hampers timely reporting and response, despite existing efforts for data sharing. Formalized reporting channels and standardized indicators are urgently needed. In remote areas, manpower and logistic issues hinder malaria control efforts, while limited capacity for entomological surveillance and stakeholder involvement, including with the private sector, poses significant challenges. Additionally, community engagement, particularly among mobile migrant populations and in remote areas, is lacking.
Recommendations

Considering the ongoing efforts and the persistent gaps in cross-border malaria control, the following recommendations are proposed:

1. **Implement joint surveillance mechanism for effective management of border malaria**

Implement a joint surveillance mechanism, including standardized data-sharing, migration surveillance, and joint vector control efforts, to detect cases promptly. For example, French Guiana and Brazil have established a cross-border malaria information system (CBMIS) that collects harmonized data on malaria cases from both countries and is updated monthly. This collaboration has led to timely management of outbreaks in bordering areas and initiatives such as a bi-national campaign for the distribution of LLINs along the French Guiana-Brazil border, potentially contributing to a decline in *P. falciparum* cases from 2013(4). Similar platforms are being explored between Indonesia and Timor-Leste.

2. **Development of joint guidelines and action plans**

Develop joint guidelines and action plans for districts and sub-districts in bordering areas, providing technical guidance on various aspects of malaria control. Define the roles of stakeholders and establish joint monitoring and resource-sharing plans. For instance, Indonesia and Timor-Leste's joint action plan laid the groundwork for enhanced cooperation which underscored the importance of addressing the porous border between Nusa Tenggara Timur (Indonesia) and Timor-Leste(5). Specific activities, focused on joint data-sharing and community engagement activities, are being identified for implementation on both sides of the border.

3. **Strengthen regional coordination**

Improve communication mechanisms between neighbouring countries to facilitate the timely sharing of information and resources. Enhance the efficiency of joint malaria control efforts to reduce the risk of disease resurgence and promote public health security in the region. A notable example is the WHO Mekong Malaria Elimination (MME) programme launched in 2017. This initiative unites six countries in the Greater Mekong subregion to combat drug-resistant malaria parasites and work toward elimination by 2030. The programme focuses on advocacy, surveillance optimization, technical support provision, and innovative strategy implementation. The programme's Malaria Elimination Database enables efficient data sharing and monitoring(6).

Conclusion

In conclusion, cross-border collaboration is essential in addressing the last-mile elimination challenges posed by malaria, recognizing the movement of humans, vectors, and parasites across international borders. Key recommendations are proposed to address ongoing obstacles and persistent gaps in cross-border malaria control. These include the establishment of a joint surveillance mechanism to standardize data collection and sharing, and collaborative vector control efforts. Additionally, the development of joint guidelines and action plans for bordering districts and sub-districts is crucial for providing technical guidance and delineating stakeholder roles. Lastly, enhancing regional coordination is vital for optimizing joint malaria control efforts.

References

(2) Epidemiology and Disease Control Division, Government of Nepal
(3) Proceedings from Indo-Nepal cross-border meetings, coordinated by Southeast Asia Regional Coordination Mechanism Forum (SRCMF)