COUNTRY BRIEFING

Eliminating malaria in CAMBODIA

Cambodia has set sequential goals for malaria elimination, including elimination of Plasmodium falciparum malaria by 2020 and elimination of Plasmodium vivax malaria by 2025.

Overview

Cambodia is currently transitioning from malaria control to pre-elimination. Currently, 45 out of Cambodia’s 87 operational districts are malaria endemic. The National Malaria Control Program (NMCP), housed under the National Center for Parasitology, Entomology and Malaria Control (CNM), has made substantial progress in reducing malaria morbidity and mortality since the late 1990s, when the country emerged from three decades of political upheaval. Between 2004 and 2014, reported cases dropped from 113,855 to 5,627 and reported deaths from 382 to 18, declines of 51 percent and 95 percent, respectively. However, these figures do not include the private sector which is believed to treat up to two-thirds of patients with febrile illness. Historically, Plasmodium falciparum has caused the majority of malaria cases in Cambodia, but this trend is slowly reversing as total cases decline: in 2014, 47 percent of reported cases were due to P. vivax. Malaria transmission in Cambodia is very focal; cases are largely concentrated in and around heavily forested areas which make up 60 percent of the country’s land mass. Most cases occur during the May–November rainy season, peaking in August and September. The groups most at risk for malaria include ethnic minorities, forest fringe inhabitants as well as mobile, migrant and cross-border populations that live and/or work near the forest. These populations primarily consist of young adult males. Approximately 20 percent of the total population either live permanently in forested endemic areas or are “forest dependent” for additional income. The primary malaria vector, Anopheles dirus, is found in forest and forest fringe environments, as well as on plantations and orchards. Other significant vectors are An. minimus and An. sundaicus, which are responsible for maintaining low levels of malaria transmission in coastal areas. Cambodia’s vectors tend to rest outside, away from human structures, minimizing the impact of indoor residual spraying (IRS) and insecticide treated bed nets (ITNs) on transmission.

In light of a steady decline in Cambodia’s malaria morbidity and mortality, in 2011 the NMCP declared a goal of malaria elimination by 2025. Political support for this goal is strengthened through Cambodia’s partnership in the Asia Pacific Malaria Elimination Network (APMEN), a network composed of 18 Asia Pacific countries and other stakeholders working to eliminate malaria in the region. Cambodia’s National Strategic Plan for Elimination (NSPE) 2011–2025 outlines a strategy focused on early diagnosis and treatment, combating drug resistance, enhancing community mobilization and providing effective management of national information and surveillance systems. In 2015, CNM developed the Malaria Elimination Action Framework (MEAF) 2016–2020 which is aligned with the country’s long term strategy for malaria elimination and GMS Regional Strategy for Malaria Elimination 2015–2030. The MEAF 2016–2020 sets out the strategies, activities, and budget for eliminating P. falciparum by 2020.

Financial support for Cambodia’s elimination strategy comes primarily from the Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM). Other key donors include President’s Malaria Initiative, the Asian Development Bank, and the Bill and Melinda Gates Foundation.

At a Glance

- Total cases of malaria (47% P. vivax): 56,271
- Deaths from malaria: 18
- % population at risk: 53
- Annual parasite incidence: 3.8 cases/1,000 total population/year
- % positivity rate: 20.2 (microscopy and RDTs)
Malaria Transmission Limits

Plasmodium falciparum

Plasmodium vivax

P. falciparum/P. vivax malaria risk is classified into no risk, unstable risk of <0.1 case per 1,000 population (API) and stable risk of ≥0.1 case per 1,000 population (API). Risk was defined using health management information system data and the transmission limits were further refined using temperature and aridity data. Data from the international travel and health guidelines (ITHG) were used to identify zero risk in certain cities, islands and other administrative areas.

Progress Toward Elimination

Cambodia launched its malaria program in 1951 with a goal of national malaria elimination. Throughout the 1950s and 1960s, the program focused on malaria treatment and vector control, primarily IRS with DDT, and was strengthened by a large workforce and solid infrastructure for communication and transportation. These early efforts brought national prevalence down to 0.9 percent in the 1960s, from a previous high of 60 percent. However, growing political unrest disrupted malaria control efforts, and by the 1970s all health services had ceased and the malaria burden returned to previous levels.\textsuperscript{15,16}

In 1984, the Ministry of Health formed the vertically-operated National Malaria Center, which evolved into Cambodia’s current CNM when it became responsible for additional vector-borne diseases in the mid-1990s. The CNM activities in the 1980s were very limited due to minimal resources and ongoing civil war. By the 1990s, the situation had improved: the Ministry of Health finally received a budget allotment in 1993, the malaria program became more proactive through initiation of community-based control and education activities, and Cambodia experienced its first full year of peace in 1999 after decades of unrest.\textsuperscript{15,16}

The National Malaria Control Program developed the first 5-year strategic plan for malaria control in 2001. In the
Early period of the program, which was still mostly vertical in structure given the urgency of the post-conflict malaria situation, focus was on introducing and scaling-up proven interventions, including traditional vector control methods and early diagnosis and treatment. Innovative approaches to malaria control were also implemented: Cambodia was the first country to include the usage of artemisinin combination therapy (ACT) in its national treatment guidelines in 2000, and the first to roll out a large-scale social marketing scheme for ACTs in the private sector in 2002 which continues to this day. A village malaria worker program was launched in 2001, designed to reach the most remote and at-risk populations. Grant support from the GFATM launched in 2004, and numerous non-governmental and international organizations have provided financial, technical, and operational support over the past 15 years of the program.

When \( P. falciparum \) tolerance to artemisinin was detected along the Cambodia-Thailand border in the mid-2000s, containment became a primary focus of external funding and support. In 2008, a series of clinical trials were conducted in order to clinically confirm artemisinin resistance, characterize the resistance for use in global surveillance systems, establish a prevalence of substandard and counterfeit drugs in the region, and develop strategies to combat the spread of resistant malaria. Using these results, an artemisinin containment and elimination program was developed with the goal of stopping the spread of artemisinin-resistant parasites and ultimately eliminating \( P. falciparum \)-resistant parasites.

To achieve this, the program focused on implementing rapid case detection and effective treatment, strengthening of vector control methods, engaging the private sector and at-risk populations, and strengthening the overall delivery of health services. In 2011, evidence derived from this program was used in the development of the WHO’s Global Plan for Artemisinin Resistance Containment (GPARC). The GPARC, which was viewed as a global call to action to combat the spread of artemisinin-resistant parasites and ultimately eliminating \( P. falciparum \)-resistant parasites. As Cambodia’s political and economic situation has stabilized and the health system has been strengthened over the past several years, the NMCP has become increasingly more integrated, with implementation and decision-making concentrated at local health facilities. The program attributes the achievements of the past 15 years to this increased local

Goals:

1. Eliminate artemisinin resistant \( P. falciparum \) parasites by 2015
2. Achieve zero deaths and eliminate \( P. falciparum \) malaria by 2020
3. Eliminate all forms of malaria by 2025
ownership and accountability, as well as the commitment, advocacy and financial support from the national government, improved health infrastructure, intensified cross-border collaborations, scale-up of malaria interventions, and better community education and engagement. In the context of such considerable progress, the country’s elimination goals seem reasonable, achievable, and essential for accelerating growth and social development in Cambodia.¹

Challenges to Eliminating Malaria

Artemisinin resistance
The Cambodia-Thailand border was already home to multidrug resistant *P. falciparum* before tolerance to artemisinin was confirmed in 2006: resistance to chloroquine originated in this region in the 1950s, followed by resistance to sulfadoxine-pyrimethamine in the 1960s and mefloquine in the 1980s.⁷,²⁴,²⁵ Artemisinin-resistant parasites have been confirmed in five Cambodian provinces, and resistance to the alternative first line drug, Malarone, was recently demonstrated in Pailin Province.² The local spread of resistance is largely attributed to the unregulated sale over several decades of artemisinin monotherapies, counterfeit and substandard drugs, as well as limited access to quality ACTs through the public and private sectors.⁴ Many efforts are underway to halt the spread of resistance which include monitoring resistance at selected sentinel sites, rapid case detection, improving ITN coverage of vulnerable and hard-to-reach populations, engaging the private sector, and strengthening communication and data exchange with neighboring Thailand.⁷,²⁶,²⁷

Engaging the private sector
The overall case load in 2014 doesn’t represent the private sector burden which is believed to treat up to two-thirds of patients with febrile illness. Misdiagnosis, poor prescription practices, and the sale of substandard and counterfeit drugs are common challenges in the private sector.⁴,²¹ To improve the quality of malaria diagnosis and treatment in the private sector, the CNM launched a Public Private Mix (PPM) program in 2011 to identify and engage private sector providers, provide training on national treatment guidelines, and develop a referral and reporting system that will feed data into the public health system.²⁹ As of December 2014, there were nearly 1,200 licensed private providers enrolled in the PPM program as well as implementing partners in 34 of the 45 malaria endemic operational districts. Approximately 17,361 confirmed malaria cases were recorded by the private sector providers in 2014.² However, case data from unlicensed health and non-health outlets that provide malaria services are not captured as these outlets are not part of the PPM program. Therefore, the number of malaria cases recorded in public health sector is an underestimation of the true burden of the disease.

Cambodia has also strengthened enforcement of its 2009 ban on oral artemisinin monotherapies and counterfeit drugs in private sector outlets through regular inspections, seizures, and closures.¹,¹⁸ In 2013, only 0.1% of the outlets were reported to be stocking artemisinin monotherapies.³⁰

Accessing mobile and migrant populations
Mobile forest workers, including miners, loggers and plantation farmers, account for the highest malaria prevalence rates among the at-risk populations. They often have limited knowledge of malaria transmission, have poor access to the health care, and play an important role in the spread of artemisinin resistance.⁵,³¹ Research indicates that the majority of the Mobile and Migrant Populations (MMP) move within Cambodia, although there is cross-border movement into Thailand, making this population a priority for both

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**Eligibility for External Funding⁰⁻¹³**

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<tr>
<th>Fund/Funding Source</th>
<th>Eligibility</th>
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<tr>
<td>The Global Fund to Fight AIDS, Tuberculosis and Malaria</td>
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<tr>
<td>U.S. Government’s President’s Malaria Initiative</td>
<td>Yes*</td>
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<td>World Bank International Development Association</td>
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*PMI support for the Greater Mekong Subregion includes Cambodia; the country is not eligible for national support from PMI.

**Economic Indicators¹⁴**

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<th>Indicator</th>
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<tr>
<td>Private health expenditure as % of total health expenditure</td>
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national and regional efforts. In 2013, the program identified subgroups of the MMP and profiled their unique activities and risk factors in order to appropriately tailor interventions. Current strategies involve the deployment of mobile malaria workers into remote areas and the distribution of free or loaned ITNs to mobile workers.

Conclusion

Cambodia has experienced a significant decline in malaria morbidity and mortality since 2000, despite a long history of economic and political difficulties. Strong commitment from the national government and considerable technical and financial support from the international community have greatly contributed to the program’s success. If this level of dedication is maintained, Cambodia will be well-positioned to overcome its challenges and eliminate malaria by 2025.

Sources


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**About This Briefing**

This Country Briefing was developed by the UCSF Global Health Group’s Malaria Elimination Initiative, in partnership with the National Malaria Control Program in Cambodia. Malaria transmission risk maps were provided by the Malaria Atlas Project. This document was produced by Alistair Dawson; to send comments or for additional information about this work, please email Alistair.Dawson@ucsf.edu.