



# Eliminating malaria in HONDURAS

*Honduras reported a 90 percent decline in malaria cases between 2000 and 2014 and is working toward the regional goal of a malaria-free Latin America by 2020.*

## Overview

Honduras has made excellent progress in reducing malaria transmission over the past two decades, reporting 3,380 total cases in 2014. Deaths attributable to malaria have been rare in recent years, with most occurring among imported cases.<sup>1,2</sup> In the past, *Plasmodium vivax* caused the vast majority of annual malaria cases in Honduras, with *P. falciparum* accounting for less than 5 percent of the total. However, as transmission has become increasingly focal, the proportion of cases due to *P. falciparum* has increased significantly: in 2014, 17 percent of reported cases were *P. falciparum* infections.<sup>1,3</sup>

Malaria transmission is now concentrated in seven departments, or states, in the northern and northeastern part of the country: Gracias a Dios, Colón, Olancho, El Paraíso, Atlántida, Yoro, and Islas de la Bahía.<sup>3</sup> The southern parts of the country are much less receptive to transmission as a result of semi-desertification and subsequent reduction in breeding sites, driven by deforestation and soil erosion after decades of cattle grazing and crop cultivation.<sup>4,5</sup> The primary mosquito vectors for malaria in Honduras are *Anopheles albimanus*, present throughout the country, *An. darlingi*, present in the northern departments, and *An. pseudopunctipennis*, present in the northeastern departments.<sup>5,6</sup> Malaria transmission is unstable and occurs year-round, with most cases reported from May to October during the rainy season.<sup>7</sup>

The Honduras Secretariat of Health (SESAL) has received financial support from the Global Fund for its malaria operations since 2002, and integrated control efforts have focused on reducing transmission in the 48 municipalities with the highest burden of disease.<sup>4</sup> Honduras is a member of the Amazon Malaria Initiative (AMI), a regional program fostering collaboration in malaria prevention and control supported by the U.S. Agency for International Development (USAID), as well as a participating country of a new regional grant from the Global Fund entitled Elimination of Malaria in Mesoamerica and the Island of Hispaniola (EMMIE). In 2013, the National Malaria Program (NMP) updated its National

## At a Glance<sup>1</sup>

- 3,380** Total cases of malaria (83% *P. vivax*)
- 2** Deaths from malaria
- 63** % population at risk (total population: 8.0 million)
- 0.4** Annual parasite incidence (cases/1,000 total population/year)
- 2.2** % slide positivity rate

Strategic Plan for Malaria in accordance with the goals and strategies outlined in the EMMIE grant and is now aiming to achieve the regional goal of malaria elimination by 2020.<sup>8,9</sup>

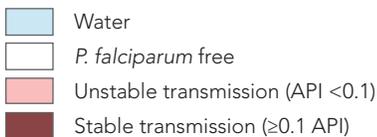
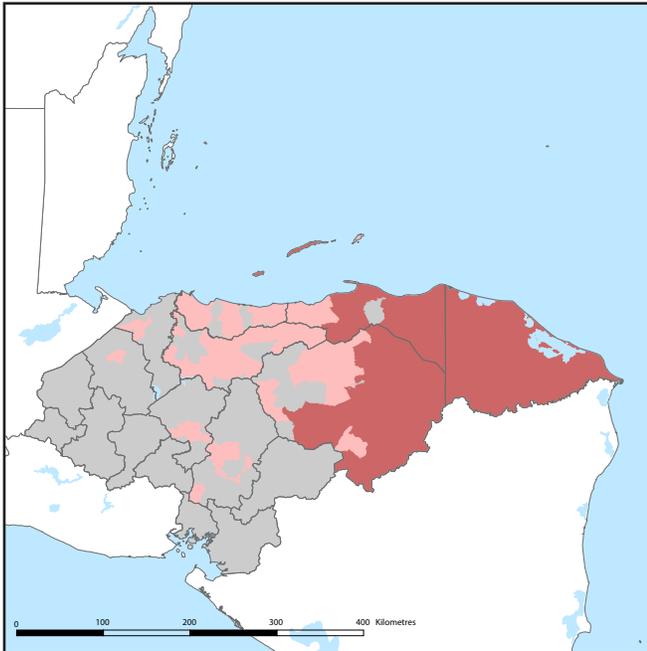
## Progress Toward Elimination

Documentation of antimalarial activities in Honduras prior to the mid-20th century eradication era is minimal, although there is record of entomological surveys going back to 1925 that established the presence of *An. darlingi* in the country.<sup>10</sup> Organized malaria control efforts began in 1951 with the launch of an indoor residual spraying (IRS) campaign across the 80 percent of the country that was considered malarious. *An. albimanus* resistance to dieldrin was detected right away and replaced with DDT; full coverage with DDT in 6-month cycles was achieved in 1959. Surveillance through passive case detection slowly ramped up during the 1950s. In 1956, only 74 cases were reported and confirmed, rising to 190 in 1957; by 1959, 14,650 cases were reported and 6,675 confirmed. It is unclear whether this rise in reported cases was due entirely to improved surveillance or if there was a simultaneous increase in transmission. During this period, *P. falciparum* caused about half of all confirmed cases. The

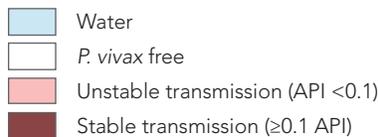
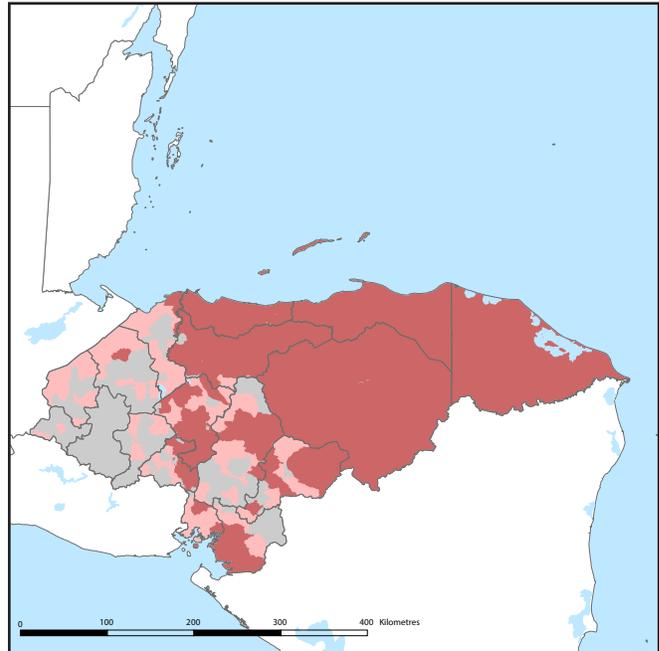


## Malaria Transmission Limits

### *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.

technical component of the malaria program was quite small in 1959, consisting of just one physician, one entomologist, and three entomological assistants. However, the rest of the program was robust, with over 350 field and operations personnel.<sup>11,12</sup>

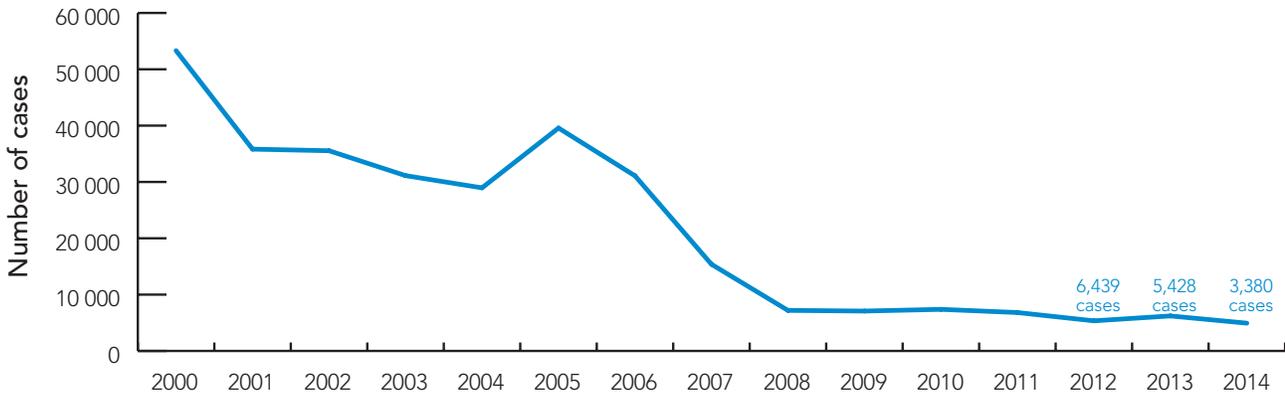
Despite evidence of DDT resistance appearing in the late 1950s, the IRS program was successful in bringing case burden down, and by 1962, much of the country had entered a consolidation phase, in which transmission rates were minimal and programmatic emphasis shifted to intensified surveillance. Pockets of transmission remained, however, primarily in areas of extensive agricultural development where several insecticides had been used indiscriminately for many

years and resistance was well established. These areas also experienced a considerable influx of migrant workers from neighboring endemic countries. By 1963, over 7,000 cases were confirmed, mostly confined to two locations where resistance and vector density were both quite high. In response, the Honduras malaria program began using malathion in the most problematic areas, and it conducted a three-month trial of mass drug administration with chloroquine and primaquine that was successful in interrupting transmission among a targeted population of 7,000 people.<sup>11</sup>

In 1970, the NMP began regulating the use of DDT in areas of known insecticide resistance, and in the following year DDT was replaced with alternative insecticides, including



## Reported Malaria Cases\*



Honduras has experienced a steady and impressive decline in malaria burden since 2000. The slowdown in recent years may be due to improved surveillance as well as growing social unrest in areas with highest transmission.

\*Honduras does not distinguish between local and imported when reporting case numbers.

Source: World Health Organization, World Malaria Report 2015

**Goal:<sup>2,9</sup> Eliminate *P. falciparum* transmission by 2017**  
**Eliminate *P. vivax* transmission by 2020, in accordance with the regional goal of zero local malaria cases in Mesoamerica and Hispaniola by 2020\***

\*Participating countries include: Belize, Costa Rica, Dominican Republic, El Salvador, Guatemala, Haiti, Honduras, Mexico, Nicaragua, Panama

malathion and propoxur; DDT was eventually banned a decade later.<sup>13</sup> The spray program was planned and executed well, but due to a lack of funding, the NMP was unable to purchase the necessary quantity of insecticides and could not achieve sufficient coverage with IRS. The malaria situation in Honduras deteriorated in the mid-1970s, with 48,804 cases reported in 1976. In the late 1970s, malaria operations were integrated into general health services and a wide network of volunteer collaborators were recruited to conduct passive surveillance and diagnose and treat malaria within their communities. This improved community participation in antimalarial activities, and by 1985, cases were down to about 30,000. However, integration also resulted in drastic reductions in the malaria budget which diminished operational capacity, a phenomenon seen throughout the region during the 1980s and 1990s.<sup>13,14</sup> In addition, insecticide resistance continued to spread, and in the 1980s the NMP tested

various biolarvicides as alternatives to IRS. Several had good results, but were prohibitively expensive and difficult to maintain at a large scale.<sup>15</sup>

Malaria incidence in Honduras climbed in the 1990s as a result of several factors, primarily a lack of financial and human resources to maintain quality interventions in areas with high transmission. The agriculture and manufacturing sectors expanded during this period, leading to a large influx of workers, many from surrounding malaria endemic areas. Environmental changes as a result of this development increased the number of man-made breeding sites for *An. albimanus*. By 1996, malaria cases in the country reached a peak of 91,799.<sup>1,13</sup>

In the late 1990s, Honduras signed on to participate in a regional project developed by the Global Environment Facility of the United Nations Environment Programme to



find sustainable, cost-effective alternatives to DDT and other insecticides for malaria control in Mexico and Central America. Shortly after, in 2000, the Roll Back Malaria Initiative launched in Central America and Hispaniola, and the Honduras NMP received technical support from WHO's Pan American Health Organization (PAHO) in developing a national workplan for malaria control. Participation in these regional projects helped the NMP strengthen its malaria interventions, and between 2000 and 2001, cases declined by 32 percent.<sup>13,16</sup>

Honduras began receiving financial support for its malaria operations in 2002 through a Round 1 grant from the Global Fund. The first phase of the grant focused on 58 municipalities with the highest malaria burden and sought to improve diagnosis, treatment, and prevention activities through strengthened epidemiological and entomological surveillance, monitoring and evaluation, and supervision. By 2007, malaria transmission had been interrupted in 24 of the target municipalities and national cases had declined by 39 percent compared to 2002.<sup>16</sup> The Round 1 grant was subsequently renewed, focusing on the 48 municipalities that accounted for 95 percent of all cases in 2007. These problem areas in the northern and northeastern part of the country are remote and difficult to access, with high poverty rates, poor infrastructure, and rapidly changing ecology conducive to *An. albimanus* breeding due to the expansion of agricultural plantations.<sup>6</sup> In accordance with the priorities laid out in the Honduras NMP's National Strategic Plan for Malaria 2014–2017, programmatic focus in these 48 municipalities will be sustained through: focal stratification; integrated vector management including long-lasting insecticidal nets (LLINs) and larval control; strengthened epidemiological surveillance to detect outbreaks; expanded diagnosis and prompt treatment; improved malaria promotion and communication with an emphasis on intersectoral and community collaboration; and overall strengthening of the health system.<sup>2</sup>

In addition, with support from AMI, Honduras is currently working to expand coverage with rapid diagnostic tests in remote areas where microscopy services are unavailable, characterize insecticide resistance, and monitor the efficacy of LLINs.<sup>8</sup> Under the EMMIE regional grant, which supports the acceleration toward elimination in the ten participating countries through the provision of results-based financing, Honduras is further strengthening its elimination plan and ensuring strategic alignment with the national-level grant from the Global Fund: the national grant will focus

on reducing transmission in the 48 high-burden municipalities, while the EMMIE grant will support elimination efforts in the remaining 250 municipalities. Honduras will benefit from standardized approaches to diagnostics, treatment and integrated vector management, regional surveillance strengthening and data sharing, and an operational research framework designed to address the common challenges faced by countries in Mesoamerica.<sup>9,17</sup>

## Challenges to Eliminating Malaria

### Eligibility for External Funding<sup>18–20</sup>

The Global Fund to Fight AIDS, Tuberculosis and Malaria	Yes*
U.S. Government's President's Malaria Initiative	No
World Bank International Development Association	Yes

\*Honduras is eligible for both regional and national malaria grants from the Global Fund.

### Economic Indicators<sup>21</sup>

GNI per capita (US\$)	\$2,280
Country income classification	Lower middle
Total health expenditure per capita (US\$)	\$196
Total expenditure on health as % of GDP	9
Private health expenditure as % of total health expenditure	51

### Lack of access to vulnerable groups

The areas of Honduras with the highest malaria transmission are also the most difficult to reach, geographically. Populations in these areas are largely poor, highly mobile, and/or ethnic minorities that do not have regular access to health services; thus, coverage with malaria interventions is irregular and community participation is weak. Compounding the problem, land dispute conflicts have led to violence and displacement of local populations in areas that have experienced malaria outbreaks in recent years.<sup>17</sup>



### Insecticide and drug resistance

As in most Central American countries, anopheline resistance to the most common insecticides is widespread as a result of indiscriminate overuse in the agricultural sector. Recent insecticide resistance studies indicate that the most common malaria vector in Honduras, *An. albimanus*, is still largely susceptible to deltamethrin, the primary agent used by the NMP. However, some areas of the country have reported signs of resistance, requiring entomological surveillance and a search for affordable and effective insecticide alternatives.<sup>2</sup>

Therapeutic efficacy studies carried out in Honduras since 2010 indicate that chloroquine remains effective against *P. falciparum* to date. Yet the department of Gracias a Dios, where malaria transmission remains relatively high, has become a major destination for migrants from South America where chloroquine resistance is widespread. In addition, chloroquine resistance phenotypes have recently been detected in *P. falciparum* in the La Mosquitia region of

Nicaragua adjacent to Gracias a Dios. Strengthened surveillance, rapid diagnosis and effective treatment, and continued therapeutic efficacy studies are essential to ensure that chloroquine resistance does not spread.<sup>22,23</sup>

### Conclusion

Although Honduras has one of the highest malaria burdens of all Central American countries, it has experienced a dramatic decline in cases since 2000. With continued strengthening of its elimination program, as well as the significant boost in financial and political support for malaria elimination within the region, Honduras is in an excellent position to achieve national elimination in accordance with the regional 2020 goal.

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## About This Briefing

This Country Briefing was developed by the UCSF Global Health Group's Malaria Elimination Initiative (MEI). To send comments or for additional information about this work, please email [Anne.Bulchis@ucsf.edu](mailto:Anne.Bulchis@ucsf.edu).



The **Global Health Group** at the University of California, San Francisco is an 'action tank' dedicated to translating new approaches into large-scale action that improves the lives of millions of people. Launched in 2007, the UCSF Global Health Group's **Malaria Elimination Initiative (MEI)** works at global, regional, and national levels to accelerate progress toward malaria elimination in countries and regions that are paving the way for global malaria eradication. The MEI believes that global eradication of malaria is possible within a generation.

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malaria atlas project

The **Malaria Atlas Project (MAP)** provided the malaria transmission maps. MAP is committed to disseminating information on malaria risk, in partnership with malaria endemic countries, to guide malaria control and elimination globally.

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