



Eliminating malaria in GUATEMALA

Guatemala reported a 91 percent decline in malaria cases between 2000 and 2014 and is working toward achieving national malaria elimination by the 2020 regional goal.

Overview

Guatemala has had remarkable success in reducing its malaria burden over the past fifteen years, from a high of 53,311 reported cases in 2000 to 4,931 in 2014, a decline of 91 percent. Only one death due to malaria has been reported since 2007.¹ Until recently, the vast majority of the country's malaria cases occurred in the northern departments, or states, of Alta Verapaz, Peten, and Quiche along the Mexican border, but in the past decade, cases have increasingly been concentrated in the southern coastal departments of Escuintla, Retalhuleu, and Suchitepequez. In 2012, 41 percent of total cases and 100 percent of *Plasmodium falciparum* cases in Guatemala were reported from Escuintla department.^{2,3} Nearly all reported cases in 2014 were caused by *P. vivax*; historically, *P. falciparum* has accounted for less than 5 percent of annual cases.¹ The primary mosquito vectors for malaria in Guatemala are *Anopheles albimanus* and *An. darlingi*, present throughout the country, and *An. pseudopunctipennis* and *An. vestitipennis*, present in the northern parts of the country. Transmission is perennial, with most cases occurring between May and October, and the malaria burden is highest among rural, indigenous populations, and migrant agricultural workers.^{2,4}

Guatemala has received financial support from the Global Fund for its malaria operations since 2005, and interventions have centered on the mobilization of community volunteers to access, educate, and treat remote, high-risk populations. In 2006, the Ministry of Public Health and Social Welfare (MSPAS) began efforts to eliminate *P. falciparum* and reduce *P. vivax* transmission by 2015 using a phased approach by department health area.^{5,6} Guatemala 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). With the

At a Glance¹

- 4,931** Total cases of malaria (98% *P. vivax*)
- 1** Deaths from malaria (last death reported in 2007)
- 77** % population at risk (total population: 16 million)
- 0.3** Annual parasite incidence (cases/1,000 total population/year)
- 1.6** % slide positivity rate

support of both initiatives, Guatemala has strengthened its malaria elimination strategy and is now aiming to achieve the regional goal of elimination by 2020.^{7,8}

Progress Toward Elimination

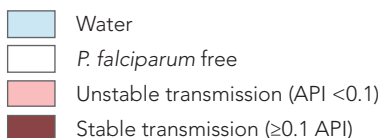
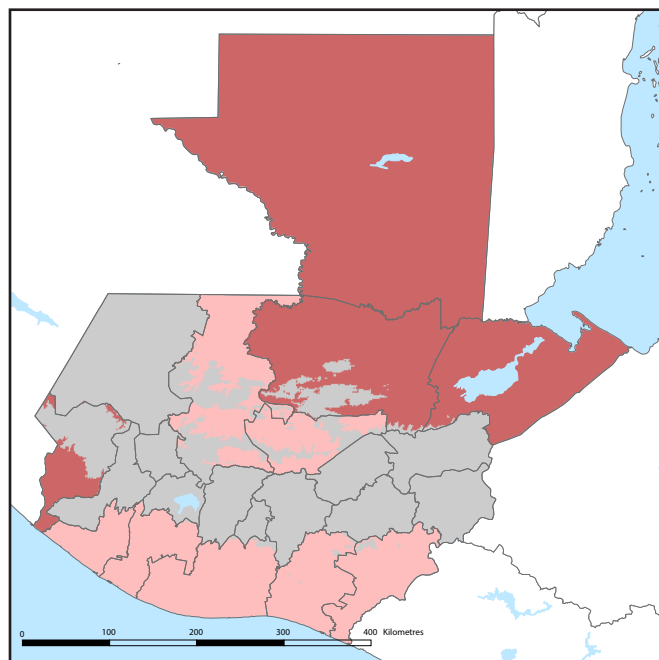
Documentation of antimalarial activities in Guatemala prior to the mid-20th century eradication era is minimal, although there is record of entomological surveys going back to the late 1920s. The presence of *An. darlingi* in Guatemala was first established in the 1930s and was thought to be associated with a rise in severe malaria cases among temporary construction workers, despite an overall decline in cases between 1931 and 1938.⁹

An annual indoor residual spraying (IRS) campaign using dieldrin was launched in Guatemala in 1956. *An. albimanus* resistance to dieldrin was detected almost immediately, and by 1958, it had been replaced with DDT, applied biannually. IRS had a dramatic effect on the malaria burden: over 12,000 cases were reported in 1958, dropping to 3,387 in 1960. However, due to its excessive use by the agricultural industry, resistance to DDT developed quickly, particularly in areas

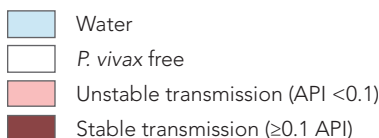
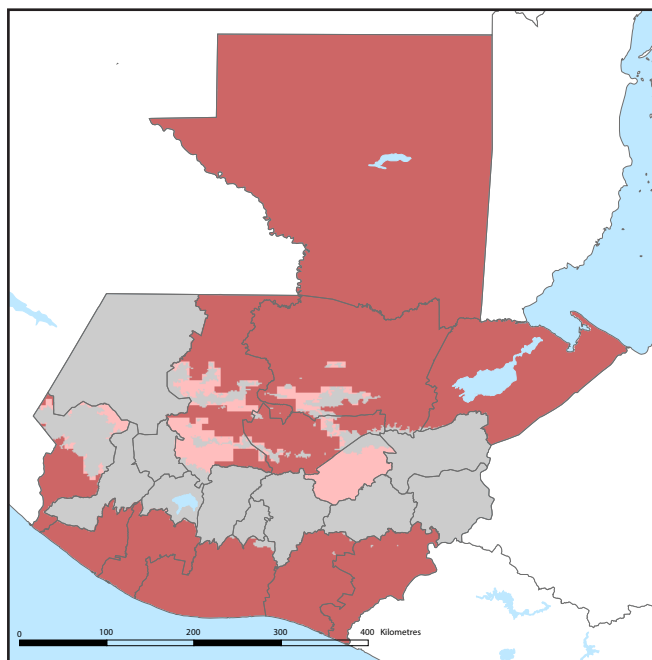


Malaria Transmission Limits

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.

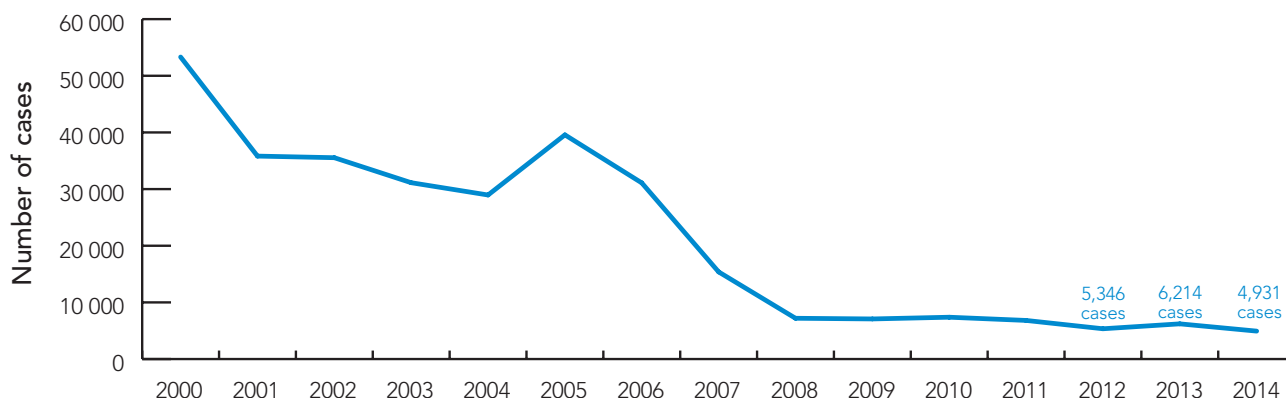
where cotton was cultivated.¹⁰ Large malaria outbreaks occurred in the early 1960s as new agricultural settlements were established and the Pacific coastal areas of Guatemala were rapidly colonized. By 1963, over 15,000 cases were reported, mostly along the newly settled Pacific coast. In response to the rise in cases, antilarval interventions were applied in areas where dieldrin and DDT resistance had already been established. Mass drug administration using chloroquine and primaquine was also used to reduce transmission.¹⁰

By 1970, some areas of Guatemala were making good progress toward elimination but others were plagued with difficulties due to widespread insecticide resistance. Also at this time, the country was in the midst of a protracted

civil war that disrupted health services and displaced large populations of indigenous people and poor farmers, the groups most at risk for malaria.^{11,12} Regional political unrest during the 1970s and 1980s, as well as seasonal hurricanes that caused flooding and property damage, led to high rates of population movement throughout Central America, which also contributed to an increase in malaria transmission in Guatemala. By 1982, 77,375 cases were reported, but by 1996, when the Guatemalan civil war concluded, cases were down to 20,268. This decline may have been a result of health system decentralization and the subsequent recruitment of a large network of community volunteers to diagnose and treat malaria patients.^{4,13}



Reported Malaria Cases*



The sharp decline in cases after 2005 corresponds with the onset of Global Fund support for Guatemala's malaria control program. Surveillance and case finding activities have progressively intensified in the past few years, resulting in a relatively stable case burden since 2008.

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

Source: World Health Organization, World Malaria Report 2015

Goals:^{3,8} 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

In the 1990s, significant changes in agricultural practices were occurring throughout Central America as rice and cotton crops were gradually being replaced with palm and bananas, forested areas were cleared to accommodate expanding plantations, and greater numbers of workers were migrating across national borders for employment opportunities. These changes led to an increase in malaria transmission throughout the region. Simultaneously, regional funding for malaria declined by over 50 percent between 1992 and 1998.¹³ The spike in cases in Guatemala to 53,311 in 2000 was likely a result of these factors. Additional programmatic limitations at the time included a lack of political commitment to malaria control, limited coverage of services in endemic areas, minimal community awareness of malaria prevention activities, and insufficient intersectoral cooperation.¹⁴

However, cases began to decline after 2000, and this trend accelerated with the onset of Global Fund grant support in 2005.¹ A Round 4 grant targeted five areas with the highest

malaria incidence, all in the northernmost departments of Guatemala with mostly rural and indigenous populations. Primary interventions included scaling up distribution of insecticide-treated nets (ITNs) in combination with locally-appropriate larval control, environmental management, and/or focal IRS; expanding the network of community volunteers to improve coverage of diagnosis and treatment; strengthening the epidemiological information system to guide targeting of interventions; and overall improvement of health service capacity to promote community action and intersectoral cooperation.⁵ By the end of the Round 4 grant in 2009, national malaria cases had declined by 82 percent relative to 2005. In addition, as a result of the targeted interventions, the areas with the highest incidence of malaria in Guatemala were no longer in the north. Instead, by 2008, the Pacific coastal areas in the south were reporting the highest numbers of cases, due to expansion of sugarcane plantations, increased migration, and rapid proliferation of artificial



breeding sites for *An. albimanus* as a result of agricultural development.^{1,2}

In 2010, a Round 9 grant from the Global Fund expanded support to 22 stratified health areas, half of which were targeted for pre-elimination, with a new focus on the southern coastal departments of Escuintla, Retalhuleu, and Suchitepequez. New interventions included distribution of long-lasting insecticidal nets (LLINs), monitoring of antimalarial drug resistance, mass education campaigns, creation of micro-copy centers to facilitate prompt diagnosis and treatment, and expansion of community-based larval control, including larvivorous fish, *Bacillus sphaericus*, chemical larvicides, and environmental management.⁶ Priorities for grant renewal after 2014 include active case detection and community-level stratification of risk areas based on improved surveillance, followed by aggressive scale-up of interventions tailored to each newly-defined stratum.³

With support from AMI, Guatemala is also working to improve supply chain management, quality assurance for malaria diagnostics, and entomological capacity by conducting trainings and workshops for malaria personnel. In addition, the program has recently undergone an assessment to identify priorities and relevant stakeholders in order to develop a national communication strategy for elimination.⁷ Under the EMMIE regional grant, which supports the acceleration toward elimination in the ten participating countries through the provision of results-based financing, Guatemala is further strengthening its elimination plan and ensuring strategic alignment with the national-level grant from the Global Fund. The country 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.⁸

Eligibility for External Funding^{15–17}

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

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

Economic Indicators¹⁸

GNI per capita (US\$)	\$3,410
Country income classification	Lower middle
Total health expenditure per capita (US\$)	\$222
Total expenditure on health as % of GDP	6
Private health expenditure as % of total health expenditure	62

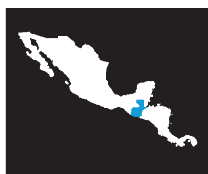
Challenges to Eliminating Malaria

Population movement and malaria importation

A large percentage of laborers in Guatemala are seasonal agriculture workers who travel throughout Central America with the harvest season, moving into and out of malaria endemic areas and increasing the rate of malaria importation across borders. In addition, changing trends in agricultural practices have increased seasonal migration in recent years.^{3,14} Importation is a serious threat, as most of the country, approximately 75 percent, remains receptive to malaria transmission. The regional EMMIE grant will help facilitate collaboration across borders to address importation, an issue that all countries in Central America are currently facing.⁸

Conclusion

Guatemala has made great progress in reducing its malaria burden since 2000 and is working to improve program capacity to address the ongoing threat of malaria importation within its borders. With the significant boost in financial and political support for malaria elimination within the region, Guatemala is in an excellent position to achieve national elimination in accordance with the regional 2020 goal.



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Transmission Limits Maps Sources

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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.



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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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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