



Eliminating malaria in PANAMA

Panama reported 874 malaria cases in 2014, which is a 16 percent decline in cases since 2000.

Overview

Panama achieved a 16 percent decrease in reported malaria cases between 2000 and 2014, from 1,036 cases to 874 cases.¹ In 2008, only four cases of *P. falciparum* were reported, three of which were imported from Africa and one from neighboring Colombia. Panamá Province, transected by the Panama Canal and home to nearly half the country's population, reported 34 percent of cases in 2008. Darién Province, along Panama's border with Colombia, reported 28 percent of cases in 2008; the remaining cases were scattered throughout the country.²

Anopheles albimanus is the primary malaria vector; its larvae are salt-tolerant and found in permanent water habitats.³ Although transmission occurs year-round, there is increased transmission during the May-through-November rainy season.⁴ Eighty-seven percent of Panama is below 700 meters in altitude, which allows for year-round vector breeding and transmission.⁵

More than half the reported cases in 2008 occurred in children under 15 years of age. Fifty percent of cases occurred in indigenous people, and all cases were attributed to those living in rural areas.² There have been only 14 reported deaths due to malaria in the last decade, with zero deaths reported for 2014.¹

Progress Toward Elimination

Malaria control efforts began in 1904 when the United States (US) began constructing the Panama Canal, which was to be used mainly for military travel. Areas of the Panama Canal provided ideal conditions for mosquito breeding, and by 1906 more than 80 percent of employees working on the Canal had been hospitalized for malaria.⁸ In response, the US implemented vector control activities to reduce transmission of malaria including the draining of ponds and swamps, fumigation, and mosquito bed net distribution.⁹ Quinine was administered to canal construction workers as a malaria prophylaxis, and

At a Glance¹

- 874** Reported cases of malaria
(99% *P. vivax*)
- 0** Deaths from malaria
(last reported death in 2012)
- 5** % of population at risk
(total population: 3.9 million)
- 0.2** Annual parasite incidence
(cases/1,000 total population/year)
- 1.2** % Slide positivity rate

by 1912 only 10 percent of workers were hospitalized due to malaria.^{4, 8}

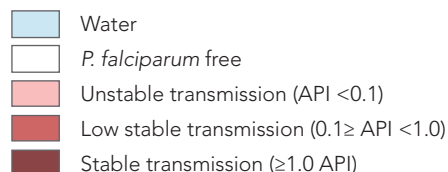
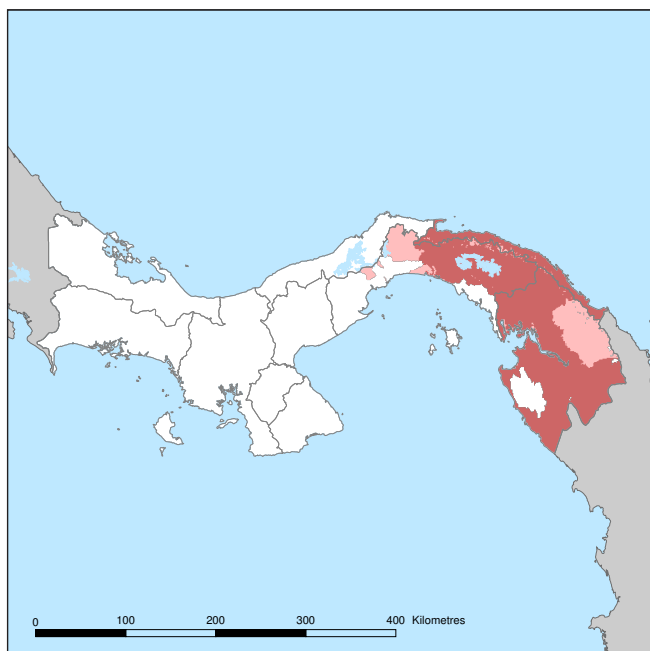
When the canal was completed in 1914, there was an increase in malaria among US soldiers in the Canal Zone, although incidence remained low in Panamanians. In 1918, the US Army developed a malaria control force to control malaria in Panama. The Gorgas Memorial Laboratory was established in 1930 as a center for research and malaria surveillance activities. In 1939, incidence in US military personnel in Panama reached a low of 22 cases of malaria per 1,000 population. Indoor residual spraying with DDT was introduced in 1944 as a primary vector control method, and by 1950 malaria cases in US troops in Panama were the lowest on record at less than 5 cases per 1,000 population.⁴

In 1956, the National Malaria Eradication Service (SNEM) was formed to diagnose and treat malaria and manage vector control activities such as insecticide spraying.¹⁰ In 1957, Panama reported 7,500 cases; by 1968, through spraying with insecticides (of which DDT was most effective), malaria had declined by 80 percent to only 1,625 cases.¹⁰ A *P. falciparum* outbreak in 1969 resulted in nearly 6,000 cases. The SNEM responded by

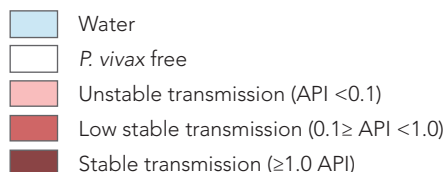
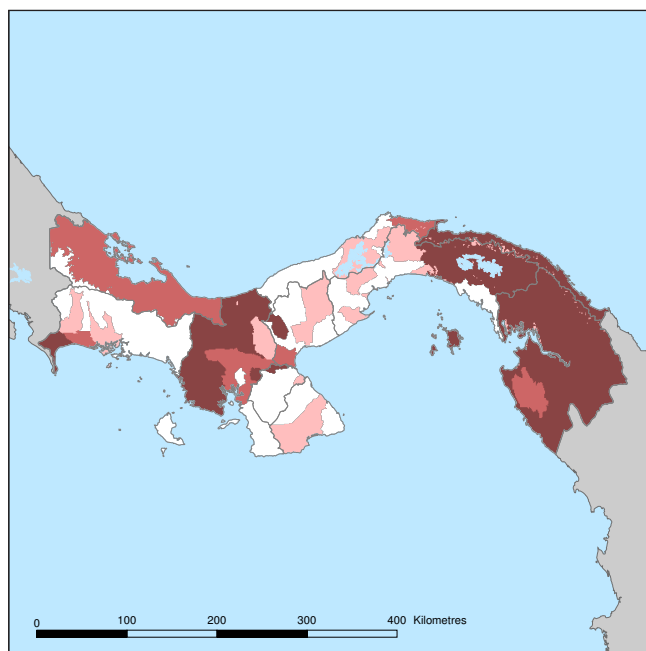


Malaria Transmission Limits

Plasmodium falciparum



Plasmodium vivax



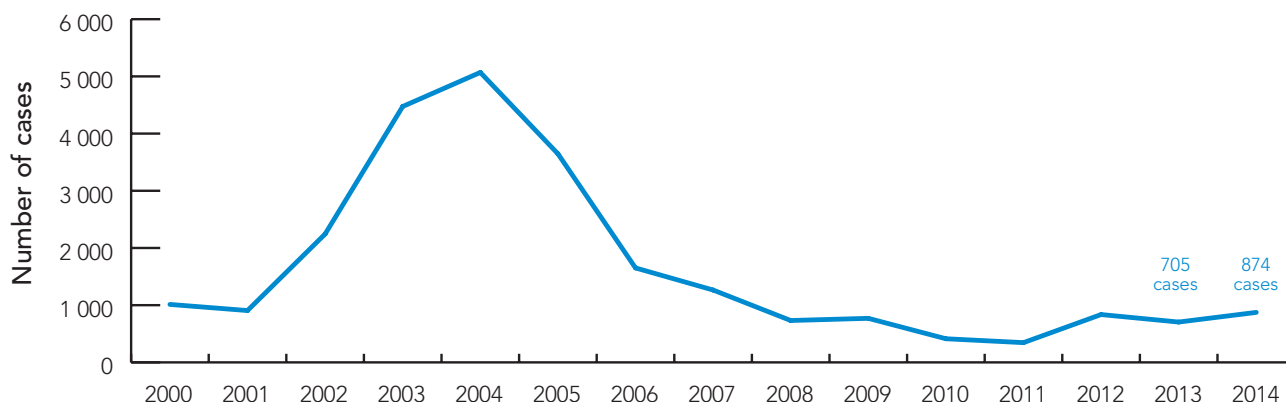
P. falciparum/*P. vivax* malaria risk is classified into no risk, unstable risk of <0.1 case per 1,000 population (API), low stable risk of ≥0.1 to <1.0 case per 1,000 population (API), and stable risk of ≥1.0 case per 1,000 population (API). Risk was defined using health management information system 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.

intensifying the use of DDT, and reported cases fell to 819 by 1972.¹⁰ In 1974, Panama developed concerns about DDT use, and SNEM began to phase out DDT and employ an alternative insecticide. From 1974 to 1984, there was a 90 percent decrease in the number of cases¹⁰ and only 126 cases were reported in 1985.⁹ However, from 1985 to 1986, malaria cases rapidly increased from 126 cases to 1,060 cases, likely due to changes in the insecticide used for indoor residual spraying.¹⁰ However, as a result of strengthened vector control measures implemented following the substantial increase in cases, the number of cases declined by 58 percent between 1987 to 1997 from 1,195 cases to 505 cases.¹⁰

From 2001 to 2004, Panama's tourism industry developed, causing significant changes in landscape and extensive deforestation. Panama experienced a malaria outbreak with a sixfold increase in reported cases during this time, from 928 cases to 5,095 cases,⁶ of which only 17 percent (881 cases) were *P. falciparum*.¹¹ Today, Panama is employing a quarterly insecticide spraying program in targeted endemic regions and has again achieved significant reductions in malaria as it works towards national elimination.^{1,2}



Reported Malaria Cases



Although malaria incidence has remained low over the past two decades, a major malaria outbreak from 2001 to 2005 resulted in more than 60 percent of all the cases reported over the past 35 years.⁶

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

Source: World Health Organization, World Malaria Report 2015

Goal:⁷ 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

Eligibility for External Funding^{11–13}

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

Economic Indicators¹⁴

GNI per capita (US\$)	\$11,130
Country income classification	Upper middle
Total health expenditure per capita (US\$)	\$796
Total expenditure on health as % of GDP	7
Private health expenditure as % total health expenditure	32

Challenges to Eliminating Malaria

International migrant populations

Darién Province in eastern Panama reported nearly 30 percent of all cases in 2008.¹⁶ This province borders Colombia's western region, which is highly malarious.¹¹ Since the 1960s, internal conflict within Colombia has prompted many Colombians to cross into Panama. The threat of malaria importation remains high although Panama has been working to control its border with military resources. Colombians in Panama are highly mobile and often live in temporary housing structures, which presents a challenge to malaria surveillance and successful prevention efforts.

In addition to importation risk from Colombia, many international migrants from malaria-endemic countries pass through the Panama Canal every day. Panama acts as a land bridge between Central and South America and is a passageway for most ships traveling between the Atlantic and Pacific oceans, thereby increasing opportunities for malaria importation into Panama.



Rural and indigenous populations

Darién Province, a vast area of lush forests nourished by plentiful rainfalls, is home to several of Panama's indigenous groups. With poor infrastructure, there is a critical lack of health care facilities and medical professionals, which makes malaria surveillance and treatment difficult.¹¹ Providing the indigenous population with greater access to health services will be critical in eliminating malaria.

Conclusion

Panama has a long history of successful malaria control. The risk of imported malaria, especially from malaria-endemic Colombia, remains significant. Panama is targeting endemic regions with quarterly insecticide spraying to mitigate this risk. And with continued progress in malaria control, Panama will move even closer to national elimination.

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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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