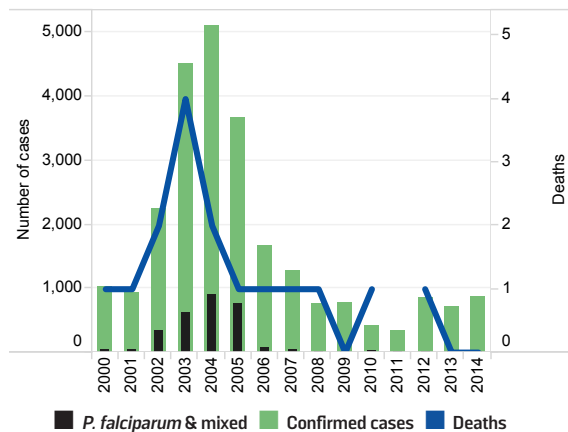


PANAMA

In Panama, there were 874 cases reported in 2014, representing only a 15.6% decrease from 2000 (Figures 1-2). While the WHA 58.2 target for MDG 6C was not met as of 2014, efforts to combat past malaria epidemics have been made. Ten years ago, malaria incidence was at a record high in Panama, but has since declined by 82.9% in 2014. In the past 2 years, there have been no reported deaths due to malaria. The slide positivity rate was 1.08 in 2014.

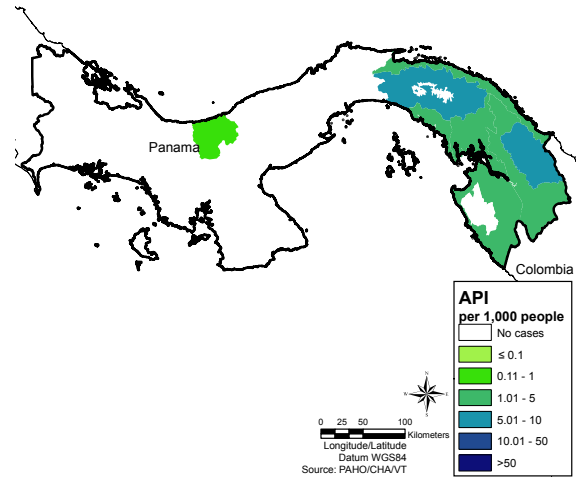
Figure 2. Number of cases and deaths due to malaria in Panama, 2000-2014



As of 2014, malaria was highly prevalent in the eastern area of the country, particularly in the district of Chepo where 49% of all malaria cases were reported (Figures 1 and 3). The *comarcas* of Guna Yala and the province of Darien are two other areas that report the majority of the malaria cases.

Anopheles albimanus is the primary malaria vector but its abundance varies across the country. A recent study conducted in the Guna Yala area

Figure 1. Malaria by Annual Parasite Index (API) at district level (ADM2), Panama 2014



demonstrated that although *An. punctimacula* and *An. aquasalis* are abundant, only *An. albimanus* was found to be infected with *Plasmodium* species (1). Around 99% of cases in 2014 were caused by *P. vivax* infections. *P. falciparum* used to cause a significant number of cases, but has declined since 2005. All cases due to that species have been imported from other countries since 2011. An outbreak due to imported *P. falciparum* infections from Colombia was reported in Darien in 2010 and the area remains at risk of such outbreaks in the future.

Overall, men are more at risk of contracting malaria as compared to women (age standardized incidence of 25.3 malaria cases per 100,000 men versus 14.9 cases in women during 2013-2014) (Figures 4 and 5). However, the incidences vary across age

Figure 3. Districts with the highest number of malaria cases in Panama, 2012-2014

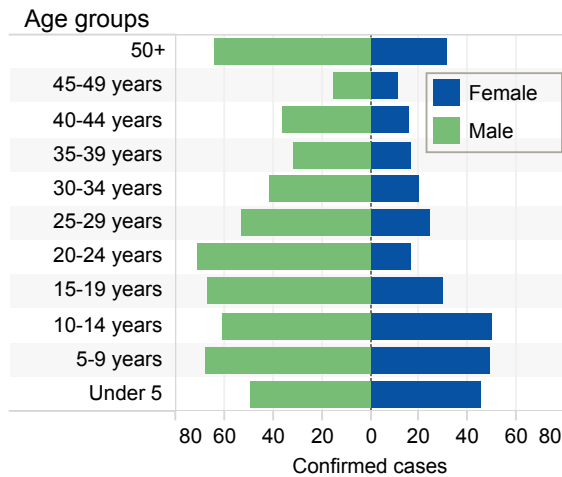
District	Province	2012	2013	2014
Chepo	Panama	160	332	432
Kuna Yala	Kuna Yala	55	156	153
Pinogana	Darien	173	92	111
Santa Catalina	Ngobe-Bugle	...	23	61
Chepigana	Darien	44	58	50
Cemaco	Embera-Wounaan	46	...	46
Chiman	Panama	0	0	12
Panama	Panama	43	4	5
Santa Fe	Veraguas	6	5	2
Bugaba	Chiriqui	0	0	1

Legend: Decrease (green bar), Increase (blue bar), Insufficient data/No change (grey bar). Scale: 0, 200, 400 cases.

"..." indicates unavailable data

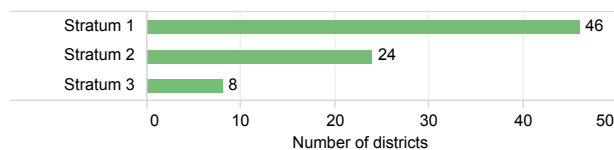
groups, being highest in men of 20–24 years old (43 cases per 100,000 men), indicating possible malaria transmission linked to occupational activities. On the other hand, transmission in women is highest in those under 5 years old (24 cases per 100,000 women) owing to increased transmission within the household. This contrasting risk could be explained by the dichotomy in the epidemiology varying across malaria endemic areas in the country.

Figure 4. Malaria cases by age and sex in Panama, 2014



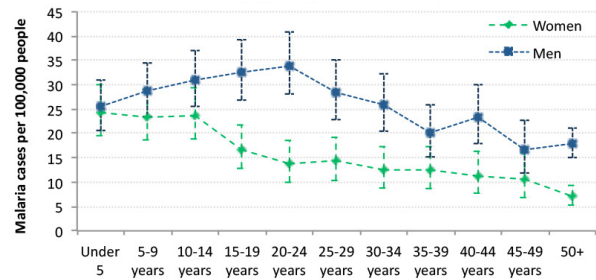
There were an estimated 8 malaria cases in pregnant women per 100,000 pregnant women in 2014, which was lower, albeit non-significantly, than that in non-pregnant women in the reproductive age group of 15–49 years (14.28 malaria cases per 100,000 women). Based on the reported data, pregnant women did not have a higher risk of having malaria even when the data were pooled for the period 2010–2014. This is in contrast with the higher incidence in children less than 5 years old and perhaps points to under-diagnosis of pregnancy status in malaria patients.

Figure 6. Number of districts (ADM2) by strata in Panama, 2012-2014



*Stratum 1: No autochthonous malaria case in 2012-2014;
 Stratum 2: <1 case per 1000 inhabitants in 2012-2014;
 Stratum 3: >1 case per 1000 inhabitants in 2012-2014

Figure 5. Malaria incidence by age and sex in Panama, 2013-2014



Priority Groups

In Panama, many ethnic groups live in areas known as *comarcas*, which are autonomous territories for these populations. Guna Yala and Madungandi are *comarcas* in the northeast Atlantic coast with large indigenous populations. The Chepo district adjoins the *comarca* of Madungandi and reported the most malaria cases followed by the *comarca* of Guna Yala. Many of the problems in the *comarcas* are believed to stem from cultural and language barriers leading to challenges in access to healthcare.

Diagnosis and Treatment

Although rapid diagnostic tests have been introduced in the country, they are still only used in laboratories. Diagnosis is not quick as the time taken between onset of symptoms and result of diagnosis was over 3 days in more than 75% of the cases during 2011–2014 (Figure 8). This is despite the fact that over 90% of the suspected cases tested for malaria and over 70% of confirmed cases during 2012–2014 have been detected through active surveillance with the rest detected through passive surveillance at health centers. Most malarious areas in

Figure 7. Blood slides examined and SPR in Panama, 2000-2014

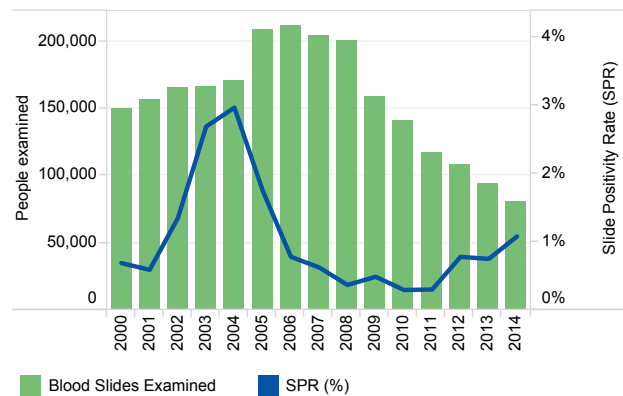
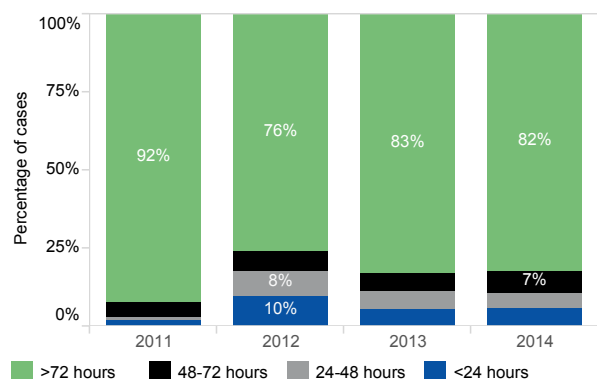


Figure 8. Time between first symptom and initiation of treatment in Panama, 2011-2014



the country are hard to reach; thus, the introduction of RDTs is of utmost importance. Panama currently plans to introduce RDTs on a massive scale in 2016. In 2012, annual blood examination rates (ABER) of 10% of total population or higher were reported from 24 districts, although 10 of these had no confirmed cases reported in 2011 or 2012. A reorientation since then has decreased the total number of slides examined with an improved focus on active case surveillance. All but one of these 10 districts reported 0 cases for 2013 and 2014 and the ABER has declined in all of these.

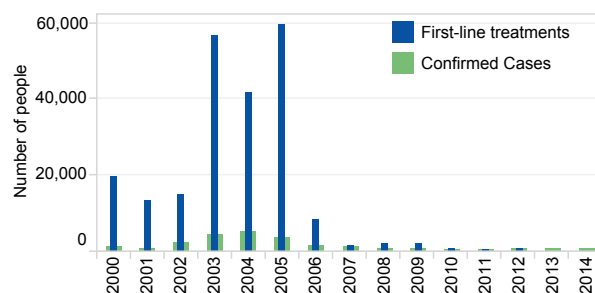
Chloroquine and primaquine are used as first-line treatment for *P. vivax* infections, with primaquine administered for 7 days in a majority of the country although a 14-day treatment is also recommended by the national guidelines. The country also used a fixed dose combination of chloroquine and primaquine in 2014. Panama is the only country in Central America to use artemether-lumefantrine as the first-line treatment for *P. falciparum*; all infections by this species in recent years have been imported from other countries of South America and Africa, mostly Colombia where resistance to chloroquine is well documented. Mass drug administration (MDA) is still conducted by the country. Supervised treatment with chloroquine and primaquine for 7 days is given en masse to localities considered at high-risk or having an outbreak.

In many hard-to-reach areas, people are treated at the time of taking a blood smear while results are awaited; however, most cases are given the full dose of radical treatment even when being treated presumptively. Thus, information about the number of first-line treatments given is inaccurate and grossly underestimated.

Vector Control

Indoor residual spraying (IRS) is currently used for vector control and protected almost 28,000 people in 2014

Figure 9. Number of malaria cases and those treated with first-line treatment Panama, 2000-2014

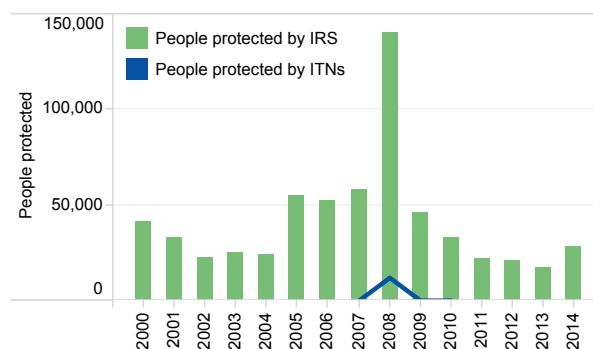


*Data was unavailable for 2013 and 2014.

(Figure 10). However, coverage at the locality level is low and often inadequate (<80% of households). Cultural barriers are significant reasons why IRS coverage has not been high in malarious areas where ethnic populations predominate. Insecticide-treated bed nets (ITNs) were introduced in 2008 but have not been distributed after that year. Cultural resistance to ITN use was linked to having no impact in areas where ITNs were distributed. However, the type of bed net distributed (regular bed net) did not take into account the fact that most people in these areas sleep in hammocks for which normal ITNs are inadequate. Use of ITNs specially designed for hammocks should be strongly considered as another tool for prevention.

On the other hand, insecticide resistance studies conducted in the malaria endemic localities of Madungandi *comarca* found that the principal malaria vector, *An. albimanus*, had confirmed resistance to pyrethroids (deltamethrin, lambda-cyhalothrin, cyfluthrin and cypermethrin) but was susceptible to organophosphates and carbamates. Studies to ascertain

Figure 10. People protected by IRS and by ITNs in Panama, 2000-2014



the mechanism of resistance are needed in Madungandi to define the future course of action in that area. Efforts are required to establish a program for regular surveillance of insecticide susceptibility in the country.

Funding

The government has provided the majority of funding for malaria, with additional support provided by the USAID-funded AMI/RAVREDA project and PAHO/WHO in the past. During 2014, the government reportedly provided almost US\$11 million for malaria (Figure 11). In 2014, the Global Fund provided US\$200,000 as startup funds for the country as part of the EMMIE initiative, although not all of these funds were used in 2014. USAID provided over US\$75,000 in funding with technical support provided by PAHO/WHO and other AMI partner agencies – CDC, MSH, USP, and Links Media.

Figure 11. Funding for malaria in Panama, 2000-2014

