

Malaria in the Region of the Americas

After increasing for the past two years, the number of malaria cases fell to below 500,000 in the year 2011, continuing the general trend of decrease over the last decade. The decrease has been far greater in *Plasmodium falciparum* and mixed infections (57%) when compared to *P. vivax* infections (23%). Of the 21 malaria endemic countries in the region, 12 have already reached the Millennium Development Goal (MDG)-6 of reduction by the year 2015 of 75% of the morbidity due to malaria based on year 2000 disease burden. Another 5 countries are on the way of meeting their MDG goal in the coming years. However four countries have shown increase in the number of cases in the same period. Guyana, which was showing decline in malaria over most part of the last decade, has recently shown an increasing trend highlighting the need for sustainment of malaria control strategies at the country level. Mortality has shown a similar trend with 113 deaths due to malaria reported in the year 2011. Guyana, Nicaragua and Venezuela reported an increase in number of malaria cases in 2011 compared to 2010.

Six countries are presently in the pre-elimination phase, including Argentina, Costa Rica, El Salvador, Ecuador, Mexico and Paraguay. Four of these reported less than 20 cases of malaria in 2011. The rest are in control phase presently but some are in the process of transitioning into pre-elimination phase. Although malaria at district level has decreased in almost all of those with the highest burden of malaria between 2010 and 2011, those from Venezuela have shown an increase, in particular Sifontes and Sucre. Areas of high transmission of malaria presently are focalised in the adjoining Amazon forest areas of Brazil, Venezuela, Guyana, Peru, Bolivia and Colombia. Also the pacific coastal region of Colombia and adjoining eastern parts of Honduras and Nicaragua had an annual parasite index of more than 10 cases per 1000 inhabitants at risk. La Gomera, Masagua and Zacapa in Guatemala, Batopilas in Mexico, the Bay Islands and Trujillo in Honduras, Benitez and Pedernales in Venezuela, and Aguarico in Ecuador were other focal yet isolated areas which reported a high incidence of malaria.

The proportion of cases in children below the age of 15 years has decreased from 35% in 2009 to 33 and 32% in 2010 and 2011 respectively. They also accounted for 21% of deaths in 2011. Geriatric population, people above 50 years of age, accounted for not more than 10% of malaria cases in any of the years since 2008, yet 33% of the deaths occurred among this age group in 2011. Men are more affected by malaria and only 37% of the cases in 2011 were in women, a proportion similar to that in previous years.

Indoor residual spraying (IRS) and use of insecticide treated bednets (ITNs) are being implemented in almost all the endemic countries of the region. Suriname and Guyana don't use IRS for malaria control. In 2011, data for IRS activities was not available for Colombia, French Guiana, Peru and Haiti. In the rest of the countries, a declining trend in IRS coverage is observable, largely on account of decreasing incidence of malaria and increasing number of areas with low transmission of malaria. ITNs as a strategy is not used for malaria control in low risk areas and countries like Argentina, Belize, El Salvador, Mexico, Panama and Paraguay. Data was not available for the year 2011 for Colombia, Guyana, Haiti and Peru. A declining trend was seen in the use of ITNs in the rest of the countries, especially Guatemala.

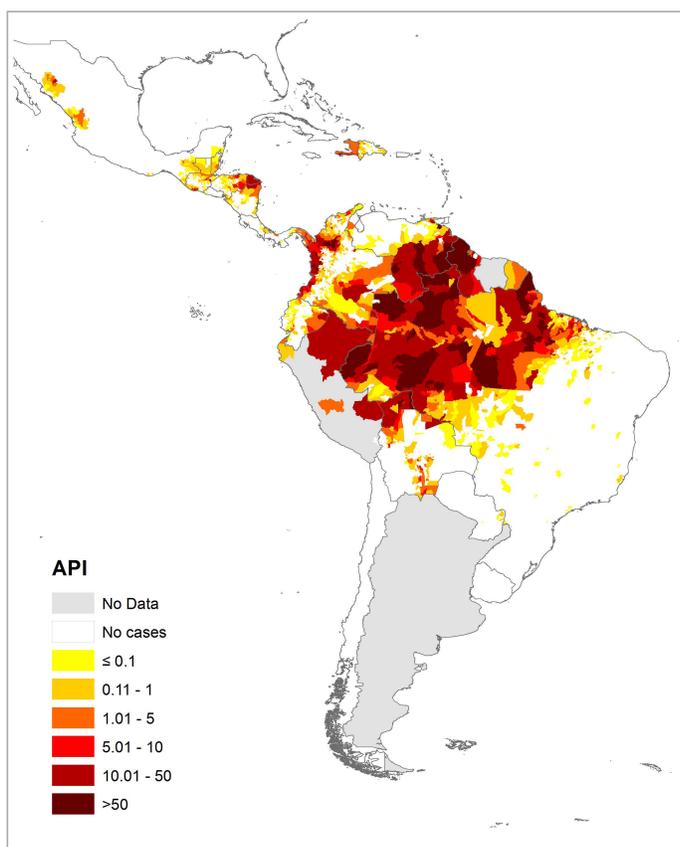
Information for funding of malaria control was not available for Colombia, French Guiana, Haiti, Peru and Suriname. Funding for malaria control, in countries for which data was available, increased slightly in 2011 over the year 2009 and 2010. However, government funding for these same countries decreased in 2011 from 164 million US\$ to 152 million US\$. Especially Bolivia, Venezuela, Guyana, Paraguay and Dominican Republic reported decreased in malaria control from government sources. The Global Fund and USAID are the major financing agencies for malaria control in the region.

Top 30 districts (ADM-2) with Malaria- 2011

District	Country	Confirmed Cases
Sifontes	Venezuela	28,143
Porto Velho	Brazil	15,915
Manaus	Brazil	14,649
Cametá	Brazil	14,220
Anajás	Brazil	13,530
Oeiras do Pará	Brazil	12,732
Moblissa/La Reconnaissance	Guyana	10,942
Cruzeiro do Sul	Brazil	10,842
Itaituba	Brazil	7,711
El Bagre	Colombia	7,549
São Gabriel da Cachoeira	Brazil	4,901
Curralinho	Brazil	4,570
Barima/Amakura	Guyana	4,350
Bagre	Brazil	4,254
Candeias do Jamarí	Brazil	4,191
Mâncio Lima	Brazil	4,182
Jacareacanga	Brazil	4,128
Pacajá	Brazil	4,085
Oiapoque	Brazil	3,528
Anapu	Brazil	3,214
Sucre	Venezuela	3,208
Breves	Brazil	3,203
Eirunepé	Brazil	3,166
Goianésia do Pará	Brazil	3,035
Rodrigues Alves	Brazil	2,887
Zaragoza	Colombia	2,886
Tierralta	Colombia	2,839
CEDENO	Venezuela	2,816
Cantá	Brazil	2,770
Lower Potaro/Ladysmith Cre.	Guyana	2,718

Malaria in the Region of Americas by API, 2011

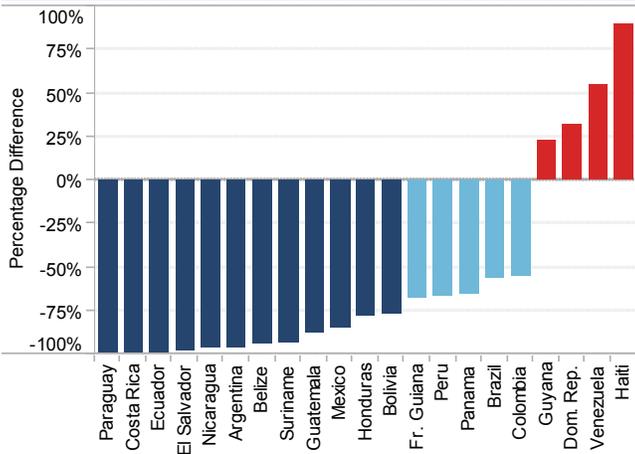
Data at ADM-1 was used for French Guiana, Guyana and Haiti. Partial data at ADM-1 level was available for Peru.



* Data at ADM2 level not available for 2011 for Peru, Suriname, Argentina, Haiti and French Guyana

Of the 21 malaria endemic countries in the region, Chloroquine is used as the first line of therapy for *Plasmodium falciparum* in 9 of these. All of these countries belong to the Central American sub-region, the island of Hispaniola or Mexico, areas where no known resistance to the drug exists. Panama is the only country using sulfadoxine-pyrimethamine combination as a first line of therapy for *P. falciparum* infections. Artemether-Lumafantrine combination is used in six of the countries while the rest use Artesunate-Mefloquine as the treatment of choice for the same parasite species. Chloroquine and Primaquine, with varying total number of days of treatment, is used as the first line of treatment in the region in all the countries for *P. vivax*.

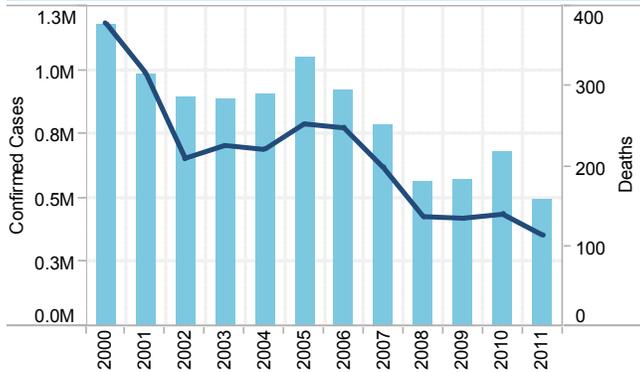
Malaria morbidity and mortality, 2000 - 2011



Dom. Rep. - Dominican Republic
Fr. Guiana - French Guiana

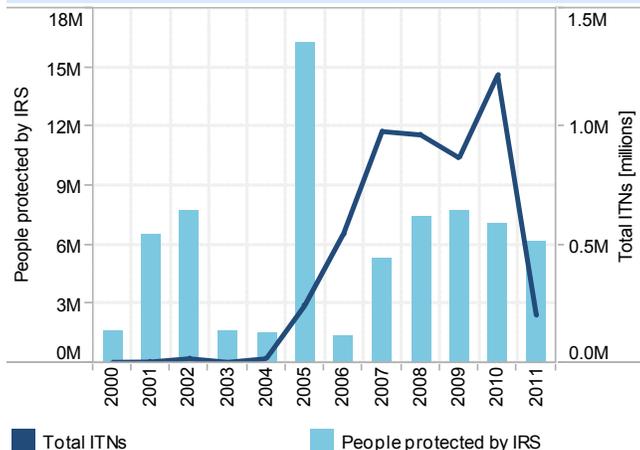
50-75% Decrease >75% Decrease Increase

Malaria morbidity and mortality, 2000 - 2011



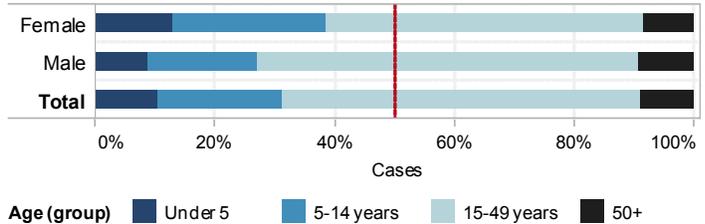
Confirmed Cases Deaths

People protected by indoor residual spraying and insecticide treated bednets distributed, 2000 - 2011



Total ITNs People protected by IRS

Cases by age and sex, 2011

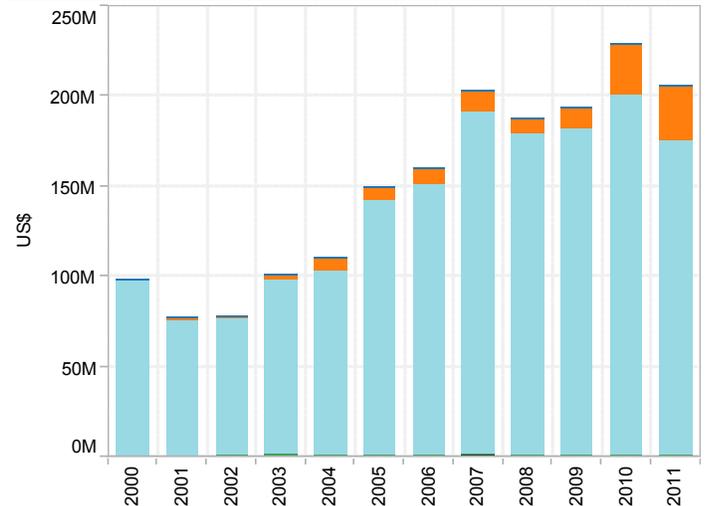


First line of treatment for malaria by species type

Country	<i>P. falciparum</i>	<i>P. vivax</i>
Argentina	-	CQ+PQ
Belize	CQ+PQ	CQ+PQ
Bolivia	AS+MQ+PQ	CQ+PQ(14)
Brazil	AL+PQ; AS+MQ+PQ	CQ+PQ(7); CQ+PQ(14)
Colombia	AL	CQ+PQ(14)
Costa Rica	CQ+PQ	CQ+PQ(7); CQ+PQ(14)
Dominican Repub.	CQ+PQ(3d)	CQ+PQ(14)
Ecuador	AL	CQ+PQ(14)
El Salvador	CQ+PQ(1d)	CQ+PQ
French Guiana	AL	CQ+PQ
Guatemala	CQ+PQ(3d)	CQ+PQ(14)
Guyana	AL+PQ	CQ+PQ(14)
Haiti	CQ+PQ(1d)	CQ+PQ(14)
Honduras	CQ+PQ(1d)	CQ+PQ(14)
Mexico	CQ+PQ	CQ+PQ
Nicaragua	CQ+PQ(7)	CQ+PQ(7)
Panama	CQ+PQ(1d)	CQ+PQ(7); CQ+PQ(14)
Paraguay	AL	CQ+PQ
Peru	AS+MQ	CQ+PQ
Suriname	AL+PQ(1d)	CQ+PQ(14)
Venezuela	AS+MQ+PQ(1d)	CQ+PQ(14)

CQ- Chloroquine PQ- Primaquine QN- Quinine
 MQ- Mefloquine CL- Clindamycin SP- Sulfadoxine & Pyrimethamine
 AM- Artemether AS- Artesunate AL- Artemether & Lumefantrine
 For *P. falciparum* (1d) = 45mg of Primaquine in one dose on first day
 (3d) = 15 mg of Primaquine per day for 3 days
 (7) = 30 mg of Primaquine per day for 7 days
 For *P. vivax* (7) = 30mg of Primaquine per day for 7 days
 (14) = 15 mg of Primaquine per day for 14 days

Financing for Malaria control, 2000 - 2011



* Data for 2011 missing for Colombia, French Guiana, Haiti, Peru and Suriname

Bilaterals Government budget UN Agencies
 Global Fund USAID World Bank

Malaria in countries in pre-elimination phase in the region of the Americas, 2009-2011

Country	Year	Total Population at Risk	Slides Examined	Confirmed Cases	P. falciparum and mixed infections	Slide Positivity Rate (x100)	Annual Parasite Index (x1000)
Argentina	2009	86	0		
	2010	190,000	2,547	72	0	2.83	0.38
	2011	250,000	7,872	18	0	0.23	0.07
Costa Rica	2009	1,608,630	4,829	262	1	5.43	0.16
	2010	1,619,302	15,599	114	2	0.73	0.16
	2011	820,254	10,690	17	4	0.16	0.02
Ecuador	2009	7,124,284	446,740	4,120	551	0.92	0.58
	2010	8,743,051	481,030	1,888	258	0.39	0.22
	2011	6,569,649	460,785	1,233	296	0.27	0.19
El Salvador	2009	1,424,551	83,031	20	1	0.02	0.00
	2010	1,509,275	115,256	23	2	0.02	0.02
	2011	433,047	100,883	15	3	0.01	0.03
Mexico	2009	5,596,605	1,240,087	2,703	1	0.22	0.48
	2010	3,937,446	1,192,081	1,226	0	0.10	0.31
	2011	4,428,831	1,035,424	1,124	0	0.11	0.25
Paraguay	2009	707,406	64,660	91	10	0.14	0.13
	2010	223,209	62,178	27	5	0.04	0.12
	2011	412,724	48,611	10	7	0.02	0.02

Malaria in countries in control phase in the region of the Americas, 2009-2011

Country	Year	Total Population at Risk	Slides Examined	Confirmed Cases	P. falciparum and mixed infections	Slide Positivity Rate (x100)	Annual Parasite Index (x1000)
Belize	2009	233,100	26,051	256	1	0.98	1.13
	2010	277,831	27,366	150	1	0.55	0.54
	2011	277,831	22,996	79	1	0.34	0.28
Bolivia	2009	1,151,925	132,633	9,743	574	7.35	8.46
	2010	3,283,487	133,463	13,769	808	10.32	4.19
	2011	1,321,178	150,662	7,143	231	4.74	5.41
Brazil	2009	48,311,980	2,620,787	309,316	50,933	11.80	6.40
	2010	44,126,491	2,713,459	334,708	51,050	12.34	7.59
	2011	38,163,081	2,568,081	267,045	35,285	10.40	7.00
Colombia	2009	10,157,351	428,004	79,347	22,141	18.52	7.81
	2010	10,244,320	521,342	117,650	34,334	22.57	11.48
	2011	10,252,284	396,861	64,436	15,404	16.24	6.29
Dominican Republic	2009	7,841,755	353,336	1,643	1,643	0.46	0.21
	2010	8,464,920	469,052	2,482	2,480	0.53	0.29
	2011	6,663,374	421,405	1,616	1,614	0.38	0.24
French Guiana	2009	163,113	20,065	3,462	424	7.14	21.22
	2010	231,151	14,373	1,608	216	4.96	6.96
	2011	209,823	14,429	1,209	161	3.50	5.76
Guatemala	2009	6,209,463	154,652	7,080	56	4.58	1.14
	2010	6,539,604	235,075	7,198	35	3.06	1.10
	2011	5,883,321	195,080	6,822	67	3.50	1.16
Guyana	2009	698,795	169,309	13,673	7,542	8.08	19.57
	2010	698,795	212,863	22,935	14,401	10.77	32.82
	2011	698,795	201,693	29,471	20,309	14.61	42.17
Haiti	2009	9,923,243	270,438	49,535	49,535	18.32	4.99
	2010	9,923,243	270,427	84,153	84,153	31.12	8.48
	2011	9,928,243	...	32,048	0		3.23
Honduras	2009	3,268,268	108,522	9,313	1,382	8.58	2.85
	2010	5,768,357	145,674	9,685	985	6.65	1.68
	2011	5,690,024	151,785	7,615	605	5.02	1.34
Nicaragua	2009	3,672,678	544,717	610	93	0.11	0.17
	2010	2,925,874	535,914	692	154	0.13	0.24
	2011	2,575,374	521,904	925	150	0.18	0.36
Panama	2009	3,335,353	158,481	778	3	0.49	0.23
	2010	2,649,531	141,038	418	20	0.30	0.16
	2011	1,624,216	116,588	354	1	0.30	0.22
Peru	2009	5,134,667	892,990	42,645	4,044	4.15	7.18
	2010	6,134,666	989,842	33,778	2,374	3.19	5.51
	2011	4,499,236	...	22,878	2,596		5.08
Suriname	2009	63,000	33,279	2,499	929	7.51	31.04
	2010	78,400	16,533	1,771	721	10.71	22.59
	2011	63,351	15,135	795	331	5.25	12.55
Venezuela	2009	6,682,093	370,258	35,828	8,776	9.68	5.36
	2010	5,398,659	400,495	45,155	12,385	11.27	8.36
	2011	5,705,160	382,303	45,824	11,167	11.99	8.03

... No data available