

7 | Dominican Republic

Overview of the situation

Figures 1-5

The Island of Hispaniola, shared by Haiti and the Dominican Republic, is the only Caribbean area endemic to malaria. In 2008, the two countries together reported 38,615 cases; of these Haiti accounted for 95% and the Dominican Republic for 1,840 cases, 169 of them among people residing in Haiti. All of the Island's malaria is caused by *Plasmodium falciparum* and the strains of the parasite in circulation are still sensitive to chloroquine. Although a large percentage of provinces in the Dominican Republic reported cases, malaria transmission is especially intense in Dajabon Province, in the northwest part of the country, along the Haitian border. A total of 563 cases were registered in Dajabon province in 2008, followed by San Juan Province with 281 cases. Agricultural activities and tourist-oriented construction activities, with the consequent movement of temporary workers, are responsible for the malaria transmission dynamics.

The only malaria vector on Hispaniola Island, *Anopheles albimanus*, is more zoophilic than anthropophilic, with a pattern of nocturnal hematophagic activity outside dwellings, mainly between 7 and 12 in the night. Stagnant pools, usually natural, with vegetation and exposure to the sun are the principal breeding sites of this vector. Investigations made by the National Center for Tropical Disease Control reveal that

this vector is still sensitive to organophosphate insecticides (malathion and fenitrothion) and to pyrethroids (permethrin, deltamethrin and cypermethrin).

Morbidity and mortality trends

Figures 4 – 9

Malaria cases increased gradually between 2001 and 2005, peaking in 2005 at 3,837 cases. Since then malaria has declined steadily. Despite a sizeable reduction in cases over the past four years, the number is still higher than that in year 2000. In 2008, there were 49% more cases than 2000. Although there were fewer deaths from malaria in the past year than in previous years, the case fatality rate is high and was the region's highest in 2008 (considering only *P. falciparum* cases in the other countries). The malaria control program in 2008, as part of its strategy to improve the situation, prepared a guidebook on malaria diagnosis, management and prevention for those health personnel who treat malaria cases.

Malaria-related hospitalisations, which are important for analyzing fatality, have not been recorded in recent years. As a result, an indicator was added in 2008 to the EPI-42 form: health establishment where the malaria case was hospitalized. The effects of that change in the system will be evaluated in deciding whether to incorporate it in 2009.

Geographic distribution

Figures 1, 12-19

An analysis of the situation at the municipal level reveals that malaria cases are heavily concentrated in Dajabon, which accounts for 32% of the country's burden of disease. It is followed by the municipality of San Juan de Maguana, in San Juan province, with 209 cases. Together, these two municipalities account for 45% of the malaria cases. In 2008, 77 municipalities reported more than one case of malaria, but only 30 reported more than 10 cases that year, and only 5 had over 50 malaria cases each. This offers a favorable scenario for efforts to further reduce malaria transmission areas and to control its geographic dissemination.

In the Dominican Republic malaria API is low when compared to other countries in the region. Dajabon municipality had the country's highest API with 19 cases per 1,000 inhabitants at risk. Jimani, in Independencia Province along the southern Haitian border had the second highest API of 8.2 cases per 1,000 inhabitants at risk.

The decline in cases has led to a reduction of the population considered to be at high risk of contracting malaria in the country; 27,989 people were at high risk in 2008.

Malaria in specific groups

Figures 25-28

As in past years, in 2008, malaria was most prevalent among males (64%) and in working age-group (64% in 15 - 49 year of age). Malaria in children under the age of 5 accounted for only 4% of the cases.

Although the program does not record pregnancy status of women malaria cases, the de-

mand for pregnancy care reported by health centers shows that this is not a significant problem.

A total of 55% of the malaria cases in 2008 were of rural origin, a figure significantly smaller compared to previous years (83% in 2002). This reduction can be mainly attributed to the fact that the proportion of malaria burden in Dajabon municipality, compared to the total cases in the country, has increased and that in this municipality urban cases represent 79% of the total, unlike the situation in the rest of the country.

In 2008, 25% of the cases registered were among Haitian citizens, generally resident sugarcane workers (*bateyes*) and construction laborers. The percentage was significantly lower this year than in past years.

Diagnosis and treatment

Figures 20-24, 29-30

A total of 381,010 slides were examined in 2008, similar to the annual figures over the past 10 years. The SPR was lower than in 2007 and, as in other countries of Central America, is significantly low. The SPR in Dajabon Province was slightly higher than that of the rest of the country, but continues to be low (1.8%). The large number of slides examined in provinces with very few cases, like Monte Cristi, with an SPR of 0.2%, is noteworthy.

There are no records of use of RDTs for malaria diagnosis in 2008, nor were they used previously in the country. Regarding the timing of parasitological diagnosis, the automated epidemiological malaria surveillance system does not register the date of onset of symptoms (reported in epidemiological investigation form - EPI-21), but this data will be included when the system is next revised in 2009.

However, the system does register the timing of the parasitological diagnosis, defined as the length of time between taking the first blood slide sample and its microscopic examination. In 2008, 86% of the samples were examined within the first 72 hours after having been taken and only 15%, more than 72 hours later.

The *P. falciparum* strains responsible for malaria morbidity on the island continue to be responsive to treatment with chloroquine; thus, ACTs are not used. The malaria treatment regimen used on the island consists of chloroquine + primaquine. A proposal has been made to develop a strategy for monitoring resistance to chloroquine in the country, based on experiences from monitoring drug resistance in the Amazon region.

Prevention and vector control

Figures 31-33

The country's prevention and vector control strategy is based on IRS, spatial applications of insecticides, and larvicide applications in *A. albimanus* breeding sites, principally during malaria outbreaks. The insecticides most frequently used are fenitrothion, malathion, deltamethrin and cypermethrin. In 2008, the country used ITNs

for the first time and 6,000 were distributed in Dajabon Municipality. In the same year plans were made to analyze vector sensitivity to insecticides and the efficacy and effectiveness of ITNs used in Dajabon.

Financing of malaria control

Figure 34

Malaria control activities have been financed by government funds, together with small external grants from PAHO in 2001 and 2003 and the Carter Center in 2008. Government funding began to gradually dwindle starting in 2000 and reached its lowest level in 2004. Since then these funds have progressively increased. In 2008, the malaria control proposal sent by the country to Global Fund was approved, amounting to 8.7 million U.S. dollars in total.

Figure 1. Number of cases by ADM 2 level (municipality, district), 2008

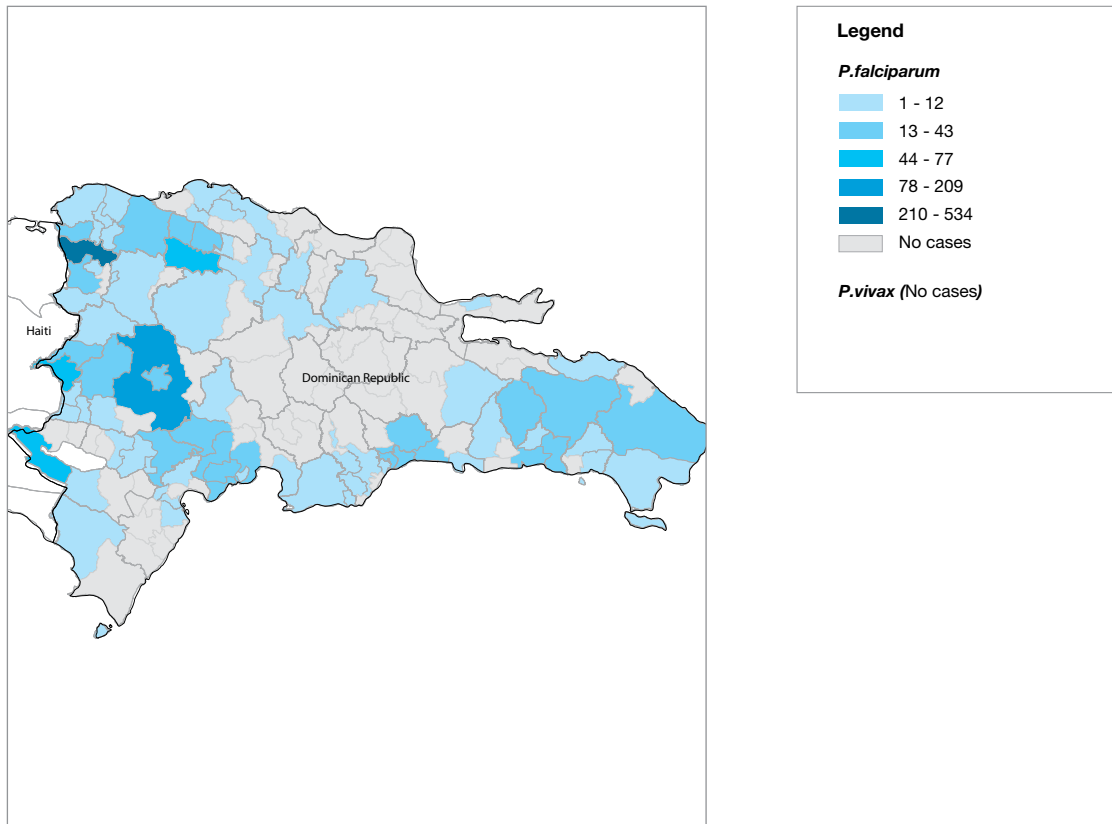


Figure 2. Proportion of cases by species, 2008

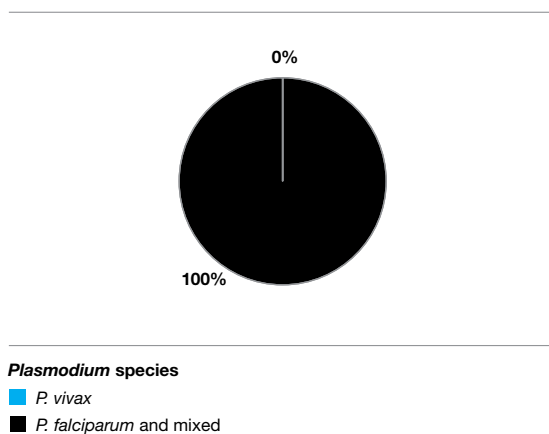
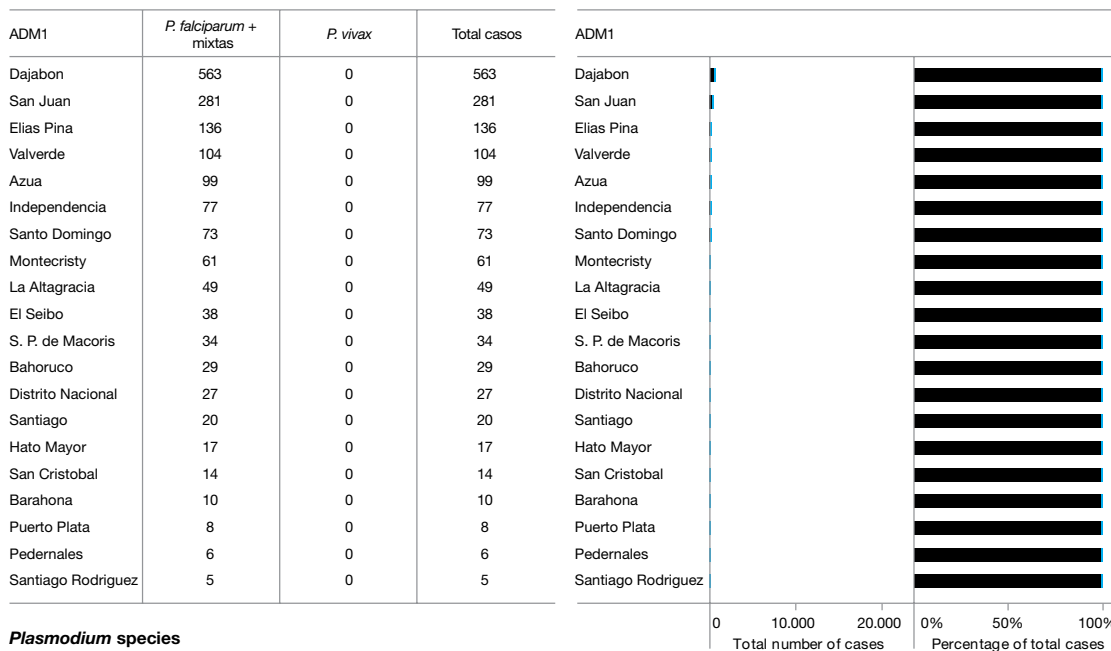


Figure 3. Number of malaria cases by species by ADM1 level in 2008



* See Annex A for a complete list.

Figure 4. Number of cases by species, 2000-2008

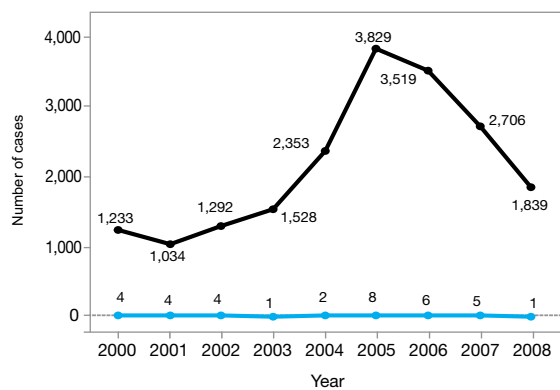


Figure 5. Number of malaria cases, 2000-2008

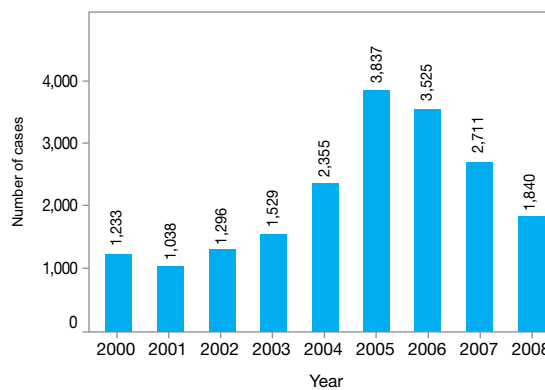


Figure 6. Number of malaria deaths, 2000-2008

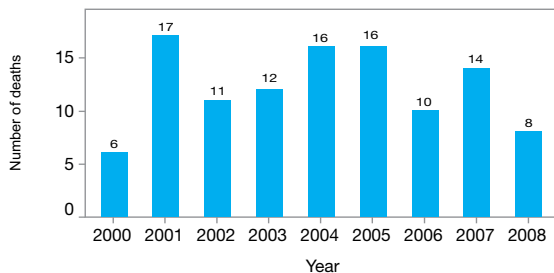


Figure 7. Number of hospitalized malaria cases, 2000 - 2008

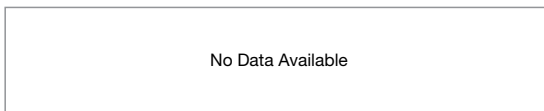
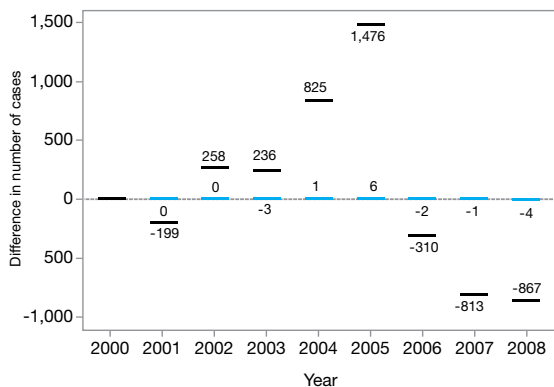
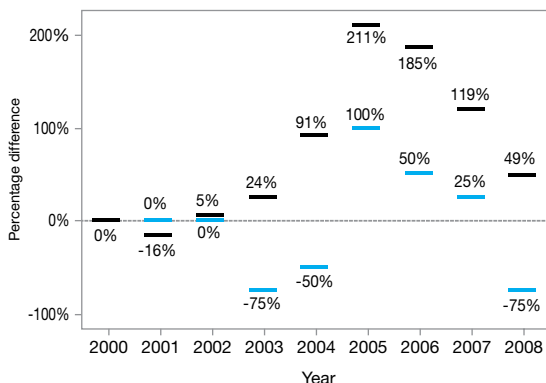


Figure 8. Annual variations in number of cases



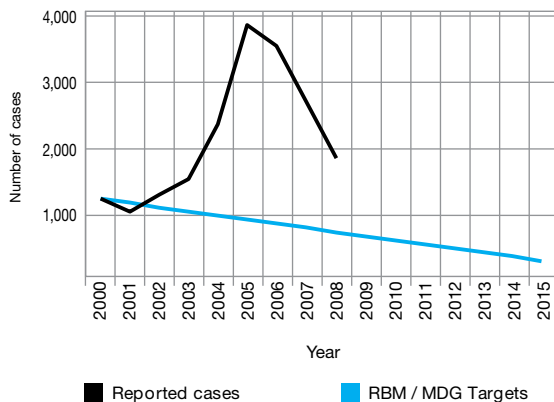
Plasmodium species
 ■ *P. falciparum* and mixed ■ *P. vivax*

Figure 9. Percentage difference in number of cases compared to 2000



Plasmodium species
 ■ *P. falciparum* and mixed ■ *P. vivax*

Figure 10. Number of cases and RBM / MDG targets for 2010 and 2015



■ Reported cases ■ RBM / MDG Targets

Figure 11. Percentage of hospitalized cases, 2008

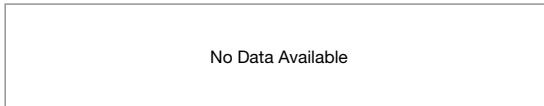
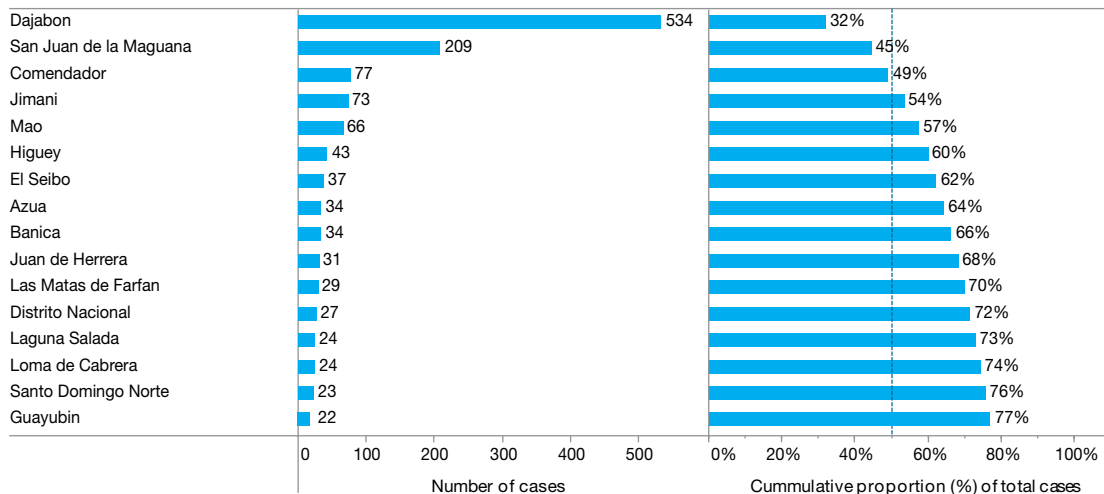


Figure 12. Districts (ADM2) with highest malaria burden and cumulative proportion of total cases in the country, 2008



* See Annex A for a complete list.

Figure 13. Districts (ADM2) by number of malaria cases, 2008

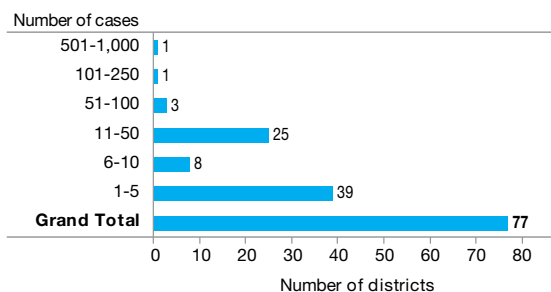


Figure 14. Districts (ADM2) by number of *P. falciparum* cases, 2008

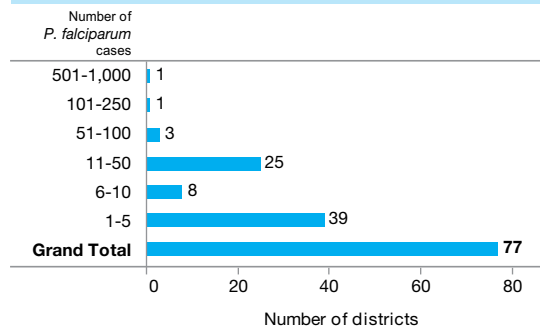


Figure 15. Districts by number of cases, API and percentage of *P. falciparum* cases, 2008

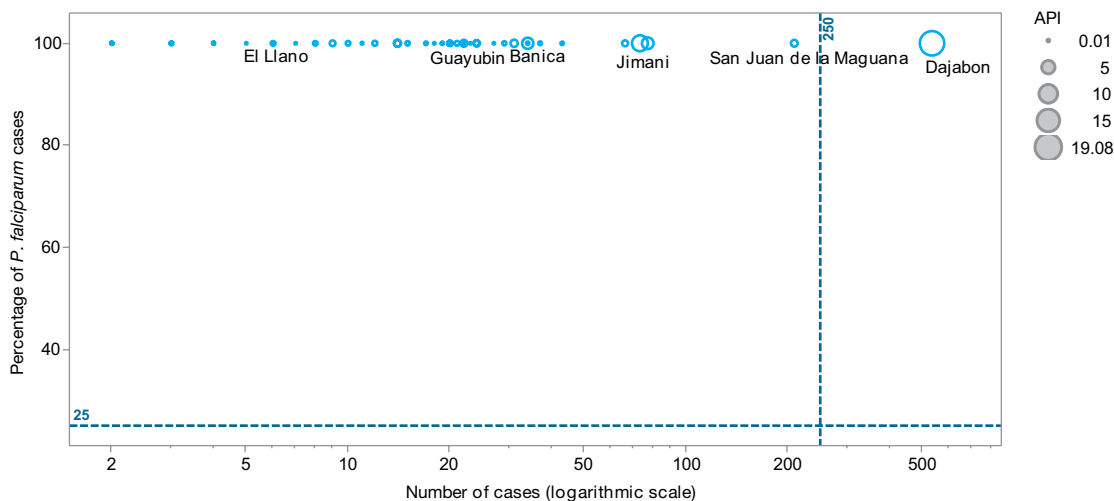


Figure 16. Annual Parasite Index (API) by districts (ADM2), 2008

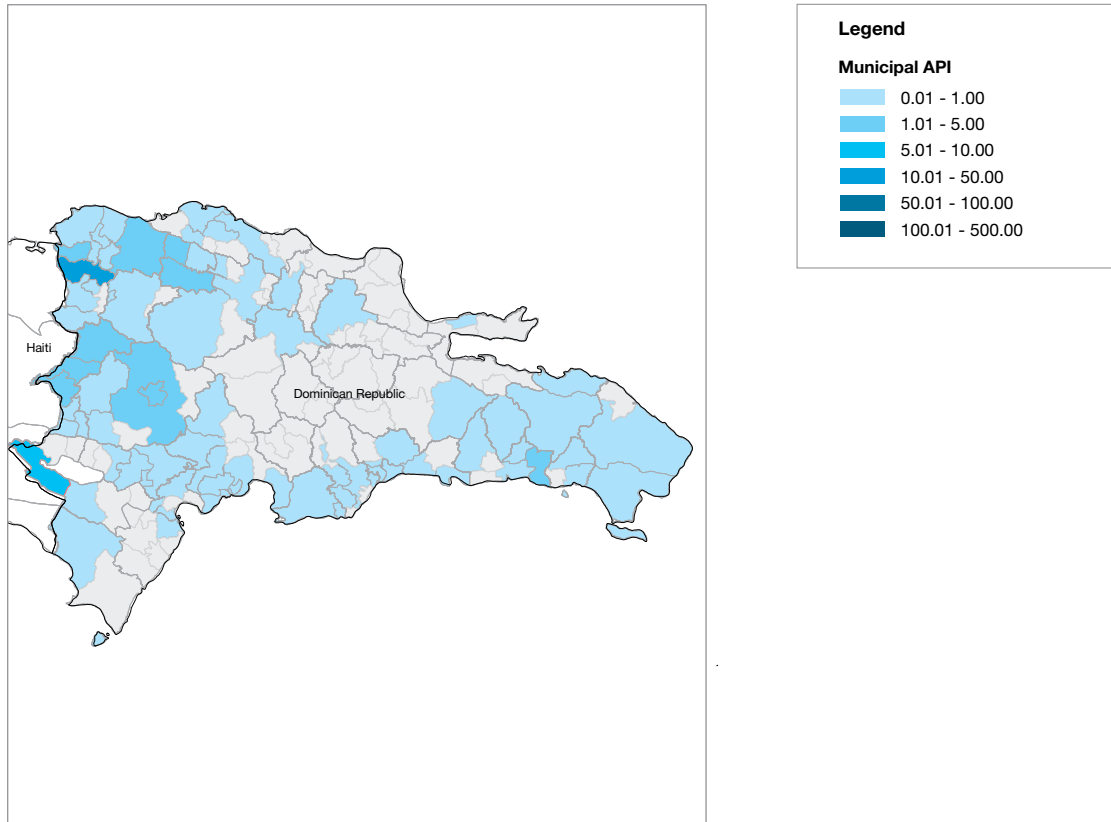
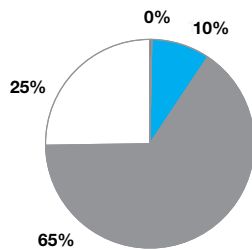


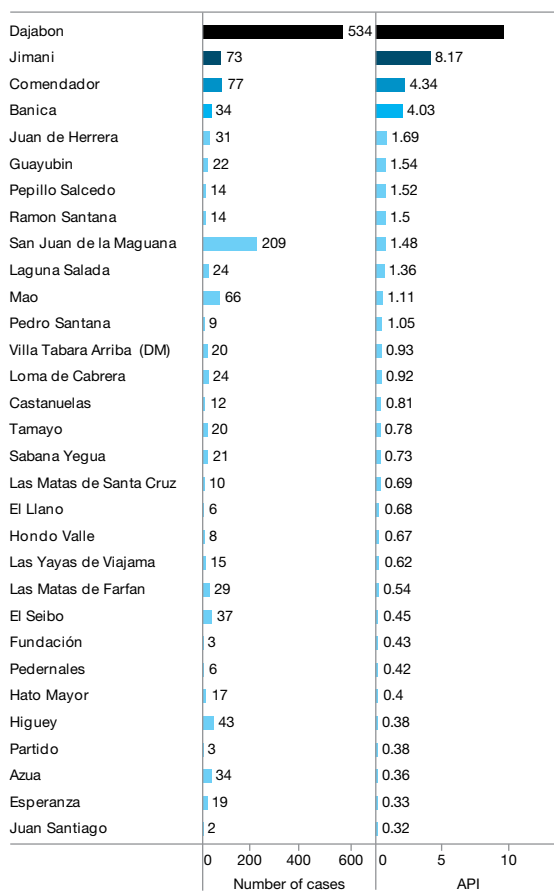
Figure 17. Population by malaria transmission risk, 2008



Population

- High risk (API > 10/1000)
- Medium risk (1/1000 < API < 10/1000)
- Low risk (API < 1/1000)
- Malaria free areas (No indigenous transmission)

Figure 18. Annual Parasite Index (API) and number of cases by district, 2008



API (cases/ 1000 people at risk)
 0 19.08

* See Annex A for a complete list.

Figure 21. Cases diagnosed by microscopy and RDTs, 2000-08

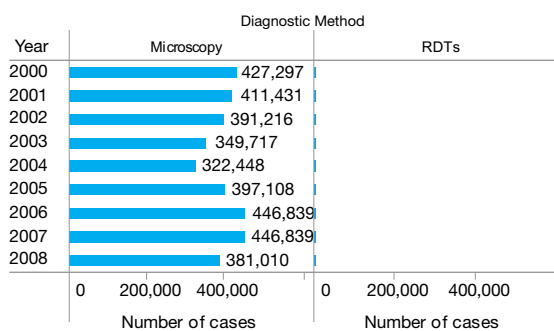


Figure 19. Population by malaria transmission risk, 2000-08

Year	High risk (API > 10/1000)	Medium risk (1/1000 < API < 10/1000)	Low risk (API < 1/1000)	Malaria free areas (No indigenous transmission)
2000	0	95,000	6,473,000	1,805,000
2001	9,000	142,000	8,791,000	0
2002	18,000	98,000	8,803,000	0
2003	55,000	156,000	9,023,000	0
2004	39,000	447,000	8,411,000	53,229
2005	51,000	620,000	7,665,000	763,719
2006	51,000	814,000	6,036,000	2,329,051
2007	51,000	814,000	6,036,000	2,329,051
2008	27,989	836,870	6,035,946	2,329,051

Figure 20. Slides examined and Slide Positivity Rate (SPR), 2000-2008

Year	Number of slides examined	Number of slides positive	Slide Positivity Rate (%)
2000	427,297	1,233	0.29
2001	411,431	1,038	0.25
2002	391,216	1,296	0.33
2003	349,717	1,529	0.44
2004	322,448	2,355	0.73
2005	397,108	3,837	0.97
2006	446,839	3,525	0.79
2007	446,839	2,711	0.61
2008	381,010	1,840	0.48

Figure 22. Number of cases diagnosed and cases treated, 2000-2008

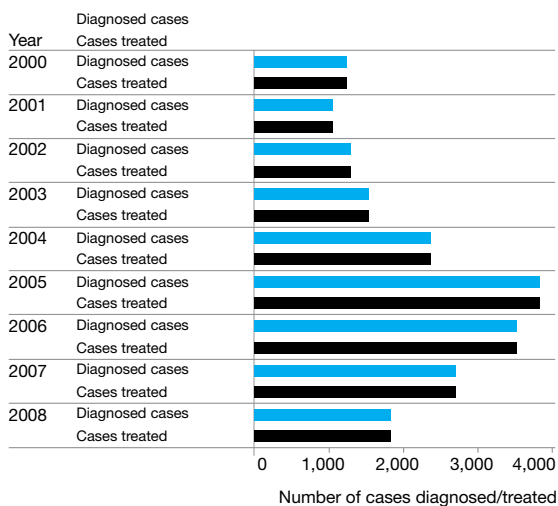
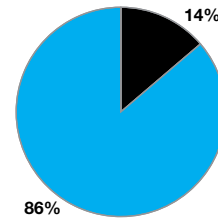


Figure 23. Slide Positivity Rate (SPR) by ADM1, 2008

ADM1	Examined	Total cases	SPR (%)
Dajabon	31,258	563	1.8
San Juan	27,321	281	1.03
Elias Pina	15,268	136	0.89
Valverde	24,390	104	0.43
Azua	24,128	99	0.41
Independencia	4,783	77	1.61
Santo Domingo	13,504	73	0.54
Montecristy	40,265	61	0.15
El Seibo	9,203	38	0.41
Bahoruco	18,367	29	0.16

Figure 24. Time span between onset of symptoms and diagnosis, 2008



Time span between onset of symptoms and diagnosis

- >72hours
- <72 hours

Figure 25. Number and percentage of cases by age group, 2008

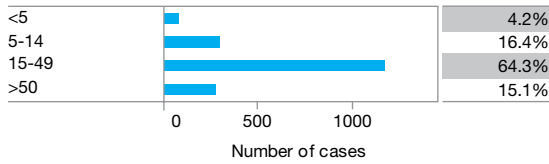


Figure 26. Number and percentage of cases by locality type, 2008

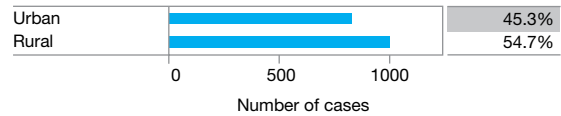


Figure 27. Number and percentage of cases in pregnant women among women of child bearing age, 2008

No Data Available

Figure 28. Number and percentage of cases in indigenous population, 2008

No Data Available

Figure 29. Proportion of *P. falciparum* cases. 2000-2008

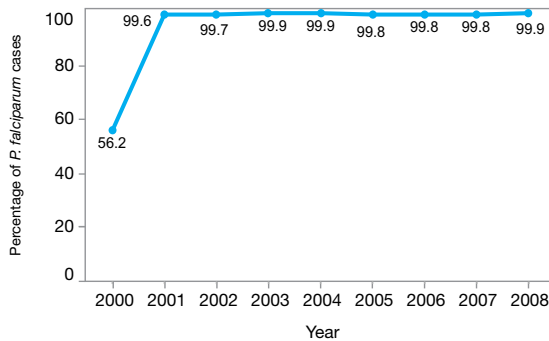


Figure 30. Number of ACT treatments distributed by year, 2000-08

Not Distributed

Figure 31. Indoor residual spraying coverage by year, 2000-08

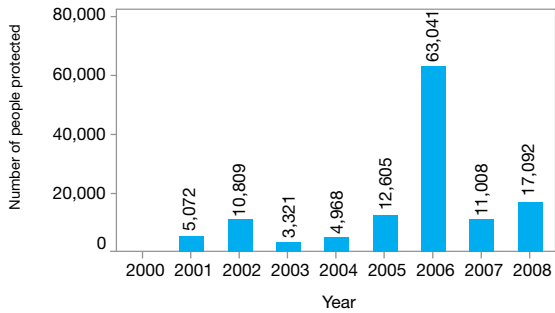


Figure 32. Number of LLINs distributed by year, 2000-2008

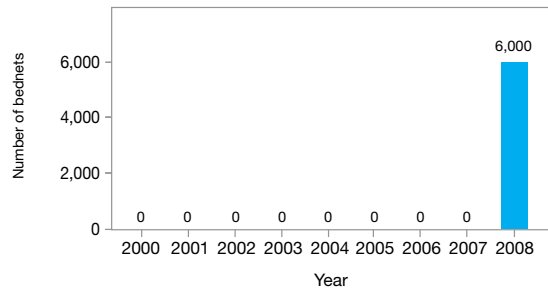


Figure 33. Number of ITNs distributed by year, 2000-08

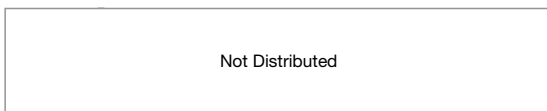
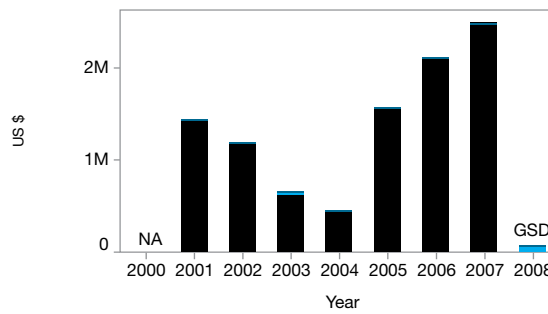


Figure 34. Sources for malaria control funds by year, 2000-08



Financing sources

- USAID
- UN agencies
- Global Fund
- Other bilateral funds
- Government

NA - Data not available

GNA- Data for Government funding not available