

Overview of the situation

Figures 1-5

The Island of Hispaniola, shared by Haiti and the Dominican Republic, is the only Caribbean island where malaria transmission is endemic. In both countries, the disease is caused almost exclusively by *Plasmodium falciparum*, which remains sensitive to chloroquine. The total reported cases in Haiti in 2008 was 36,775, of which only 6 were by *P. vivax*. In the past five years, there has been an increase in the number of reported malaria cases over the years 2000, 2001 and 2004 (reports were not available in 2002 or 2003).

Malaria transmission occurs in Haiti throughout the year, but historically there have been peaks from November to January, and after the rainy season (June to August). However, environmental changes suffered by the country have altered the seasonal pattern of the disease.

Transmission occurs in almost the entire territory; therefore, the whole population is at risk. The lower areas where the intensity of rainfall is greater and where rice is grown with irrigation canals are particularly conducive to the proliferation of the anopheles. The most common vector of malaria is the mosquito *Anopheles albimanus*, although there is localized transmission due to *Anopheles pseudopunctipennis*.

Internal population displacement in order to exchange goods in the market and due to poli-

tical instability in the past 20 years also determines the spread and perpetuation of the endemic. The burden of disease in Haiti and permanent population movements between Haiti and the Dominican Republic are also factors that affect the behavior of the disease.

Morbidity and mortality trends

Figures 4-9

Since 2005 the annual number of malaria cases has exceeded 20,000, and reached its peak in 2008. This increase could be attributed to better detection of cases. In 2005, case detection was strengthened with a project funded by the Global Fund to cover 10 departments and includes a component aimed towards improving diagnosis. In 2007, there was a decline in the number of cases accompanied by a decrease in the rate of positive slides; however there is no reliable information to determine if this is a trend. However, in 2008 there was again an increase in the number of reported cases, which could be an artifact of reporting, i.e. there may have been underreporting in previous years.

The annual number of reported cases has variations that are due to reporting problems, insufficient staffing and equipment and availability of tests for parasites. In some periods, the reports include probable cases.

In 2008, no deaths from malaria were repor-

ted to PAHO, however, Haiti has been one of the countries of the region with higher rates of mortality and mortality from the disease. In the past decade, the mortality rate has a behavior similar to the disease, i.e. a reduction in 2002 and lack of notification in 2003 and 2004. The increase in the number of cases in 2006 indicates probable underreporting of such events in the past year.

Geographical distribution

Figures 1,12-19

Malaria in Haiti tends to concentrate in pockets. Depending on environmental conditions, it is possible to find locations with SPR > 10% near areas where the same parameter is 0.

The data in this report correspond to the distribution of cases by place of diagnosis and not necessarily the origin of the cases, which limits the analysis of the dispersion of the transmission. In 2008, 25% of cases in the country were concentrated in Port de Paix, capital of Nord-Ouest department, although in all regions of the country districts were reporting cases. In 2008, there were only three districts with more than 1,000 cases and 18 districts that reported between 250 and 1,000 cases a year. At the level of localities, malaria behaves with significant focalization given the confluence of socio-ecological determinants.

Ouanaminthe district, on the border with the Dominican Republic, is particularly relevant to the situation across the Massacre River in Dajabon in the Dominican Republic, given the passage of people.

Deforestation affects a large part of Haitian territory and changes in land use associated with population movements are likely to be determinants of the spatial and temporal variations of malaria transmission.

Malaria in priority groups

Figures 25-28

In Haiti, malaria transmission is present even in urban areas. Moreover, there is transmission in suburban Port-au-Prince, but the epidemiological data for 2008 does not distinguish between cases of rural or urban transmission.

The age distribution of reported cases of malaria shows that the proportion of cases of children under the age of 5 five years is much higher than most countries. This distribution agrees with previous observations that infants and children represent a significant proportion of the population affected by malaria in Haiti. Also, the high proportion of childhood cases is compatible with a home transmission dynamics, unlike the patterns of transmission related more to labor, primarily affecting adults.

Diagnosis and treatment

Figures 20-24, 29-30

The political instability in the country since 1986 makes the organization and implementation of effective strategies for diagnosis and treatment difficult. In 2008, the slide positivity rate was 21.8% lower than in 2007, although there was an increase in the number of cases. Some areas, however, showed a high positivity rate (e.g. 37% in the northwest), which indicates a deficiency in the search for cases for diagnosis and timely treatment. Colombia, which follows Haiti in slide positivity, has a ratio of 17% positivity. The historical series of slides examined (2000-2008) shows significant changes and lack of information in some years. The slide positivity rate is high relative to the average of the Region, but has declined relative to other periods in the country.

As in many countries, the malaria infor-

mation system cannot report the time between the onset of symptoms and diagnosis. Moreover, there is no information that rapid tests are being used to improve access to diagnosis or any information is received on the number of tests performed with this method in 2008.

The number of treatments in 2006 and 2007 was significantly greater than the number of cases diagnosed in those years, which is compatible with a strategy of presumptive treatment of cases, as in some Central American countries. In 2008, the number of treatments distributed was not reported to PAHO.

The political difficulties have affected the control program. After a period of almost 20 years, only in 2006 did an active control program begin. In January 2005, a project for malaria control funded by the Global Fund was launched, and the first phase was designed to strengthen epidemiological surveillance, clinical management, prevention and laboratory diagnosis. This project benefits three departments. Artemisinin-based combination therapy is not part of this program.

Prevention and vector control

Figures 31-33

There are severe limitations on physical infrastructure and human capacity to properly structure a control program. Currently, indoor residual spraying with insecticide is not implemented.

In recent years it has begun to use long-lasting impregnated mosquito nets; the initial distribution was made during an outbreak in November 2005. A total of 60,000 insecticide treated mosquito nets were ordered in early 2006 and distributed largely in 2006 and 2007. Targeted actions are also carried out to control breeding sites through the application of larvicides.

Financing of Malaria Control

Figure 34

Virtually all funding for malaria control in Haiti comes from external cooperation. In 2005, the implementation of a five-year project approved by the Global Fund Project for a total of US\$ 14.8 million began. This project is a collaborative effort of the Ministry of Health and 11 NGOs, with technical collaboration and support of PAHO/WHO, the CDC, the French Cooperation and UNICEF.

In 2008, the Carter Center started a bi-national pilot project to support actions towards the elimination of malaria from the island. Among others, the project finances technical support activities, epidemiological surveillance, training and control methods for Haiti and the Dominican Republic.

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

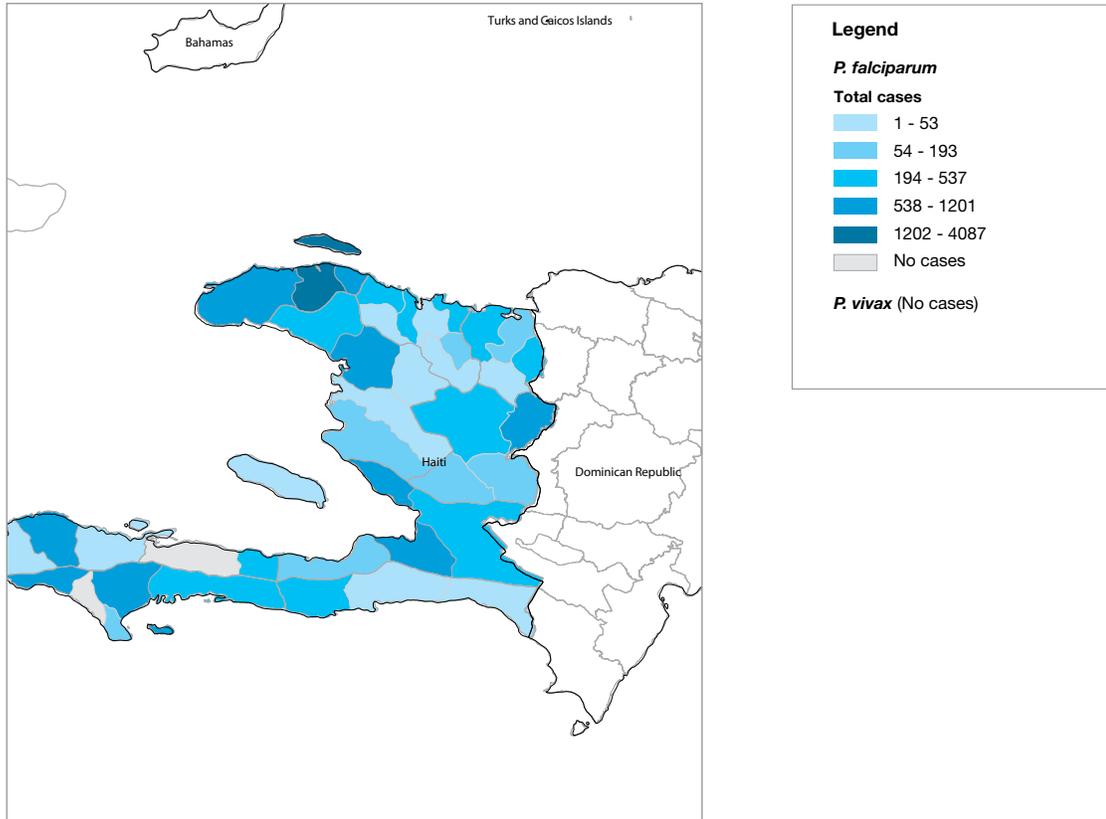
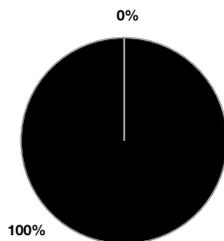


Figure 2. Proportion of cases by species, 2008



Plasmodium species

- *P. vivax*
- *P. falciparum* and mixed

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

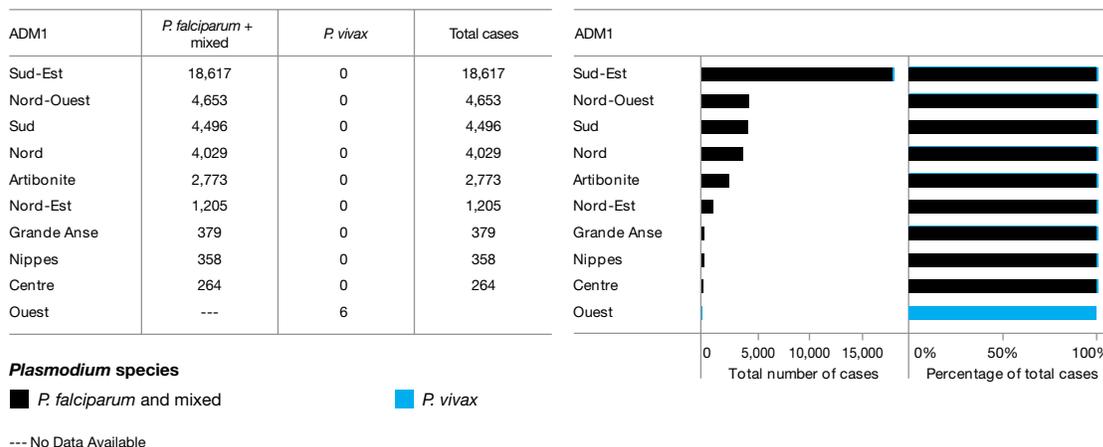


Figure 4. Number of cases by species, 2000-2008

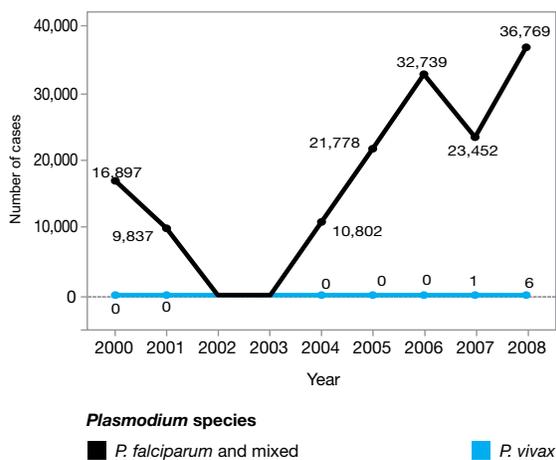


Figure 5. Number of malaria cases, 2000 - 2008

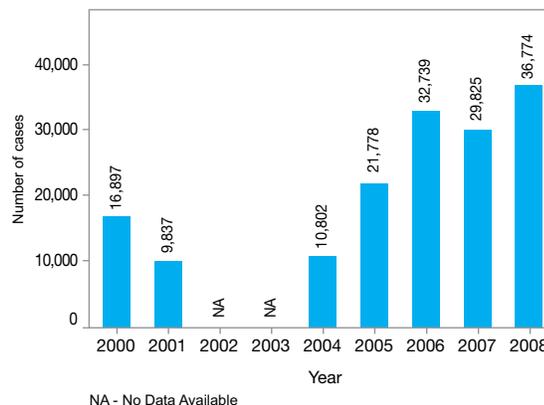


Figure 6. Number of malaria deaths, 2000-2008

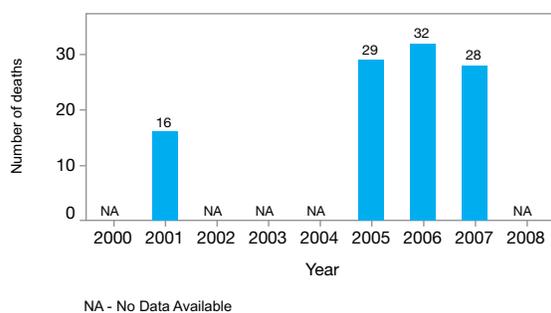


Figure 7. Number of hospitalized malaria cases, 2000 - 2008



Figure 8. Annual variations in number of cases

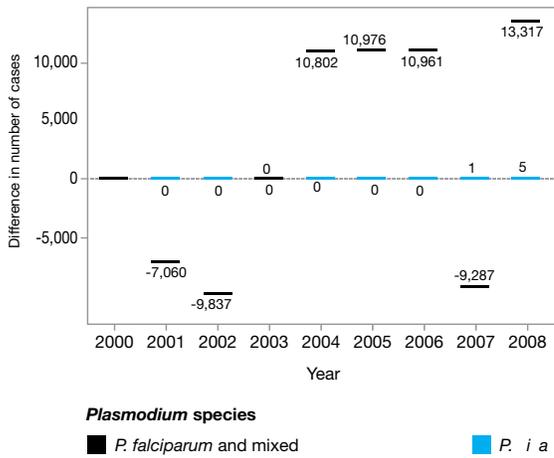


Figure 9. Percentage difference in number of cases compared to 2000

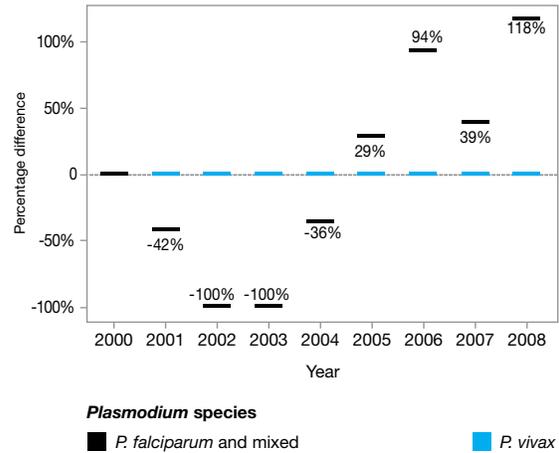


Figure 10. Number of cases and RBM / MDG targets for 2010 and 2015

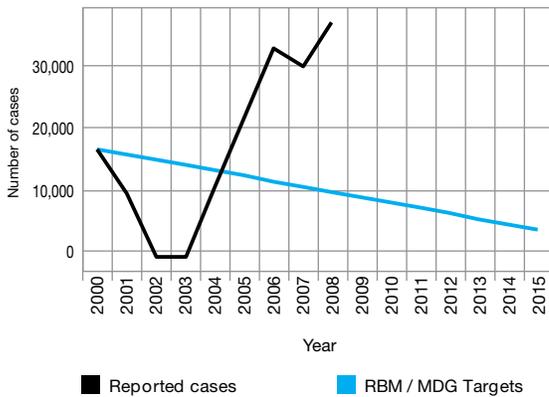


Figure 11. Percentage of hospitalized cases, 2008

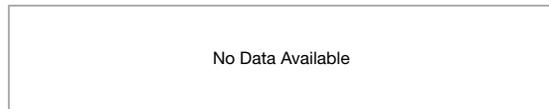
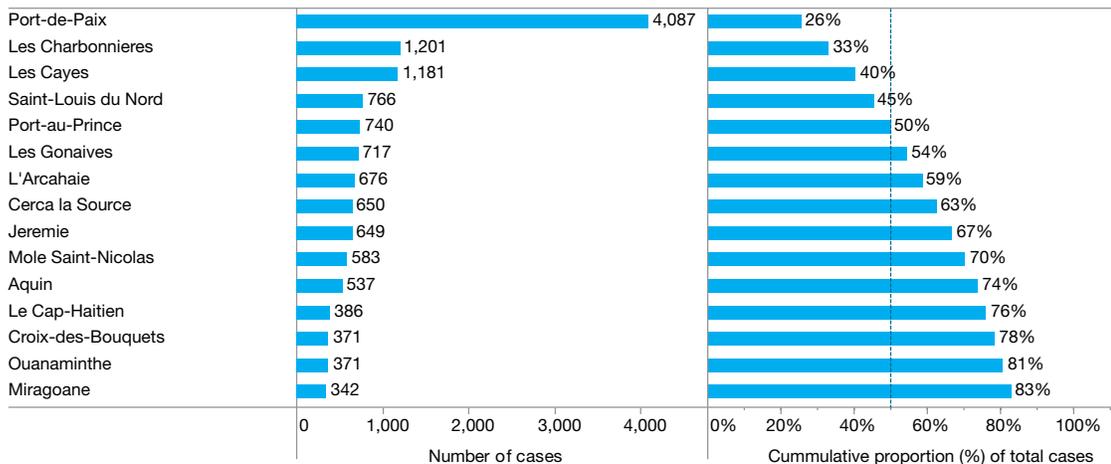


Figure 12. Districts (ADM2) with highest malaria burden and cumulative proportion of total cases in the country, 2008



* See Annex A for a complete list.

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

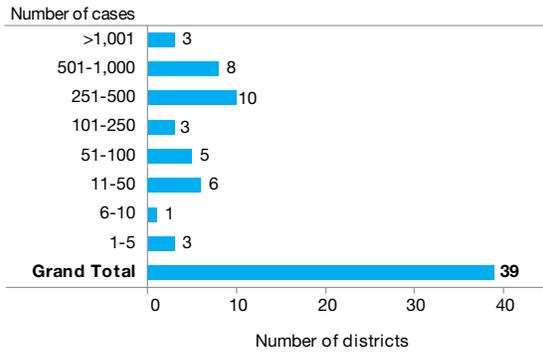


Figure 14. Districts (ADM2) by number of *P. falciparum* cases, 2008

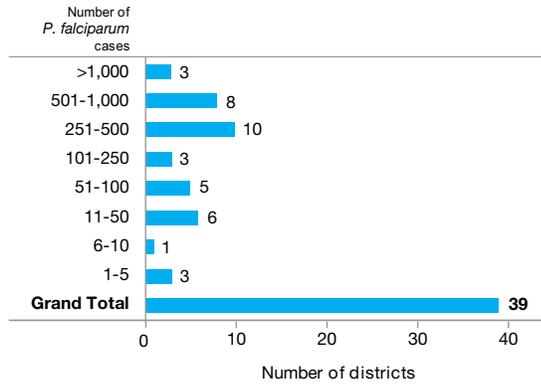


Figure 15. Districts by number of cases, API and percentage of *P. falciparum* cases, 2008

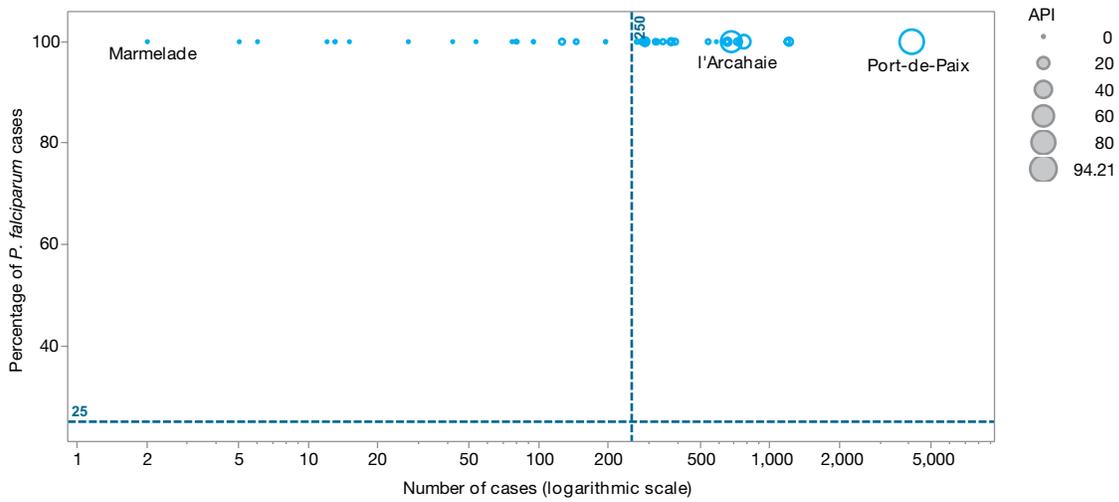


Figure 16. Annual Parasite Index (API) by districts (ADM2), 2008

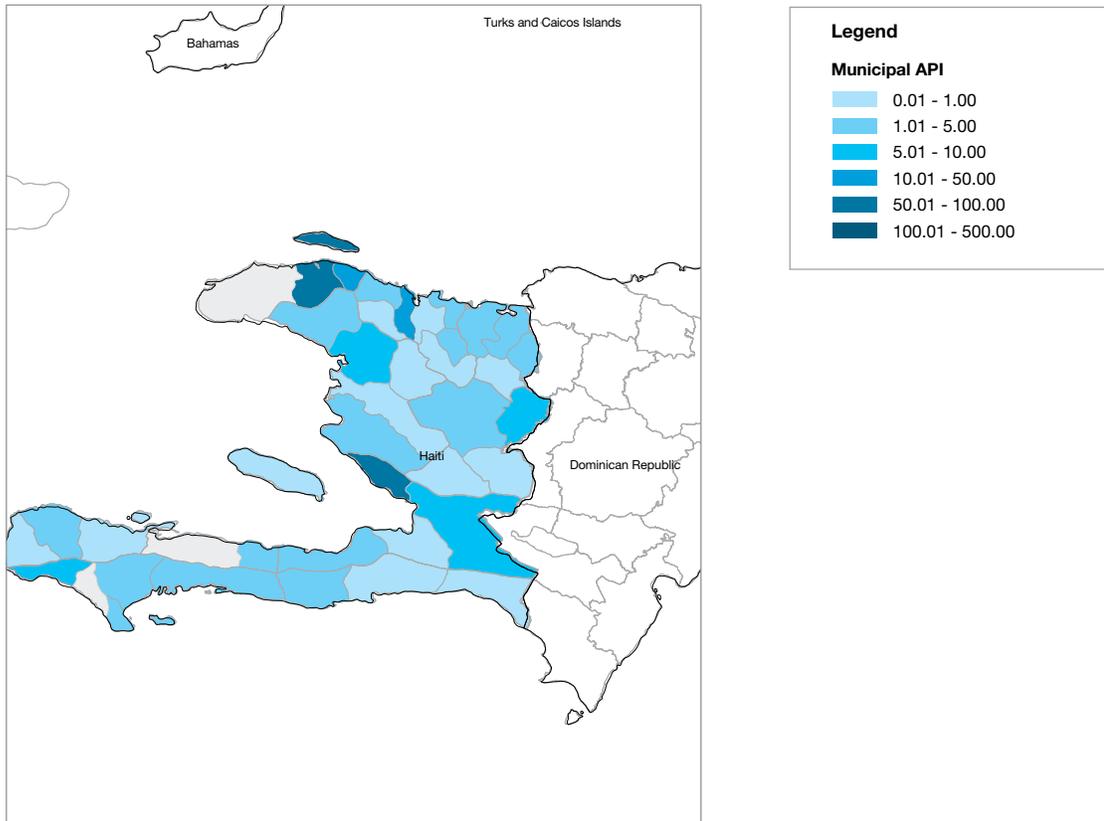
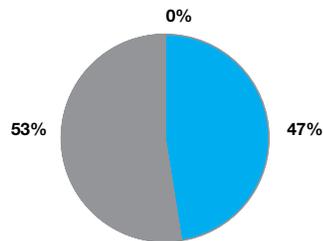


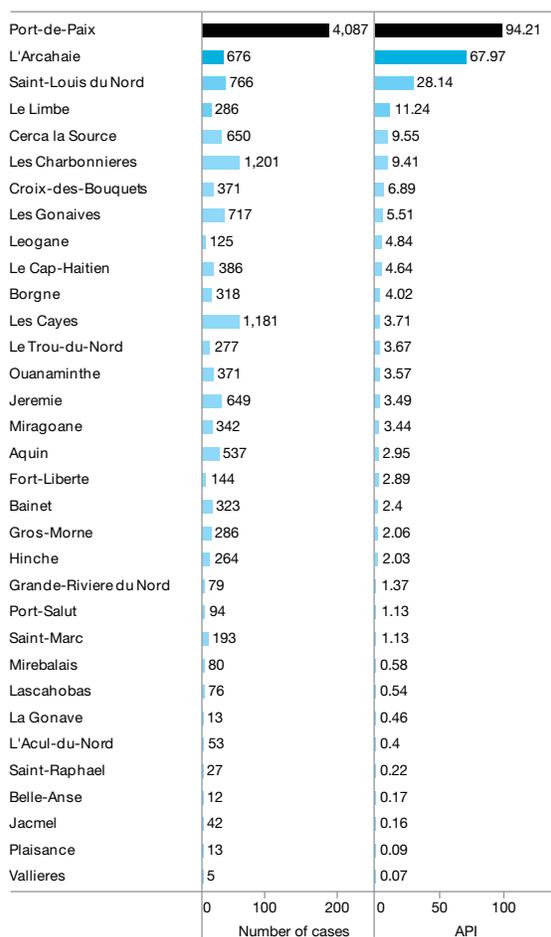
Figure 17. Population by malaria transmission risk, 2008



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 94.21

* See Annex A for a complete list

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	---	---	---	---
2001	0	4,758,000	3,242,000	0
2002	0	4,758,000	3,242,000	0
2003	0	4,758,000	3,242,000	0
2004	0	4,758,000	3,242,000	0
2005	445,000	3,320,000	4,164,000	0
2006	445,000	3,320,000	4,164,000	0
2007	907,132	6,780,432	0	1,921,891
2008	0	3,764,952	4,164,096	0

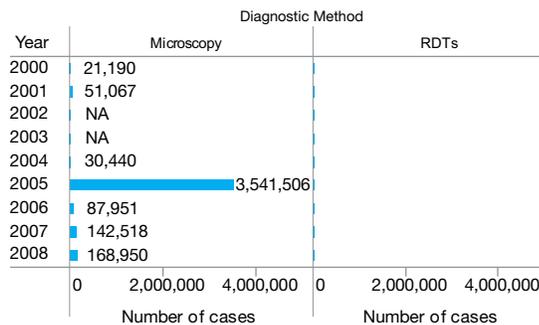
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Figure 20. Slides examined and Slide Positivity Rate (SPR). 2000-2008

Year	Number of slides examined	Number of slides positivas	Slide Positivity Rate (%)
2000	21,190	16,897	79.74
2001	51,067	9,837	19.26
2002	---	---	---
2003	---	---	---
2004	30,440	10,802	35.49
2005	3,541,506	21,778	0.61
2006	87,951	32,739	37.22
2007	142,518	29,825	24.32
2008	168,950	36,774	21.77

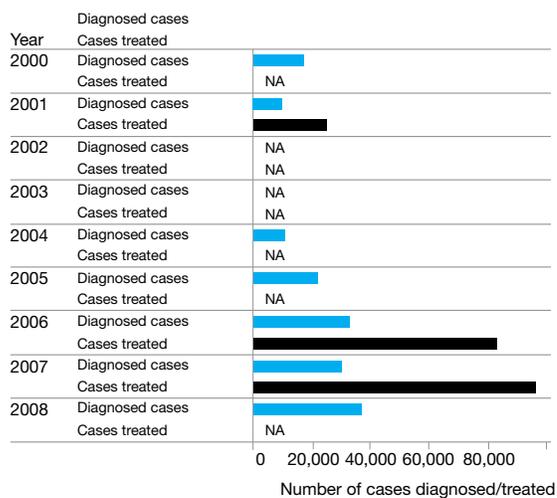
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Figure 21. Cases diagnosed by microscopy and RDTs, 2000-08



NA- No Data Available

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



NA- No Data Available

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

ADM1	Examined	Total cases	SPR (%)
Sud-Est	85,851	18,617	21.69
Nord-Ouest	12,564	4,653	37.03
Sud	13,611	4,496	33.03
Nord	25,583	4,029	15.75
Artibonite	15,158	2,773	18.29
Nord-Est	7,319	1,205	16.46
Grande Anse	1,423	379	26.63
Nippes	3,743	358	9.56
Centre	3,698	264	7.14

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

No Data Available

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

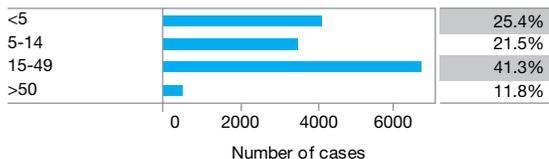


Figure 26. Number and percentage of cases by locality type, 2008

No Data Available

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

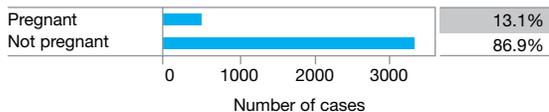


Figure 28. Number and percentage of cases in indigenous population, 2008

No Data Available

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

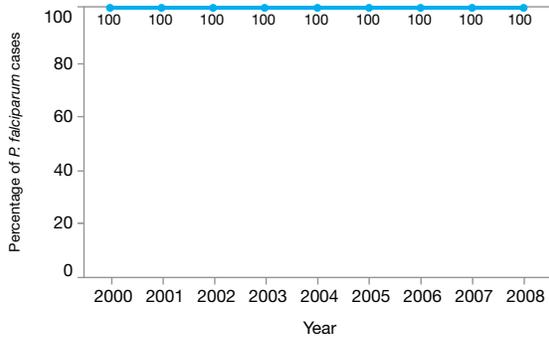


Figure 30. Number of ACT treatments distributed by year, 2000-08

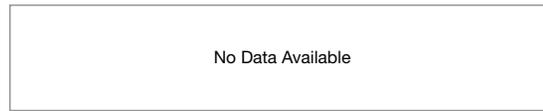


Figure 31. Indoor residual spraying coverage by year, 2000-08



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

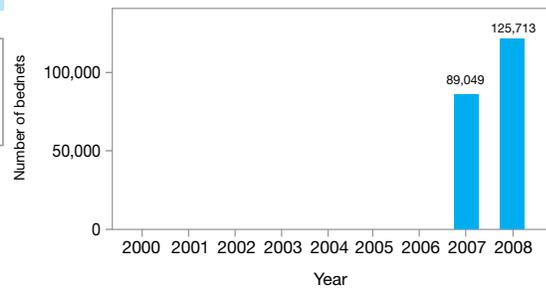


Figure 33. Number of ITNs distributed by year, 2000-08

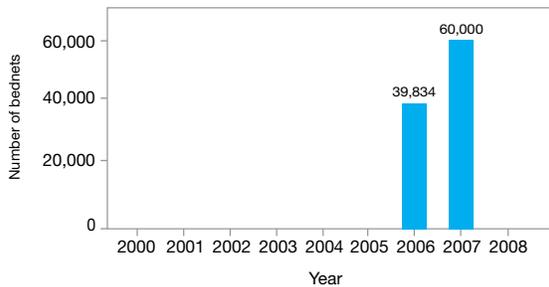
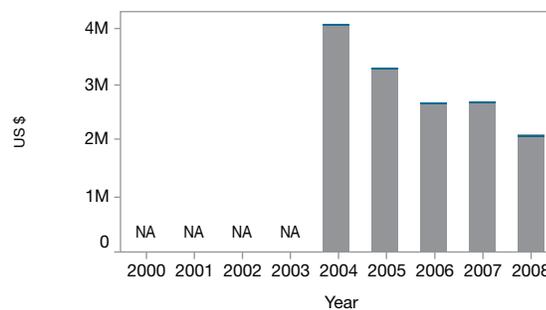


Figure 34. Sources for malaria control funds by year, 2000-08



Financing sources

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

NA - Data not available