2 Belize

Overview of the malaria situation

Figures 1-5

Historical information on the incidence of Malaria in Belize shows that the maximum number of cases recorded in a year was in 1994 with a total of 10,400 cases. The last peak in malaria incidence in Belize was in 2005 with a total of 1,549 cases sharply decreasing in 2008 to a total of 540 confirmed cases with no case of *P. falciparum* malaria reported in Belize since 2006.

Malaria in Belize is particularly focalized in localities of the Southern and Western Districts (Toledo, Stann Creek and Cayo Districts) where a number of social and environmental factors influence the incidence - migratory movement and poverty level.

Entomological studies have revealed the presence of at least three species of Anopheles mosquitoes in Belize. The primary vectors for malaria transmission are *Anopheles albimanus, A. darlingi, and A. vestitipennis.* The behavior of these species of mosquitoes and the social and environmental factors mentioned previously can certainly explain the differences in the intensity of transmission.

Although the number of positive localities has been reduced even in the most affected districts, the challenges to maintain the low number of cases are primarily: keeping a cadre of trained staff and maintain or improve the level of resources for the proper functioning of the program.

The reduction of *P. falciparum* malaria is congruent with similar phenomenon observed in neighboring countries like Guatemala and Nicaragua. Although there is a close relationship with Honduras, the reported areas with presence of *P. falciparum* in this neighboring country is more towards its border with Nicaragua than in the north towards Guatemala and Belize.

Morbidity and mortality trends

Figures 4 – 11

Taking the year 2000 as baseline the reduction in incidence of *P. falciparum* has been 100% while that for *P. vivax* has been 63%.

Malaria does not appear among the most frequent causes of hospitalization at national or district level and apart from one malaria related death reported in 2006, there has been no deaths linked or caused by malaria. The absence of *P. falciparum* malaria in the late years is certainly a positive influencing for absence of malaria deaths.

Geographical distribution

Figures 1, 12-19

In 2008, 94.4 % of the country's malaria cases came from the districts of Toledo, Stann Creek and Cayo and within those districts 64.5% of the cases were reported from 11 communities.

Toledo alone was responsible for 47% of the

cases in the country in 2008, and 56% of the cases came from 5 villages: Tambran, Indian Creek, Corazon, Crique Sarco and Punta Gorda Town.

Given its small population, Belize is the country with the highest malaria API in Central America, close to the API reported by Colombia and Brazil. The API of 17 cases per 1000 inhabitants at risk in Toledo district is similar to that of the neighboring Guatemalan towns but somewhat lower than in some Honduran locations as reported in 2008.

Malaria in specific populations

Figures 25–28

In 2006, 46.3% of malaria cases were in female and 43% in 2008. Morbidity among less than 15 years old age group reduced slightly from 57.4% in 2007 to 53.3% in 2008. Women in child bearing age of 15 to 44 years of age accounted for 15.2 % of the total malaria. Although no data is available for the incidence of malaria among pregnant women, morbidity in this sub-group is not considered to be a significant but it certainly warrants closer investigation and documentation. No data is available about the existence of malaria urban transmission in Belize.

Diagnosis and treatment

Figures 20-24, 29–30

In Belize, cases are detected by both active and passive surveillance. Passive surveillance refers to sampling of all fever cases at the moment of consultation or contact with the health services at any level. Active surveillance is the sampling of fever cases by malaria evaluators searching for febrile persons and/or during foci investigations. The objective is to maintain an ABER level of 10% of the population per year. Active case surveillance accounted for more than 40% of the slides tested in 2008.

The SPR has decreased gradually from the beginning of the decade to a 2.1% while the API was 1.7 per 1000 inhabitants at risk in 2008. The number of slides examined has remained steady in recent years despite the reduction in the number of cases with an initial tendency to increase active case detection than passive. At district level during 2008 important variations were observed in SPR, ranging from 3.4 to 4.1 in the high incidence districts and 0.03 to 0.4 in low risk areas (Belize, Orange Walk and Corozal Districts)

The malaria control program relies on the microscopic confirmation of slides for the confirmation of malaria cases. There is one microscopist in every district with exemption of Orange Walk that sends its samples to be tested at the neighboring district of Corozal.

Private sector regularly sends slides taken at their facilities to be tested by control program microscopists and positive cases are given 14 days semi-supervised treatment, just as is done with any other case detected in the Public Health System. However, in some areas self-medication represents a challenge for the program.

Prevention and vector control

Figures 31-33

The vector control program of the Ministry of Health is responsible for control interventions, which include larviciding and spraying for adult mosquitoes - both IRS and space spraying.

Over the years, IRS has been limited to the most positive localities for malaria. In 2008 approximately 47,000 people were protected by IRS. The focalized approach and utilization of insecticides during this period of reduction of

the transmission is certainly in line with more effective and rational use of pesticides. It is noteworthy that case surveillance and early initiation of a 14 days semi-supervised treatment has been maintained while efforts are underway to implement environmental actions following the DDT-GEF Project model.

Financing of malaria control

Figure 34

In Belize, vector control staff deals with Malaria, Dengue and Chagas Disease (Integrated Vector Management) and is funded almost exclusively by Government. Annual vector control budget is approved and activities are implemented making it logistically difficult to differentiate expenses by disease of interest.

A rough estimate can be 50%, 40%, and 10% for Malaria, Dengue and Chagas disease or administrative duties. The percentage of the Ministry of Health budget dedicated to vector control has been 0.7% and 0.9% for the years 2007 and 2008 respectively, notably less than 1% per annum.

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

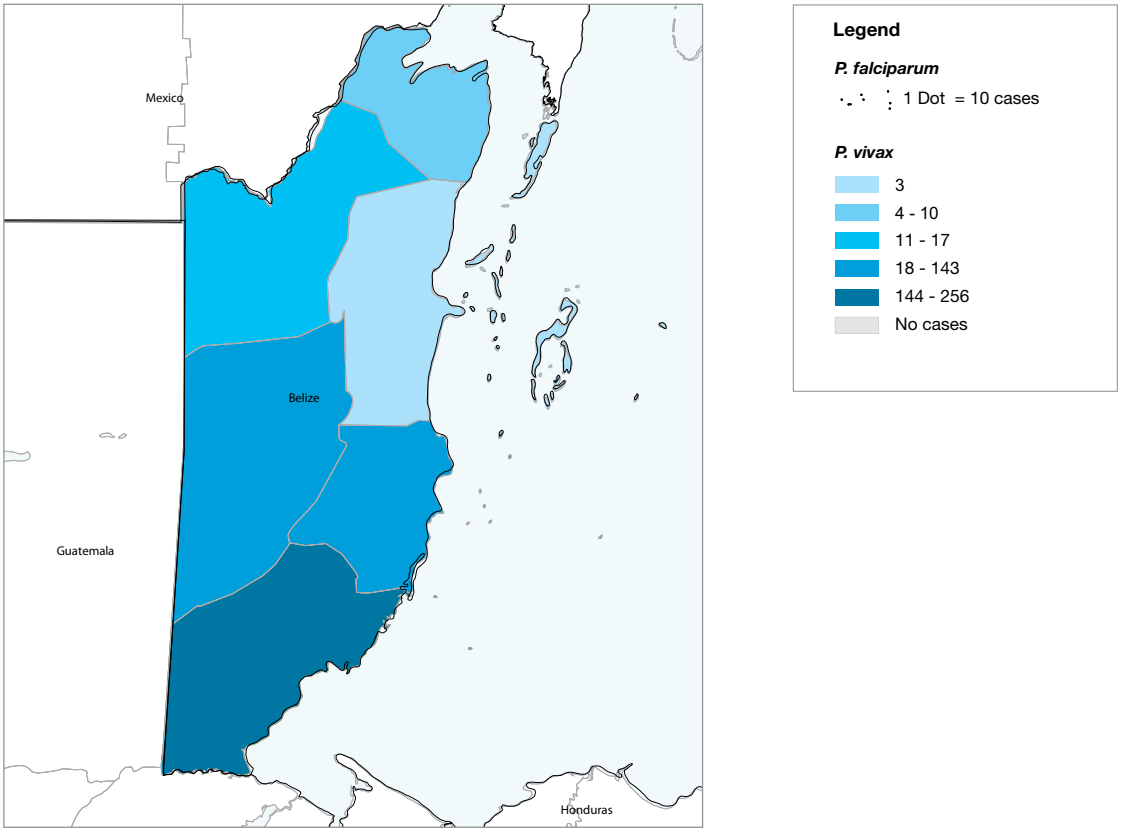
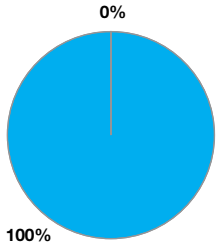


Figure 2. Proportion of cases by species, 2008



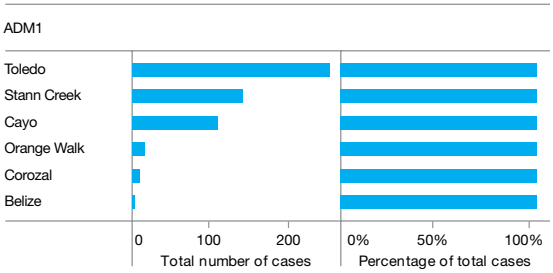
***Plasmodium* species**

P. vivax

P. falciparum and mixed

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

ADM1	*P. falciparum* + mixed	*P. vivax*	Total cases
Toledo	0	256	256
Stann Creek	0	143	143
Cayo	0	109	109
Orange Walk	0	17	17
Corozal	0	10	10
Belize	0	3	3

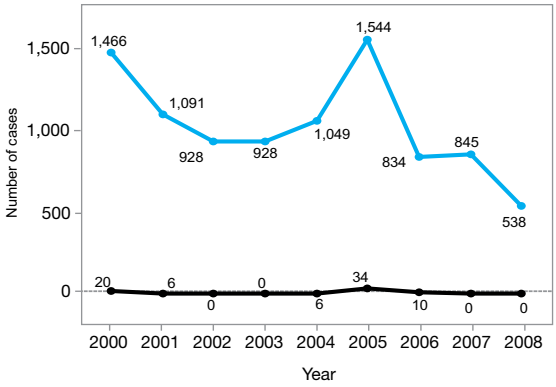


***Plasmodium* species**

P. falciparum and mixed

P. vivax

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



***Plasmodium* species**

P. falciparum and mixed

P. vivax

Figure 5. Number of malaria cases, 2000 - 2008

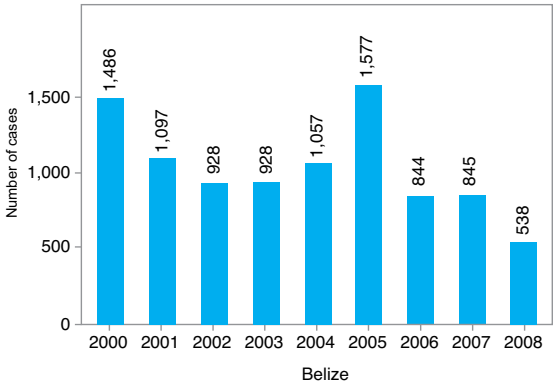


Figure 6. Number of malaria deaths, 2000-2008

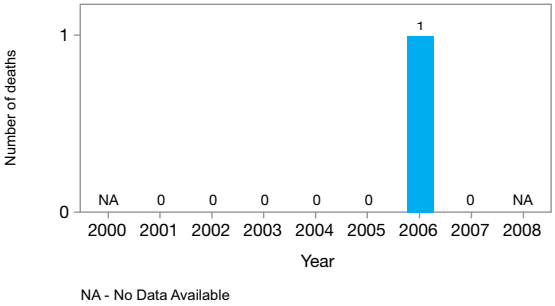


Figure 7. Number of hospitalized malaria cases, 2000 - 2008

No Data Available

Figure 8. Annual variations in number of cases

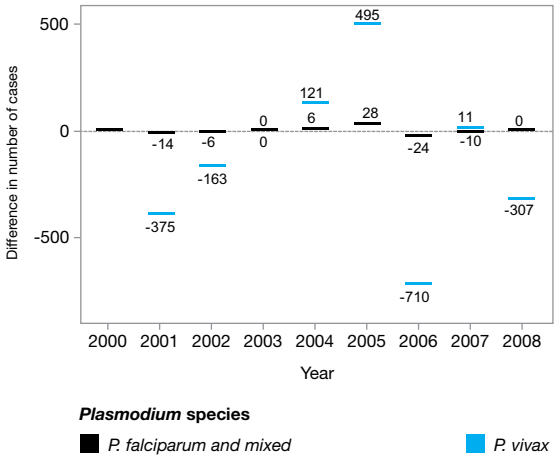


Figure 9. Percentage difference in number of cases compared to 2000

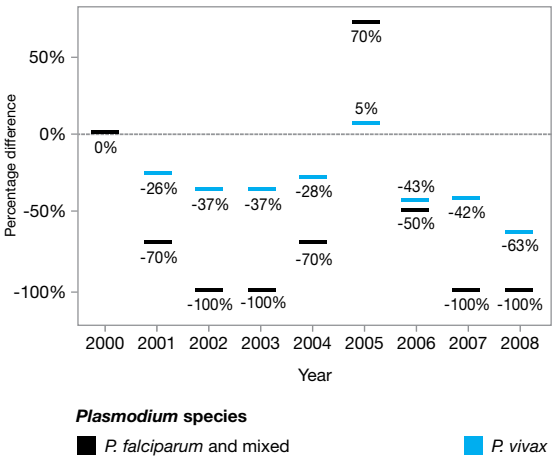


Figure 10. Number of cases and RBM / MDG targets for 2010 and 2015

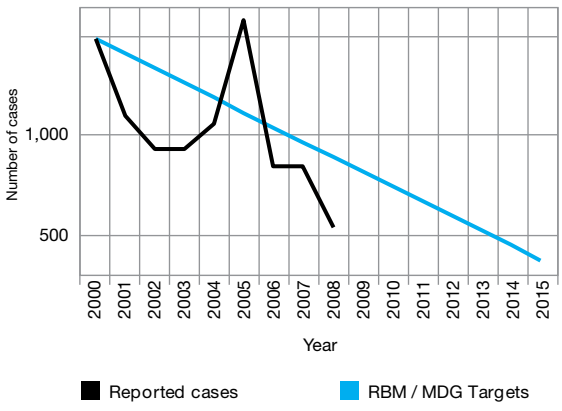


Figure 11. Percentage of hospitalized cases, 2008

No Data Available

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

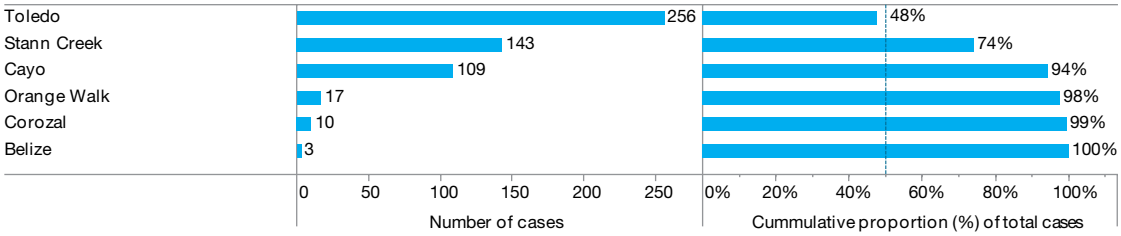


Figure 13. Districts (ADM2) by number of malaria cases, 2008

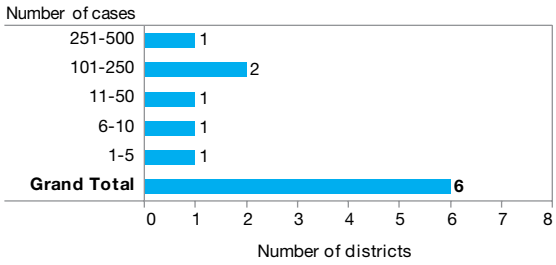


Figure 14. Districts (ADM2) by number of *P. falciparum cases*, 2008

No district reported cases of *P. falciparum* malaria in 2008

Figure 15. Districts (ADM2) by number of cases, API and percentage of *P. falciparum* cases, 2008

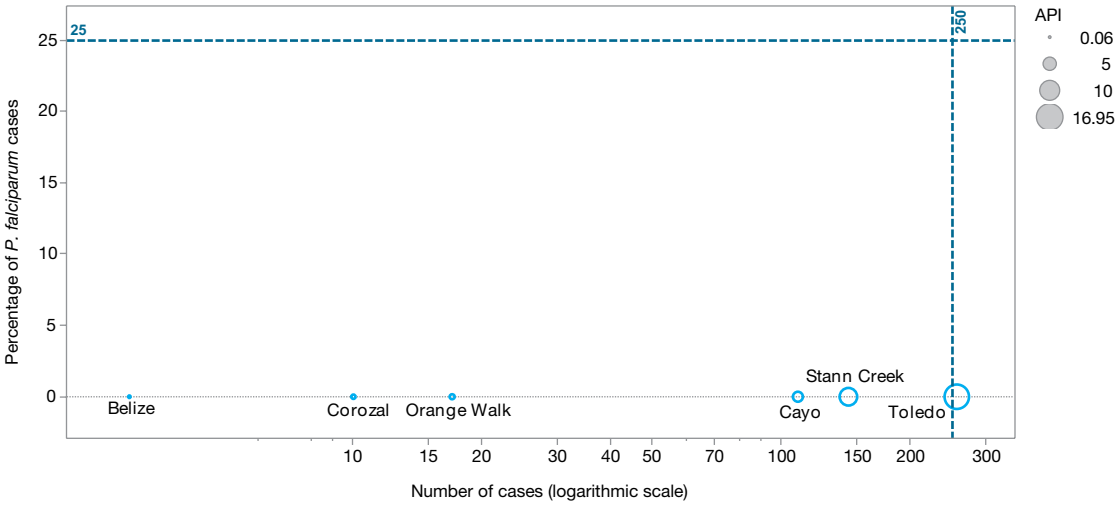


Figure 16. Annual Parasite Index (API) by districts (ADM2), 2008

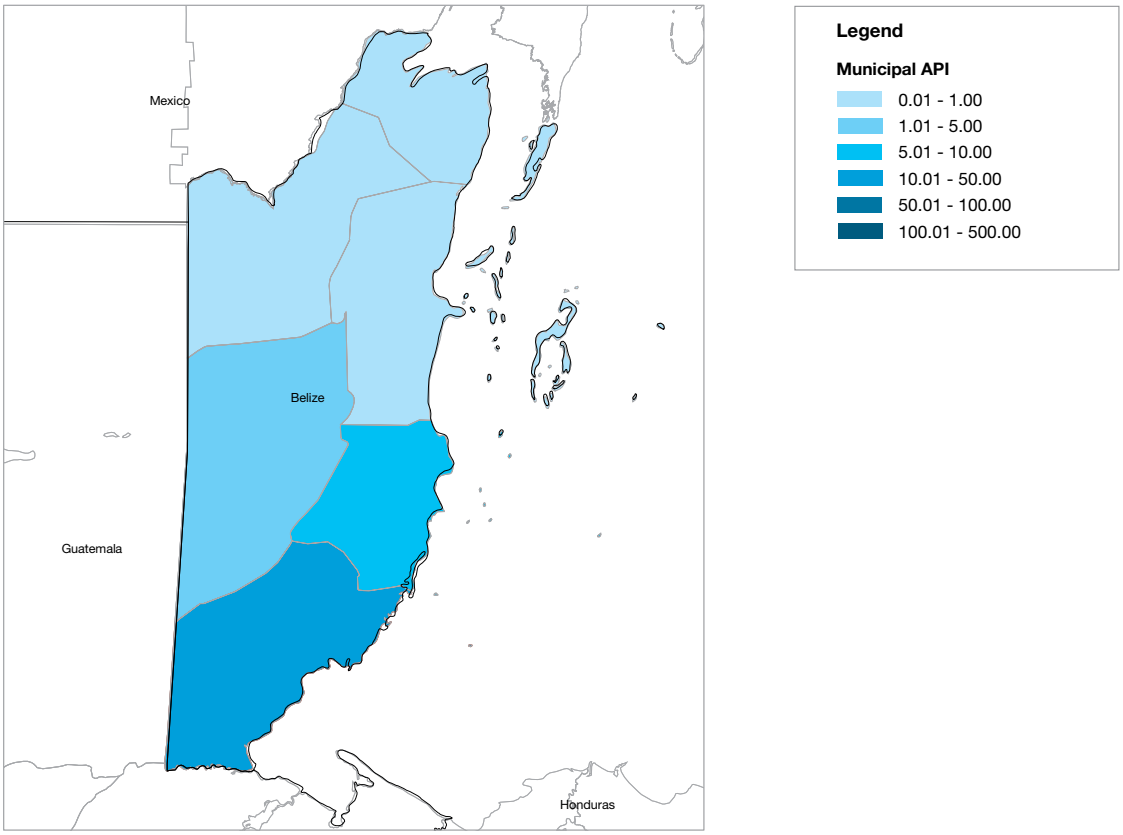


Figure 17. Population by malaria transmission risk, 2008

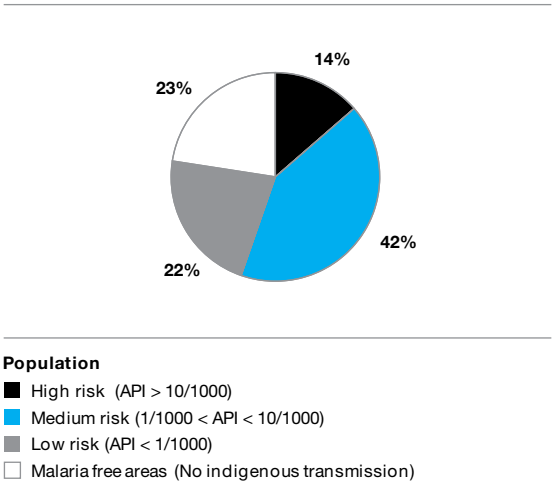


Figure 18. Annual Parasite Index (API) and number of cases by district, 2008

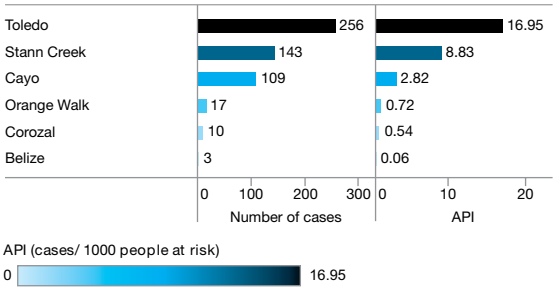


Figure 19. Population by malaria transmission risk, 2000-08

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	85,000	68,000	67,000	15,000
2001	0	153,000	0	97,000
2002	0	153,000	0	0
2003	0	153,000	0	97,000
2004	54,000	78,000	124,000	9,000
2005	54,000	61,000	142,000	0
2006	54,000	61,000	142,000	0
2007	63,403	71,497	176,600	0
2008	39,991	122,527	64,959	66,241

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

Year	Number of slides examined	Number of slides positive	Slide Positivity Rate (%)
2000	18,559	1,486	8.01
2001	18,173	1,097	6.04
2002	15,480	928	5.99
2003	15,480	928	5.99
2004	17,358	1,057	4.11
2005	25,119	1,577	6.13
2006	25,755	844	3.28
2007	22,134	845	3.82
2008	25,550	538	2.11

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

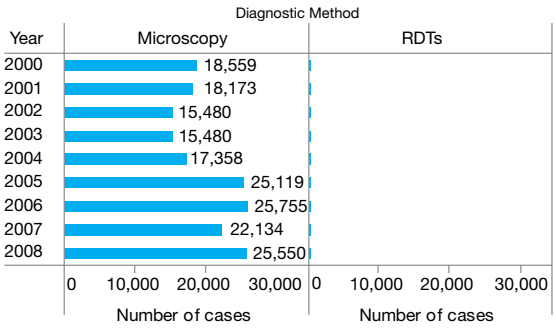
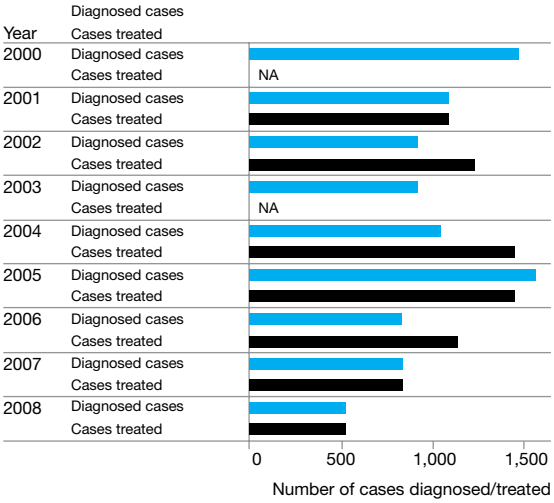


Figure 22. Number of cases diagnosed and cases treated, 2000-2008

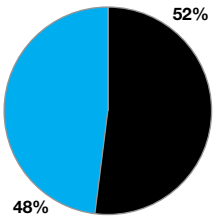


NA- No Data Available

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

ADM1	Examined	Total cases	SPR (%)
Toledo	6,271	256	4.08
Stann Creek	3,990	143	3.58
Cayo	3,209	109	3.4
Orange Walk	3,809	17	0.45
Corozal	2,874	10	0.35
Belize	5,397	3	0.06

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



Time span between onset of symptoms and diagnosis

>72 hours

<72 hours

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

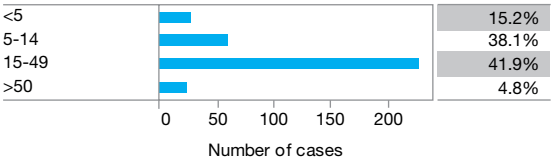


Figure 26. Number and percentage of cases by locality type, 2008

No Data Available

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

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

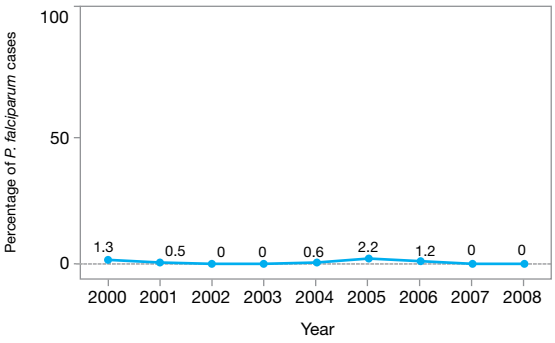


Figure 30. Number of ACT treatments distributed by year, 2000-08

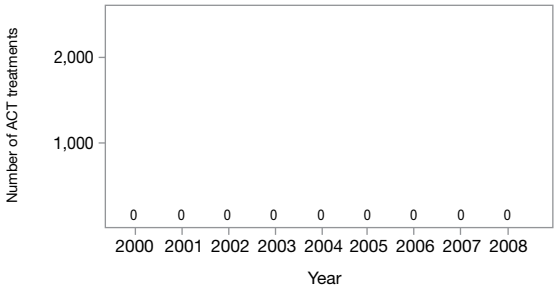


Figure 31. Indoor residual spraying coverage by year, 2000-08

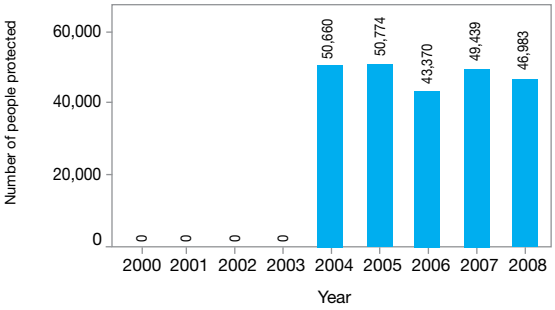


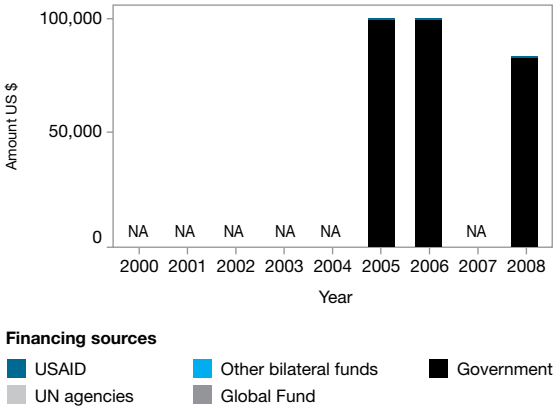
Figure 32. Number of LLINs distributed by year, 2000-2008

Not Distributed

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

Not Distributed

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



NA - No Data Available