10 Guatemala

Overview of the situation

Figures 1-5

In Guatemala, 70% of the territory is considered endemic. Although the number of cases in the country has fallen considerably in the last decade, transmission continues in a significant number of municipalities in over 10 departments. Of countries in Central America, Guatemala was second only to Honduras in the number of cases in 2008. While the number of cases by *Plasmodium vivax* was similar in the two countries, Guatemala had very few *P. falciparum* cases. It had only 50 cases by this type of malaria parasite in 2008, all of them autochthonous.

Malaria in the country is focalized in three areas: 1) the Pacific region, particularly in the departments of Escuintla, Suchitepequez, San Marcos and Quetzaltenango; 2) northeast of the Sierra Madre in the central-eastern zone, which carries a lower burden and where Baja Verapaz is the most, though not the only, affected department; and 3) in northern Guatemala, where malaria is scattered throughout the Department of Alta Verapaz. Also part of this focus are some municipalities of the departments of Peten and Izabal.

In 2008, the Escuintla Department on the Pacific coast registered 2,427 cases of malaria, the highest number of cases in the country, followed by Alta Verapaz with 1,546 cases. Historically, malaria in Guatemala has affected departments in the north of the country, in other words, El Peten, Alta Verapaz, Izabal and El Quiche. But, in recent years, transmission in the Department of Escuintla on the Pacific coast has garnered attention. This change can be attributed to, on the one hand, the impact of foreign assistance on the northern region of the country, where new strategies, such as ITNs, breeding site control and diagnostic and treatment improvements, have been implemented. On the other hand, mosquito breeding sites have proliferated in the Escuintla region, as has large-scale domestic migration driven by sugarcane harvesting activities. Malaria is present primarily in the lowlands of these departments.

The vector species involved are *Anopheles albimanus*, *A. darlingi*, *A. pseudopunctipennis* and *A. vestitipennis*. The latter two are found in the region of El Peten and in Ixcan. Poor living conditions, makeshift rural dwellings and migration in search of higher wage jobs are among the determinants of endemic persistence in the country.

Morbidity and mortality trends

Figures 4 – 9

In 2000, the annual number of confirmed malaria cases exceeded 50,000. After a slight decrease in 2005, when fewer than 40,000 cases were re-

ported, the country has reported a steady drop in malaria transmission. Externally funded projects have contributed significantly to those results since 2007.

Between 2000 and 2008, the number of cases by *P. vivax* fell by 86%, and those of *P. falciparum* malaria, by 97%. These reductions have taken place in the country's northern departments and its central-eastern region, while the number of malaria cases increased in the Pacific departments.

The number of *P. falciparum* malaria cases dropped dramatically in 2008, and no deaths from malaria were reported in the country that year.

Geographical distribution

Figures 1, 12-19

In 2008, the Municipality of La Gomera reported 14.5% of the country's cases. La Gomera was followed by the municipalities of Santa Cruz Verapaz and Cotzumaguapa, with 356 cases each. All three municipalities are in the Department of Escuintla in the Pacific region. The three are followed by several municipalities with similar disease situation and slight differences in the number of reported cases. A total of 179 municipalities reported cases in 2008. Of these, 82 reported five or fewer confirmed cases, while 35 reported 50 cases or more.

The infected area in the Pacific coast region is associated with domestic migration related to sugarcane harvesting activities and to the presence of artificial *A. albimanus* breeding sites. The Municipality of La Gomera, which had the largest number of cases, also had the highest API of 24.1 per 1,000 inhabitants. Four other municipalities in the Departments of Escuintla and Alto Verapaz also had APIs of over 10 cases per 1,000 inhabitants. The national API was 0.9 cases per 1,000 people at risk, very similar to that of other countries in the Region, such as Bolivia, Honduras, and Venezuela.

Malaria in specific populations

Figures 25–28

In 2008, 34% of malaria cases occurred among children under the age of 15 years, a percentage similar to that of the Region as a whole. This figure is much lower in other countries where malaria is more occupational in nature, such as in Costa Rica, Dominican Republic, El Salvador, and Guyana.

Most cases are of rural origin, but urban or marginal urban transmission can be found in the Izabal Department, which has been undergoing urbanization. In the Municipality of El Estor, people have lived at the city limit, in an area with malaria transmission, for years.

Malaria in the country affects predominantly indigenous populations. About 65% of malaria cases reported in 2008 occurred among indigenous groups, making Guatemala one of the countries in the region with the highest proportion of malaria cases among native peoples. Inasmuch as 80% of the population in the northern part of the country is of indigenous origin, this is not surprising. Native communities affected by malaria can be found in localities in the Departments of Alta Verapaz, Quiche and Peten, which have over the past four years been the target of breeding site control activities that involved the local community. Case detection among pregnant women was conspicuously low in 2008, which could be a symptom of deficiencies in reporting.

Diagnosis and treatment

Figures 20-24, 29–30

In 2008, 170,188 blood slide examinations were conducted, yielding a 4.2% slide positivity rate. This is an important reduction vis-à-vis the previous year, and the lowest SPR of the decade, even though the number of slides examined was higher than in 2007. A comparison of data by department reveals important variations in SPRs and case detection intensity through blood slide examinations. For instance, while in Escuintla the slide positivity rate was 18%, in Alta Verapaz it was 5%; these two departments have the highest number of cases. In El Peten, the SPR was extremely low (0.5%). In the past two years, the network of voluntary collaborators in the North has been strengthened, as has the diagnostic network, which added 40 new laboratories.

Despite significant improvements in case detection, the timing of parasitological diagnosis still lags. Only 2% of all cases in 2008 had access to diagnosis within 72 hours of the onset of symptoms.

The implementation of rapid diagnostic tests has been initiated, but their use is limited in comparison to microscopy; only 2,000 rapid diagnostic tests were performed in 2008, as opposed to 170,000 blood slide examinations in the same year.

As in the rest of the Central American subregion, *P. falciparum* strains circulating in Guatemala continue to be sensitive to 4- aminoquinoline; therefore, this form of malaria is treated with chloroquine. Treatment of *P. vivax* malaria has been modified in recent years to extend primaquine administration to the classic 14-day recommendation. Because a significant number of cases are treated under clinical presumption, the number of treatments distributed in 2008 exceeded the number of confirmed cases.

Prevention and vector control

Figures 31-33

The use of IRS as a vector control measure has declined steadily in Guatemala. Widespread insecticide use in agriculture --particularly for cotton crops—led to vector insecticidal resistance. For the past four years, Guatemala has participated in the DDT/GEF project.

A total of 12,410 people were protected by indoor residual spraying in 2008, a far smaller number than in previous years. Various vector control strategies with community participation have been promoted over the past five years. External funding available since 2006 has made the implementation of LLINs possible; 700,000 of these have been distributed.

Financing of malaria control

Figure 34

In 2006, a project was launched with 14 million dollars in Global Fund financing to benefit five health areas with intense malaria transmission in northern Guatemala. In 2009, a malaria control proposal was approved as part of the Ninth Round of the Global Fund, which should benefit the country's remaining endemic areas (22 health areas). The DDT/GEF Project and Health in Action Project have also played an instrumental role in the country's positive epidemiological change.

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

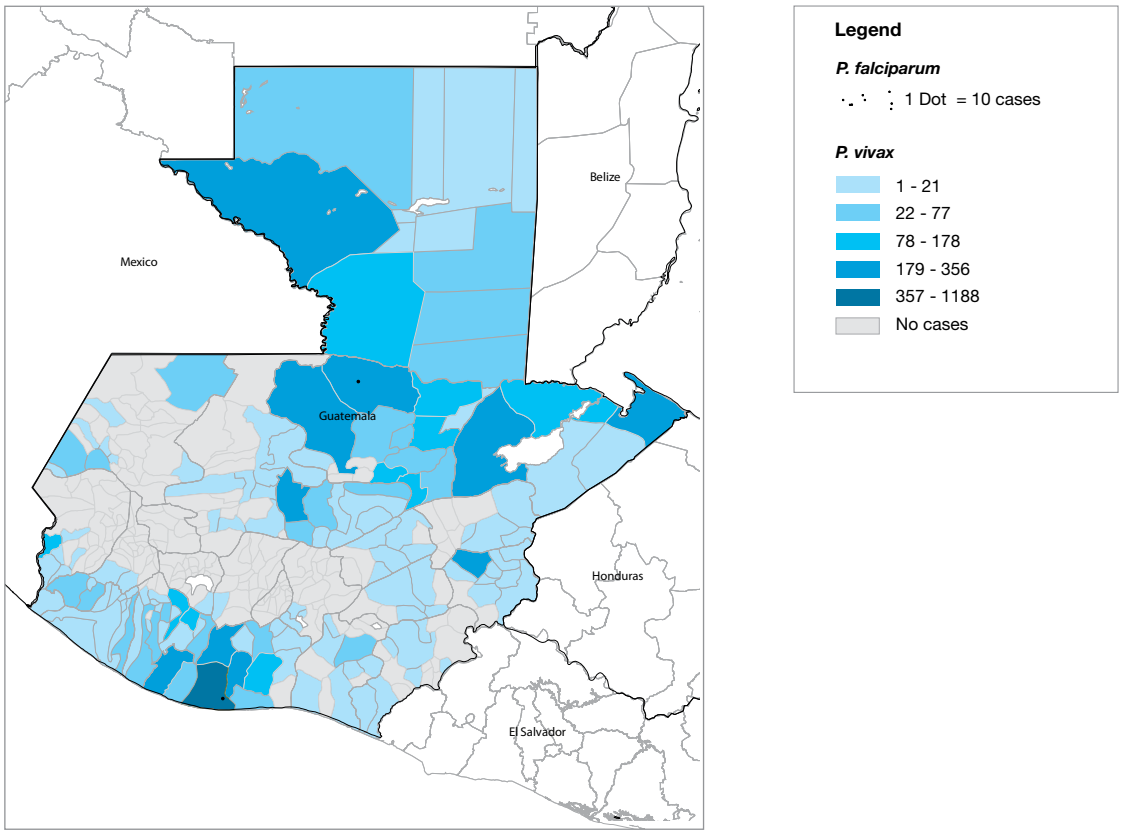
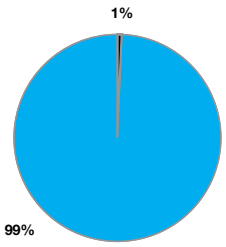


Figure 2. Proportion of cases by species, 2008



***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
Escuintla	15	2,412	2,427
Alta Verapaz	19	1,527	1,546
Izabal	0	642	642
Peten	0	560	560
Suchitepequez	0	422	422
Baja Verapaz	1	396	397
Chiquimula	1	288	289
Ixcan	9	189	198
San Marcos	0	151	151
Retalhuleu	0	136	136
Quetzaltenango	2	113	115
Huehuetenango	0	113	113
Santa Rosa	2	68	70
Quiche	1	45	46
Jutiapa	0	26	26
Jalapa	0	16	16
El Progreso	0	15	15
Zacapa	0	13	13
Chimaltenango	1	3	4
Solola	0	3	3
Guatemala	0	2	2

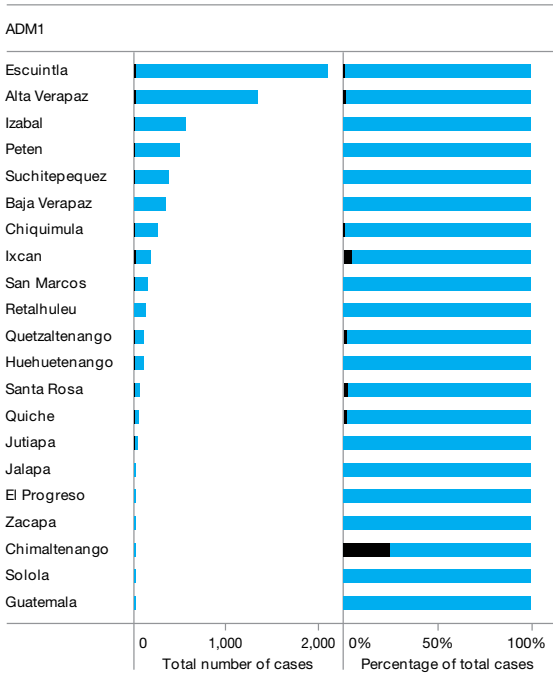


Figure 4. Number of cases by species, 2000-2008

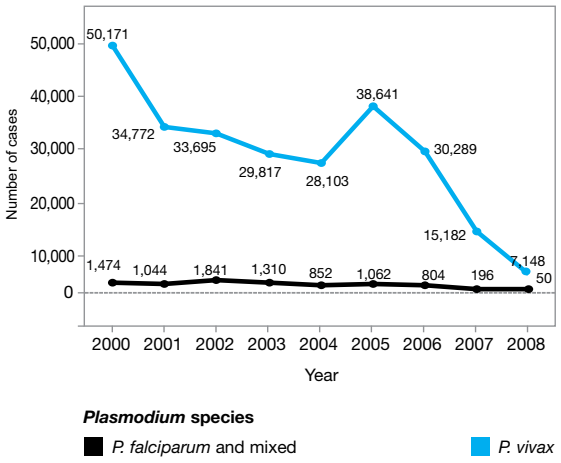


Figure 5. Number of malaria cases, 2000-2008

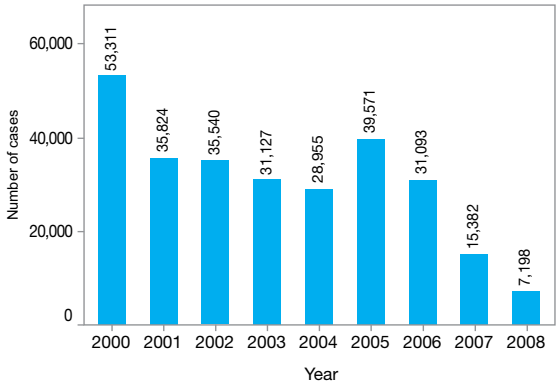


Figure 6. Number of malaria deaths, 2000-2008

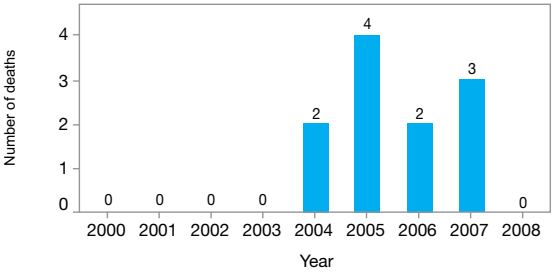


Figure 7. Number of hospitalized malaria cases, 2000 - 2008

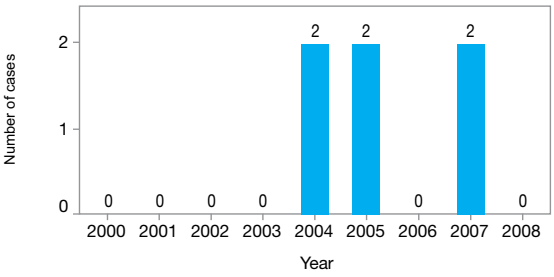


Figure 8. Annual variations in number of cases

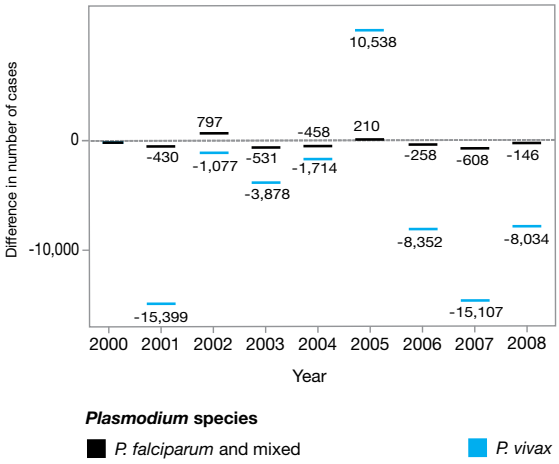


Figure 9. Percentage difference in number of cases compared to 2000

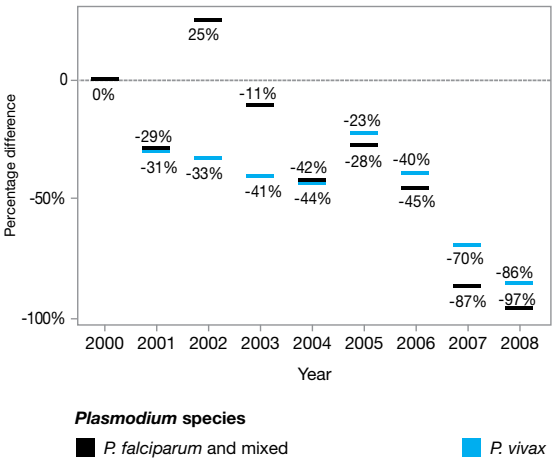


Figure 10. Number of cases and RBM / MDG targets for 2010 and 2015

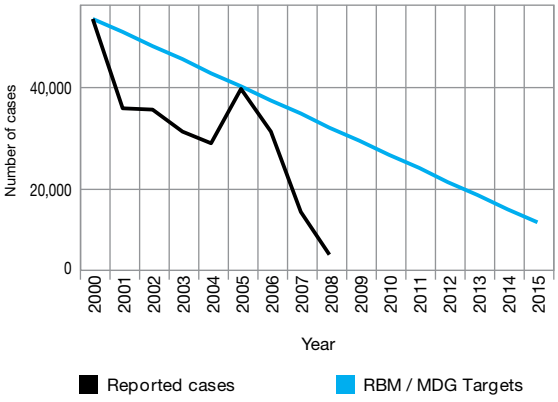


Figure 11. Percentage of hospitalized cases, 2008

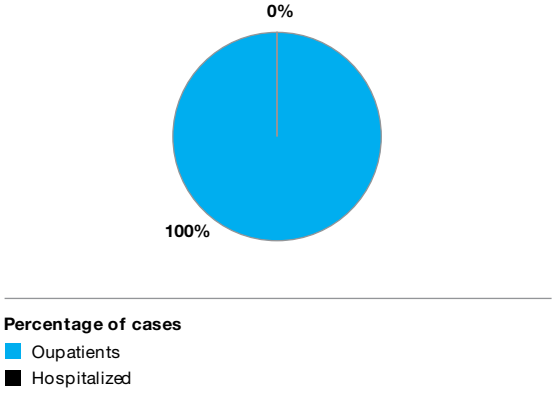
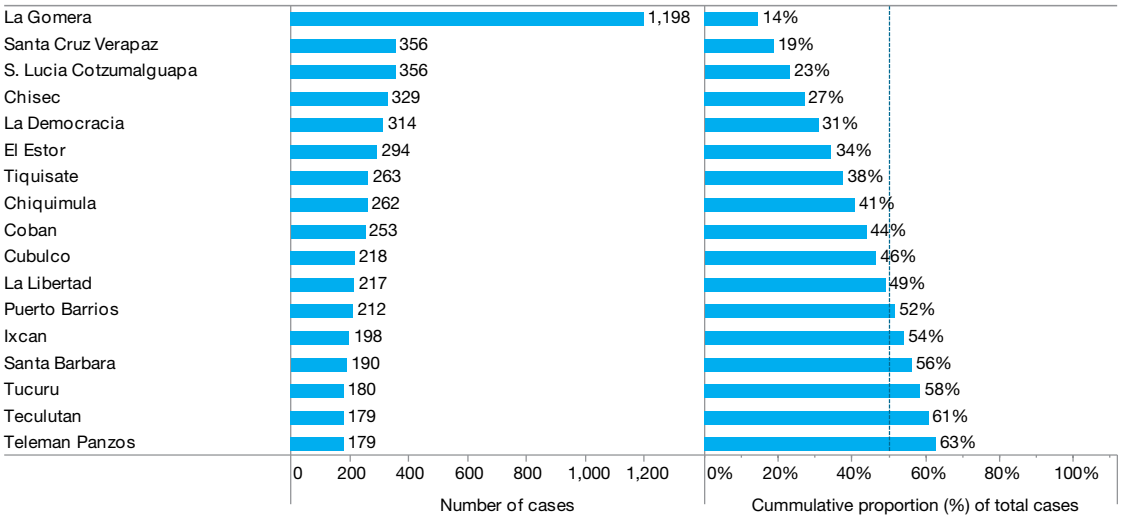


Figure 12. Districts (ADM2) with highest malaria burden and cummulative proportion of total cases in the country, 2008



* See Annex A for a complete list.

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

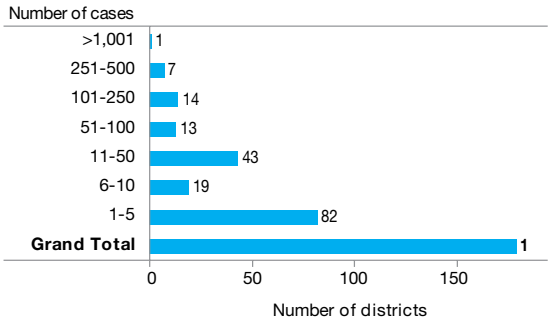


Figure 14. Districts (ADM2) by number of *P. falciparum cases*, 2008

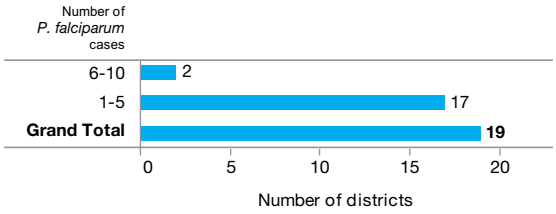


Figure 15. Districts by number of cases, API and percentage of *P. falciparum* cases, 2008

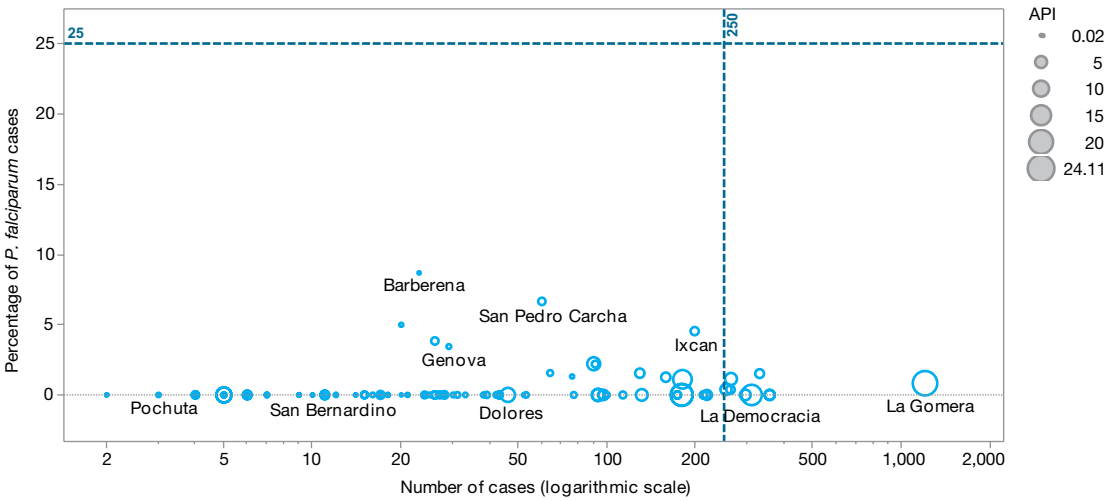


Figure 16. Annual Parasite Index (API) by districts (ADM2), 2008

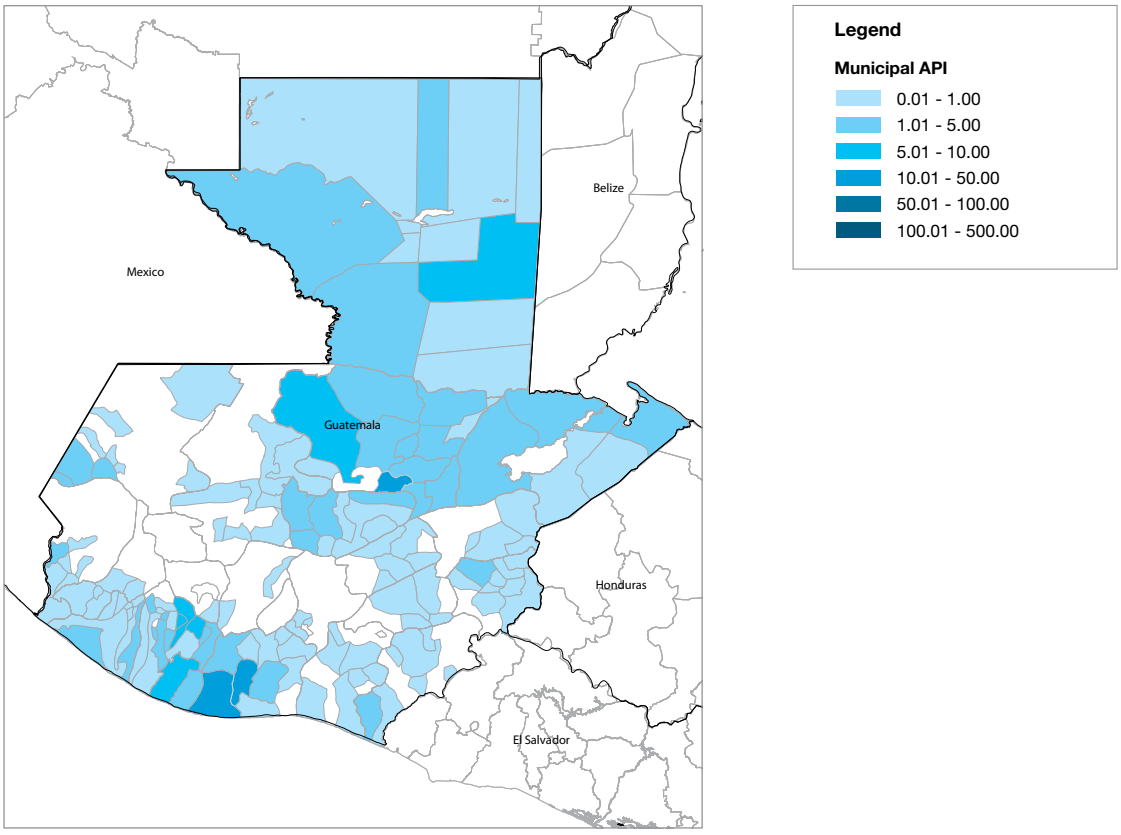


Figure 17. Population by malaria transmission risk, 2008

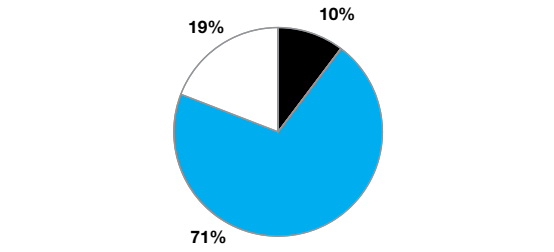
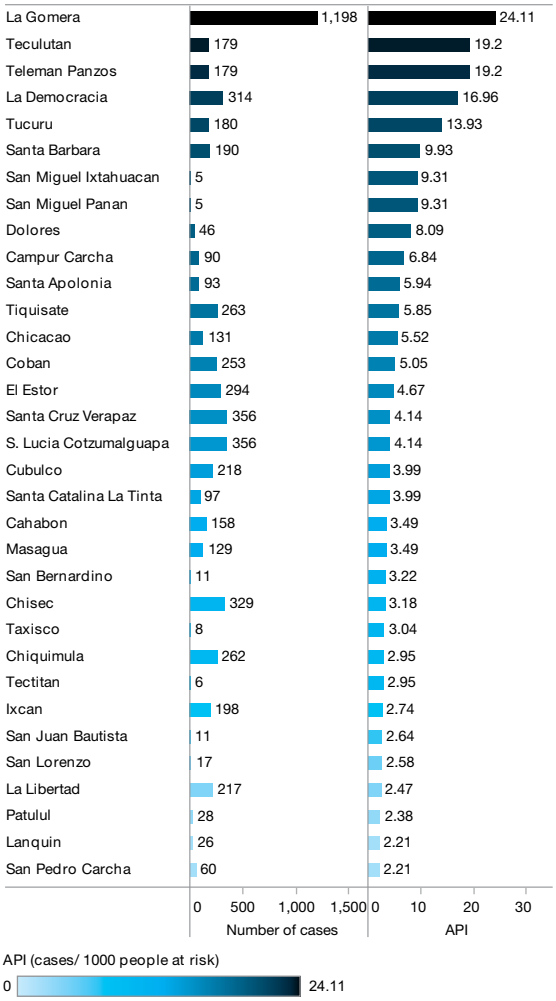


Figure 18. Annual Parasite Index (API) and number of cases by district*, 2008



* 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	884,000	1,277,000	751,000	8,473,000
2001	705,000	1,478,000	1,763,000	5,420,000
2002	521,000	1,715,000	2,582,000	6,366,000
2003	600,000	2,562,000	2,110,000	5,957,000
2004	638,000	1,741,000	6,188,000	5,957,000
2005	337,000	1,386,000	2,453,000	4,686,086
2006	333,000	986,000	2,582,000	2,578,533
2007	101,854	300,731	3,138,886	9,803,300
2008	---	771,456	5,303,141	1,436,584

--- Data not available

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

Year	Number of slides examined	Number of slides positive	Slide Positivity Rate (%)
2000	246,642	53,311	21.61
2001	198,114	35,824	18.08
2002	197,113	35,540	18.03
2003	156,227	31,127	19.92
2004	148,729	28,955	19.47
2005	178,726	39,571	22.14
2006	168,958	31,093	18.4
2007	129,410	15,382	11.89
2008	170,188	7,198	4.23

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

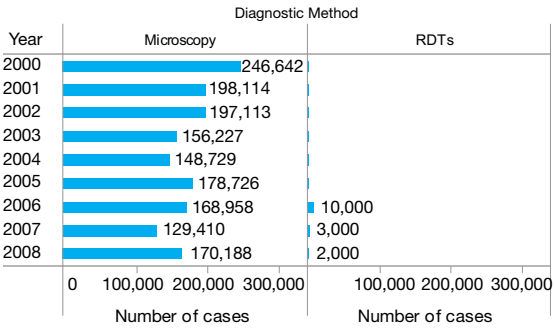


Figure 22. Number of cases diagnosed and cases treated, 2000-2008

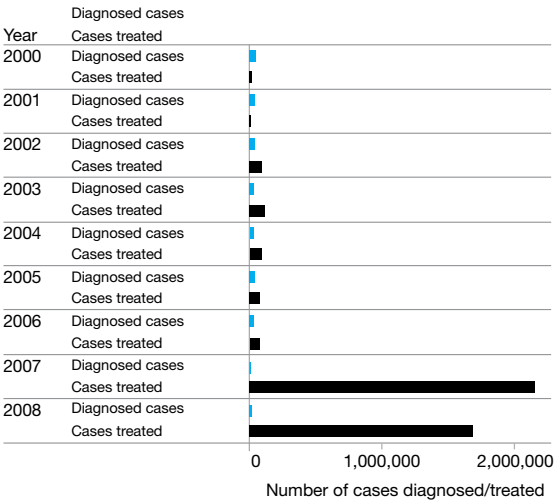
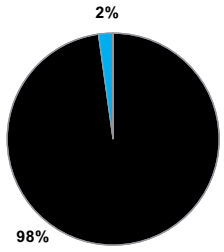


Figure 23. Slide Positivity Rate (SPR) by ADM1, 2008

ADM1	Examined	Total cases	SPR (%)
Escuintla	13,367	2,427	18.2
Alta Verapaz	29,826	1,546	5.2
Izabal	8,066	642	8.0
Peten	119,602	560	0.5
Suchitepequez	5,147	422	8.2
Baja Verapaz	3,246	397	12.2
Chiquimula	---	289	
Ixcan	10,601	198	1.9
San Marcos	2,543	151	5.9
Retalhuleu	1,235	136	11.0
Quetzaltenango	1,025	115	11.2
Huehuetenango	8,814	113	1.3
Santa Rosa	1,684	70	4.2
Quiche	4,470	46	1.0
Jutiapa	5,296	26	0.5
Jalapa	1,253	16	1.3
El Progreso	476	15	3.2
Zacapa	576	13	2.3
Chimaltenango	84	4	4.8
Solola	17	3	17.6
Guatemala	190	2	1.1
Ixil	0	0	

--- Data not available

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

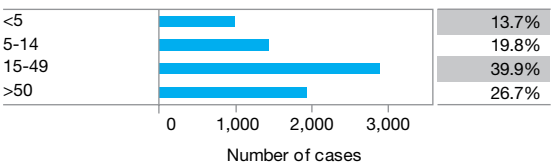


Figure 26. Number and percentage of cases by locality type, 2008

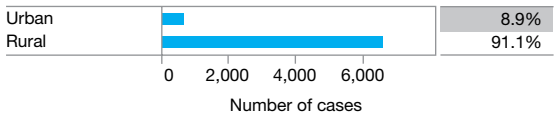


Figure 27. Number and percentage of cases in pregnant women among women of child bearing age, 2008

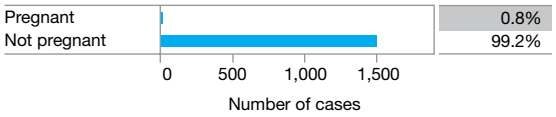


Figure 28. Number and percentage of cases in indegenous population, 2008

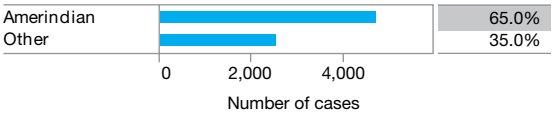


Figure 29. Proportion of *P. falciparum* cases. 2000-2008

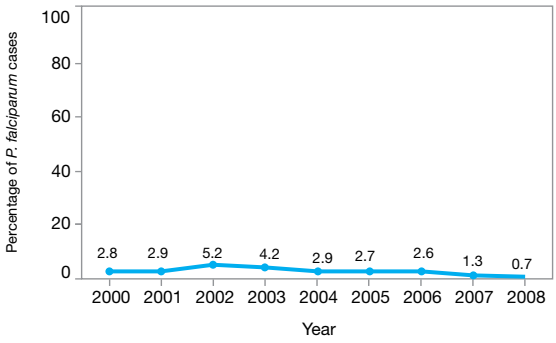


Figure 30. Number of ACT treatments distributed by year, 2000-08

Not Distributed

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

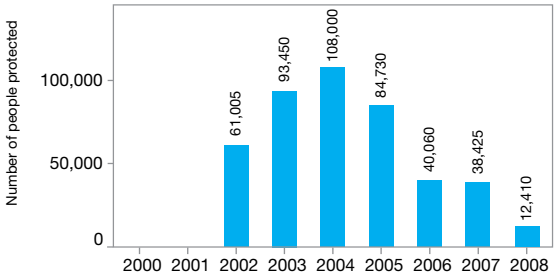


Figure 32. Number of LLINs distributed by year, 2000-2008

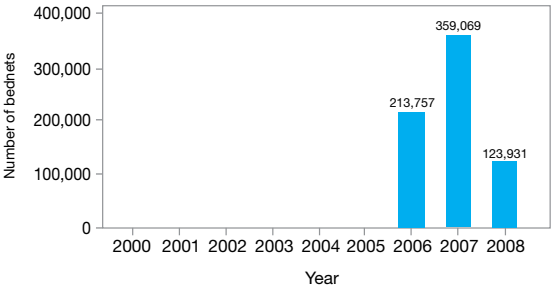
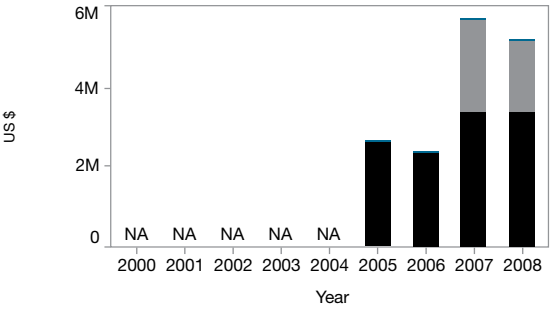


Figure 33. Number of ITNs distributed by year, 2000-08

Not Distributed

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



Financing sources

USAID
UN agencies
Other bilateral funds
Global Fund
Government

NA - Data not available