

# 9 | El Salvador

## Overview of the situation

### Figures 1-5

Among malaria endemic countries in the Region, El Salvador has the lowest incidence. In 2008, the country reported 33 cases of malaria, 22 of them autochthonous and caused by *Plasmodium vivax*. The remaining 11 cases were imported and, of those, nine were by *P. vivax*, one was a case of *P. vivax* infection associated with an infection by *P. falciparum*, and another was by *P. malariae*. Of the imported cases, eight were originally from Guatemala (73%), two from Honduras (18%), and one from Africa (9%). The growing number of imported cases, averaging 40% of cases reported over the last three years, highlights the need for intense and ongoing active surveillance. Malaria incidence has declined dramatically in the last two decades, and reached very low transmission levels by 2008, especially when compared to the early 1980s, when the country's burden of disease was almost 100,000 cases.

Historically, the mosquito *Anopheles albimanus* has been the vector species responsible for malaria transmission in El Salvador. Populations of this species with high levels of resistance to insecticides have been described.

Although important gains have been made in recent years, there is a risk that transmission will be reestablished in disease-free areas. The risk is a result of the following factors: i) the persistence of autochthonous malaria in some

departments coupled with constant domestic migration of the population; ii) the presence of cases of asymptomatic malaria, which go undetected by conventional blood slide examinations; iii) the presence of the vector species and iv) existing malaria transmission in the rest of Central America, where migration between countries, including El Salvador, is frequent.

## Morbidity and mortality trends

### Figures 4 – 9

The number of malaria cases fell most sharply between 2000 and 2001 (48%) and, again, between 2001 and 2002 (32%). Between 2000 and 2008, the number of cases dropped by 96%, with only 33 cases reported at the end of 2008. The decline is due, in part, to an improvement in surveillance activities. Deaths from malaria were last reported in El Salvador in 1984, and the last autochthonous case of *P. falciparum* malaria was reported in 1994.

## Geographical distribution

### Figures 1, 12-19

Santiago Texacuangos was the Municipality with the largest number of autochthonous malaria cases in 2008. It reported 11 cases, or 50% of all autochthonous cases reported in the country. San Francisco Menendez claimed the second highest number, with four cases reported in 2008, or

18% of the total number of cases in the country. The remaining seven cases were reported in six other municipalities.

The high number of cases in Santiago Texacuangos resulted from an isolated malaria outbreak. Six cases occurred in the municipality between epidemiological weeks 4 and 5. That outbreak produced another five cases at the end of the year, between weeks 46 and 52. The epidemic behavior of malaria in this municipality can be attributed to: i) the area's vulnerability to climate changes; ii) the presence of asymptomatic cases undetected by conventional blood slide examinations; iii) geographic, environmental and climatic conditions favorable to propagation of the vector and iv) social and cultural factors that hamper the use of preventive and control measures by the population.

Economic activities are another important element in malaria transmission in Santiago Texacuangos. Local residents depend on tourism and fishing on the shore of lake Ilopango as a source of income. Tourists come both from other areas of El Salvador and from abroad. The visitors are at risk of acquiring malaria in the area, and of carrying the infection and introducing it into transmission-free areas. There is also a risk that a new species of *Plasmodium* will be brought in by a carrier visiting from a neighboring country.

Residual transmission was responsible for the rest of the autochthonous cases in other municipalities.

### Malaria in specific populations

#### Figures 25–28

Of all malaria cases reported in the country, 11 (33%) were imported. Of these, 91% occurred among people between 15 and 44 years of age.

These are individuals in productive age, and primarily agricultural workers (33%) and road construction workers (27%). Economic activity was the reason for immigration in each of the imported cases. Two of the latter cases were reported in urban areas of the municipalities of San Salvador and San Marcos. In 2008, a case of malaria associated with *P. vivax* and *P. falciparum* was detected in a pregnant woman from Honduras; the case required hospitalization. A case from Africa by *P. malariae* was also detected.

In 2008, autochthonous cases of malaria affected mostly the population groups between of 15 and 49 years of age, and were exclusively reported in rural areas.

### Diagnosis and treatment

#### Figures 20-24, 29–30

In 2008, 97,872 blood slide examinations were conducted for malaria diagnosis, yielding an annual blood examination rate (ABER) of 1%. The departments with the highest ABER and the best rates of surveillance were La Paz (4%), Usulután (4%), Ahuachapán (3%), Chalatenango (3%) and La Unión (3%). The slide positivity rate was less than 0.1%.

Radical treatments administered in El Salvador consist of combined chloroprimaquine tablets, i.e., chloroquine 1,500 mg and primaquine 150 mg daily for five days. All suspected cases in 2008 had access to timely diagnosis and treatment within 72 hours of the onset of symptoms.

The country's strategy for solidifying achievements in malaria control includes actions that target the vector, the environment and people. Foremost among surveillance activities are collective case finding, case investigation, the administration of presumptive combined

treatment in single dose schemes, and the collective and selective drug administration to high-risk populations.

This strategy has been recently bolstered by the addition of epidemiological case surveillance through active and passive detection within public health services. Surveillance today emphasizes timely detection and treatment of autochthonous cases and their contacts (due to residual transmission in endemic municipalities), and timely detection and treatment of suspected clinical cases among travelers at border crossings, airports and ports. Surveillance is also conducted in places like mills, estates, and handmade brick and tile factories, where populations at risk are known to seek temporary employment.

### Prevention and vector control

#### **Figures 31-33**

The vector of malaria in El Salvador is the mosquito *An. albimanus*. Although *An. pseudopunctipennis* is also present, its role as a vector of malaria has not been scientifically proven.

The use of IRS as a malaria control strategy continued in 2008. It was implemented as part of a comprehensive control strategy that included

a breeding site control component and community participation. Residual spraying actions are determined by the flow of tourists, and trends in domestic and foreign migration. Spraying was also used along the country's borders with Honduras and Guatemala.

### Financing of malaria control

#### **Figure 34**

In 2008, the Government provided all the funding for malaria prevention and control activities. Between 2005 and 2007, innovative and sustainable activities were conducted with PAHO's assistance under the DDT/GEF in pilot demonstration areas in the municipalities of Chalchuapa in the Department of Santa Ana; Armenia, Department of Sonsonate; Jiquilisco, Department of Usulután; and San Luis Talpa, San Pedro Masahuat, San Luis, and La Herradura, all in the Department of La Paz.

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

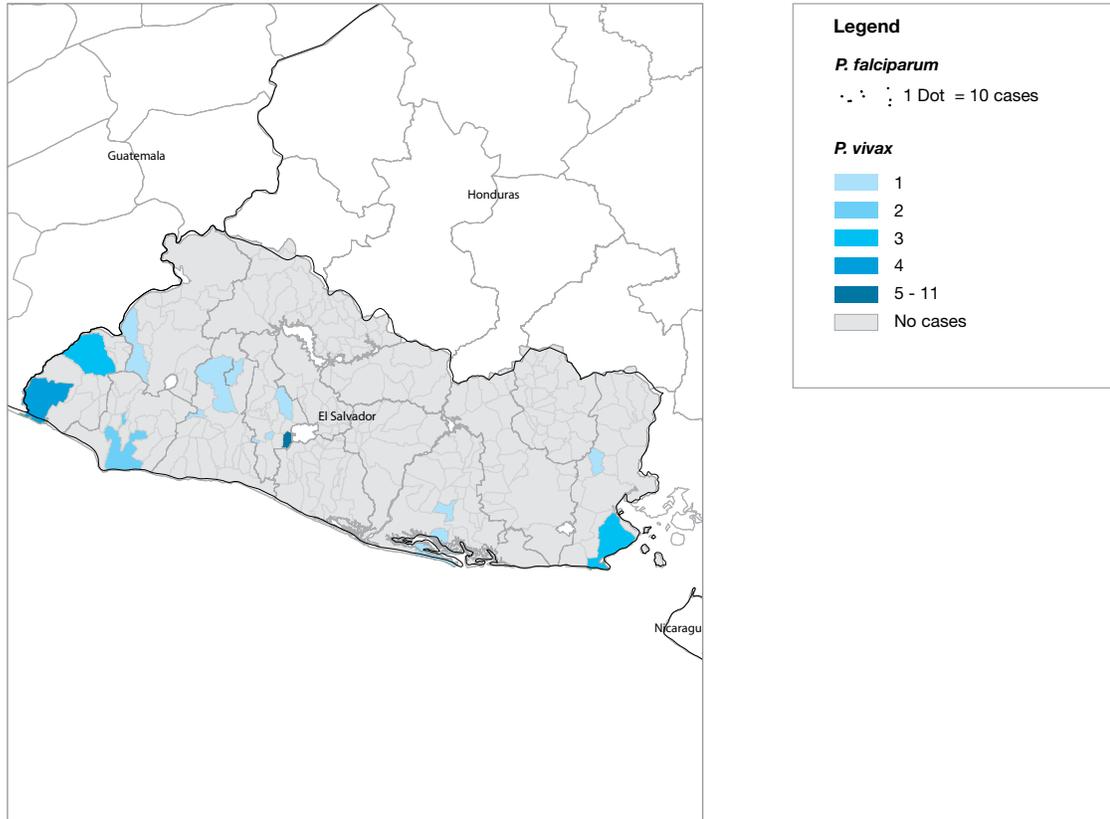
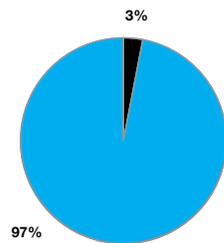


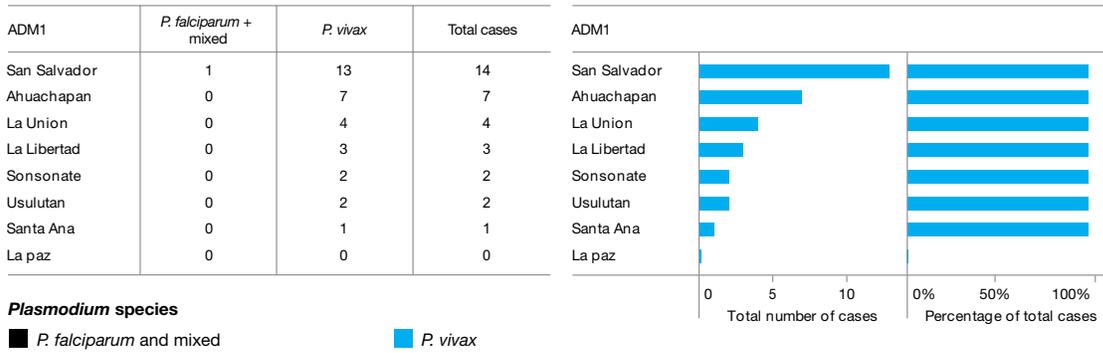
Figure 2. Proportion of cases by species, 2008



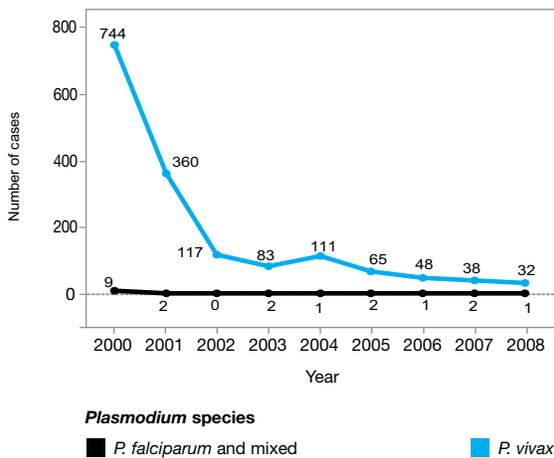
**Plasmodium species**

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

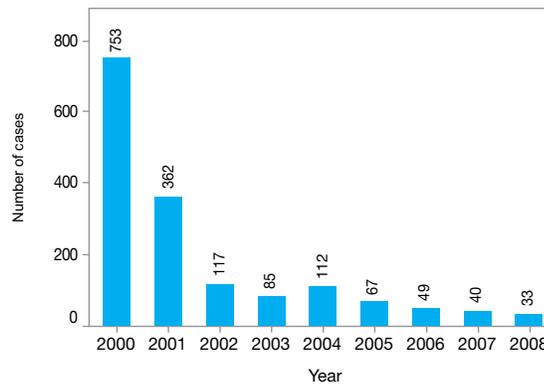
**Figure 3. Number of malaria cases by species by ADM1 level in 2008**



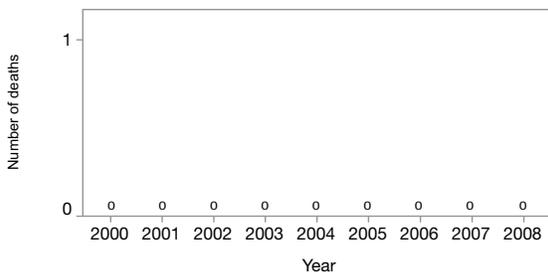
**Figure 4. Number of cases by species, 2000 - 2008**



**Figure 5. Number of malaria cases, 2000 - 2008**



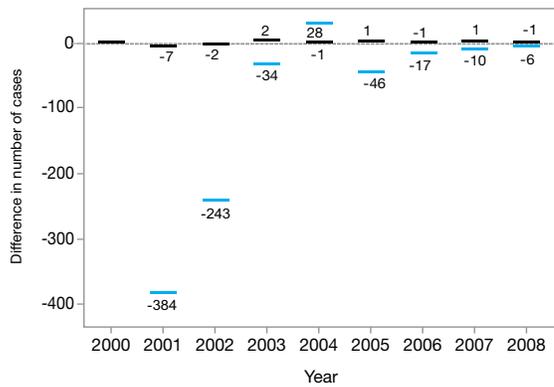
**Figure 6. Number of malaria deaths, 2000-2008**



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



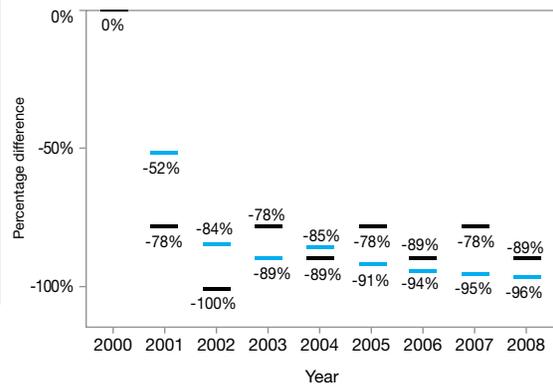
**Figure 8. Annual variations in number of cases**



**Plasmodium species**

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

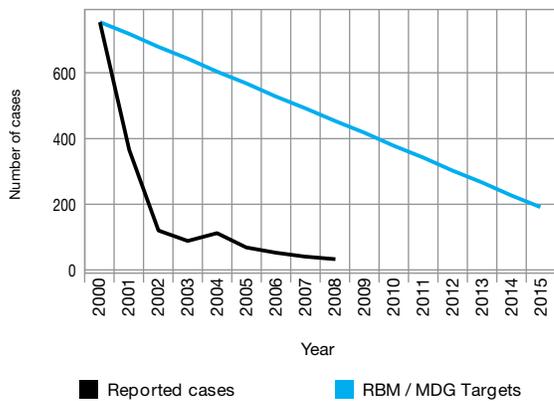
**Figure 9. Percentage difference in number of cases compared to 2000**



**Plasmodium species**

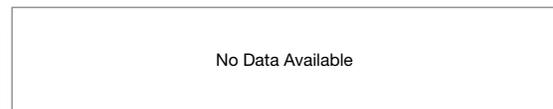
■ *P. falciparum* and mixed      ■ *P. vivax*

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

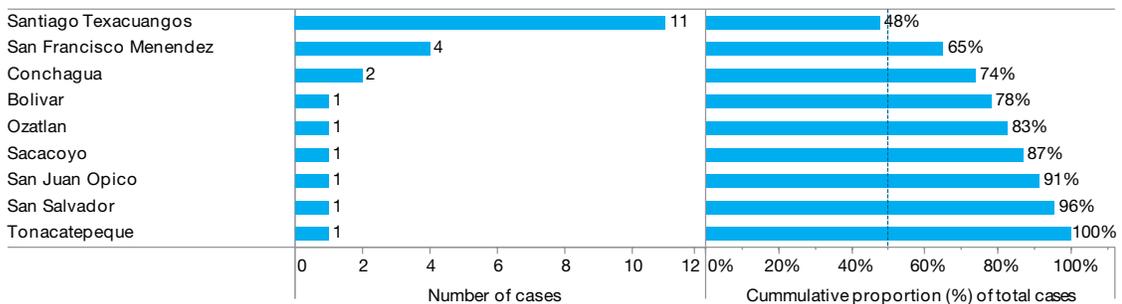


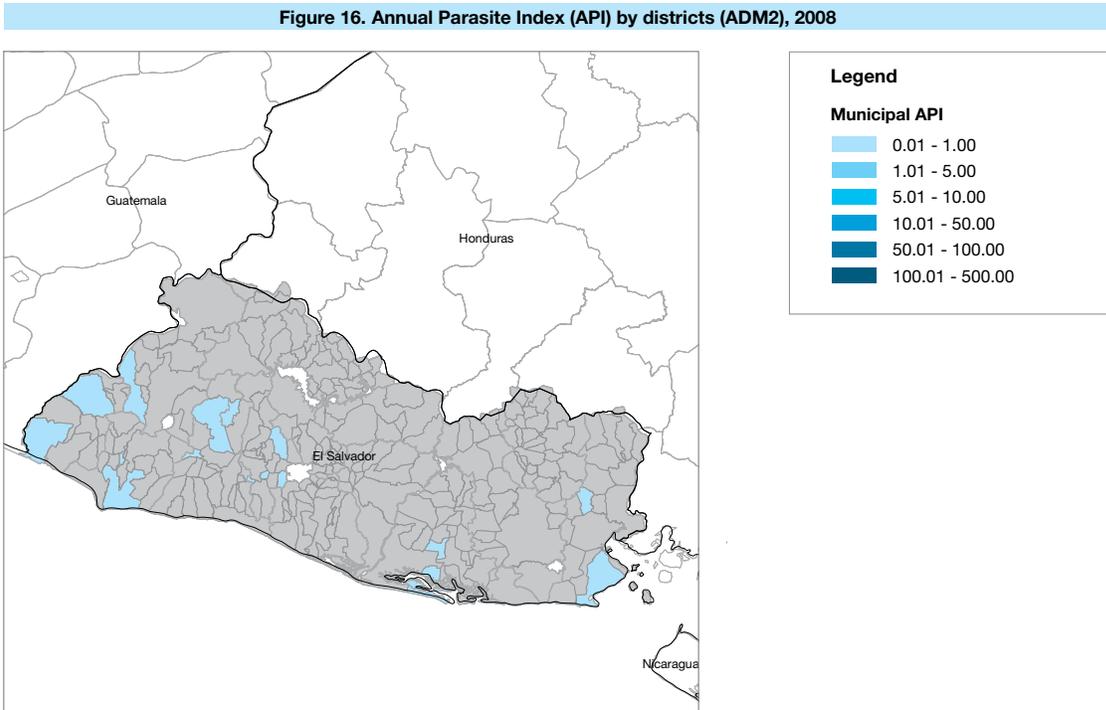
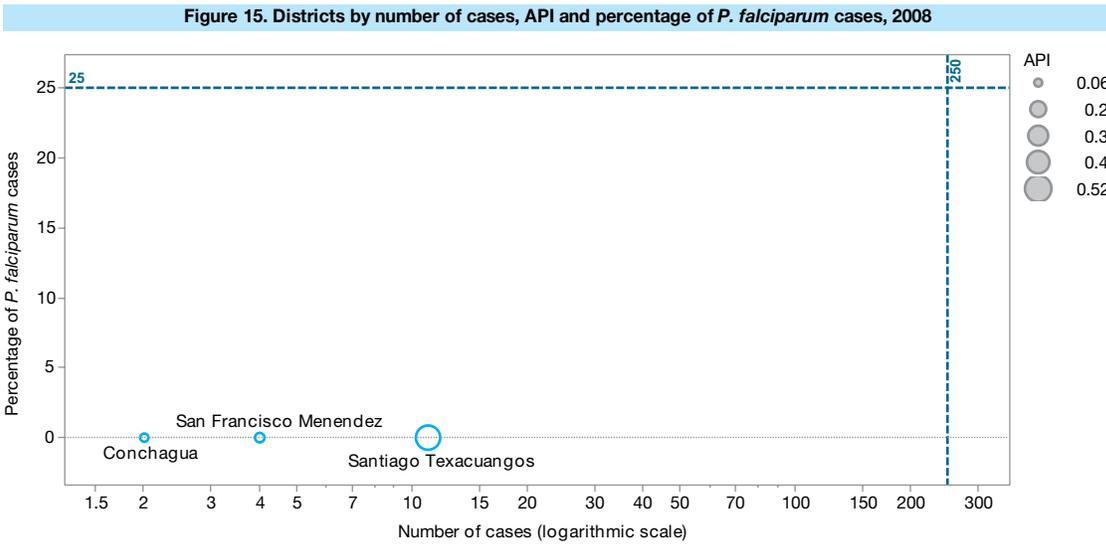
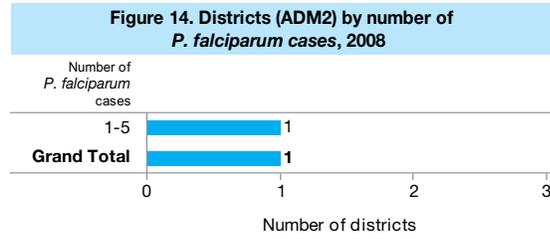
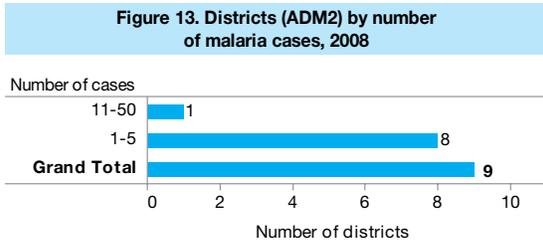
■ Reported cases      ■ RBM / MDG Targets

**Figure 11. Percentage of hospitalized cases, 2008**

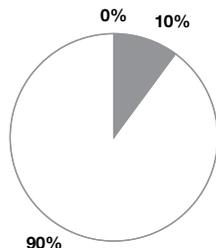


**Figure 12. Districts (ADM2) with highest malaria burden and cumulative proportion of total cases in the country, 2008**





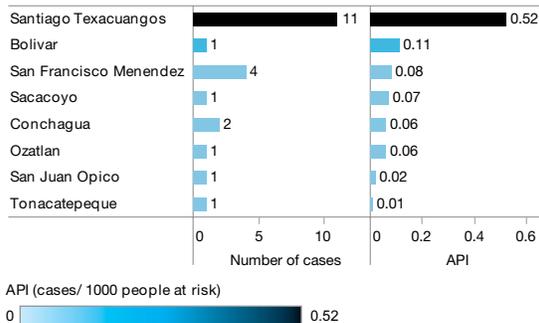
**Figure 17. Population by malaria transmission risk, 2008**



**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**



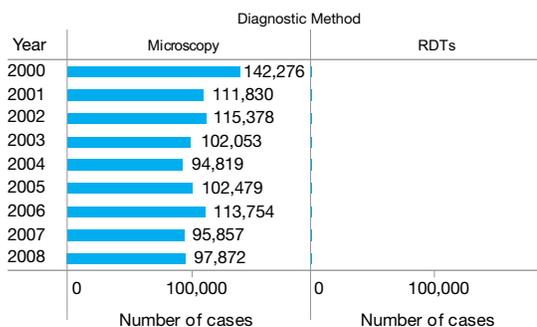
**Figure 19. Population by malaria transmission risk, 2000-08**

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	1,350,000	907,000	3,143,000	878,000
2001	0	2,283,000	3,179,000	889,000
2002	0	2,641,000	3,789,000	0
2003	0	5,000	2,714,000	3,925,000
2004	0	5,000	2,714,000	3,925,000
2005	0	1,273,000	318,000	745,976
2006	4,032,000	2,234,000	725,000	1,380,366
2007	4,032,000	2,234,000	725,000	1,380,366
2008	0	0	705,541	

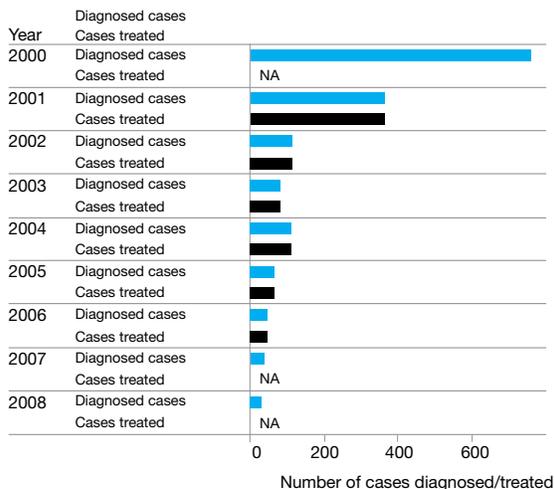
**Figure 20. Slides examined and Slide Positivity Rate (SPR), 2000-2008**

Year	Number of slides examined	Number of slides positive	Slide Positivity Rate (%)
2000	142,276	753	0.53
2001	111,830	362	0.32
2002	115,378	117	0.1
2003	102,053	85	0.08
2004	94,819	112	0.12
2005	102,479	67	0.07
2006	113,754	49	0.04
2007	95,857	40	0.04
2008	97,872	33	0.03

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



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

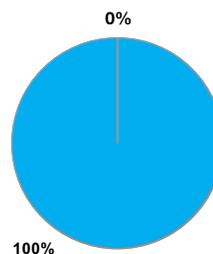


NA- No Data Available

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

ADM1	Examined	Total cases	SPR (%)
San Salvador	3,709	14	0.38
Ahuachapan	9,488	7	0.07
La Union	10,485	4	0.04
La Libertad	5,342	3	0.06
Sonsonate	7,211	2	0.03
Usulután	13,867	2	0.01
Santa Ana	9,167	1	0.01
Cabanas	1,756	0	0
Chalatenango	6,223	0	0
Cuscatlan	3,102	0	0
La paz	14,712	0	0
Morazan	1,788	0	0
San Miguel	7,609	0	0
San Vicente	3,413	0	0

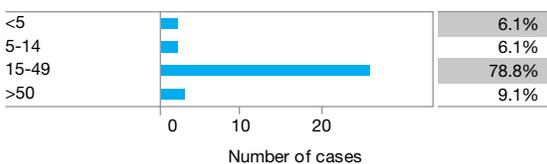
**Figure 24. Time span between onset of symptoms and diagnosis, 2008**



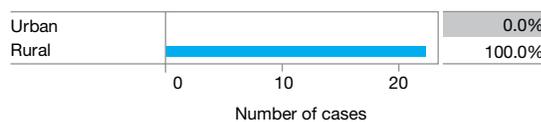
**Time span between onset of symptoms and diagnosis**

■ >72 hours  
■ <72 hours

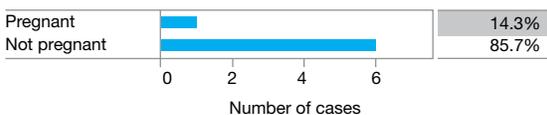
**Figure 25. Number and percentage of cases by age group, 2008**



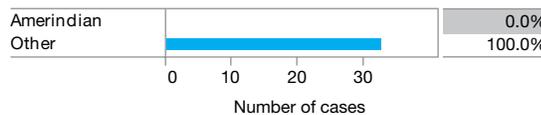
**Figure 26. Number and percentage of cases by locality type, 2008**



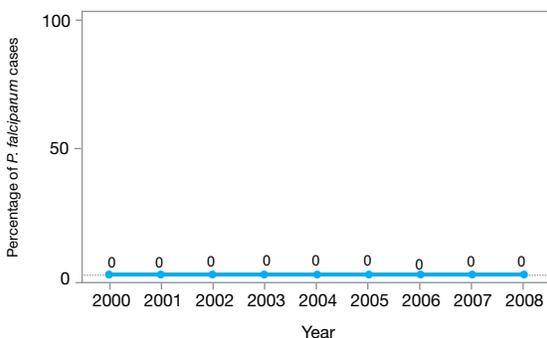
**Figure 27. Number and percentage of cases in pregnant women among women of child bearing age, 2008**



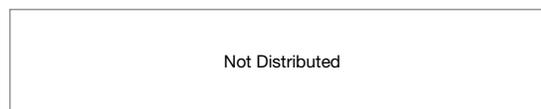
**Figure 28. Number and percentage of cases in indigenous population, 2008**



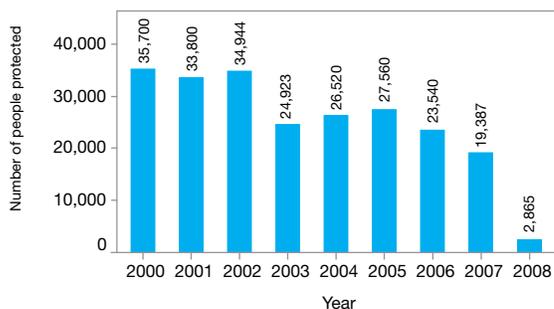
**Figure 29. Proportion of *P. falciparum* cases, 2000-2008**



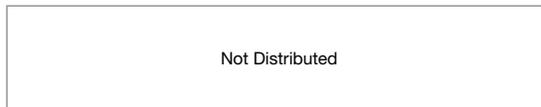
**Figure 30. Number of ACT treatments distributed by year, 2000-08**



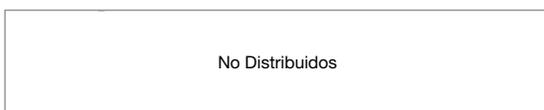
**Figure 31. Indoor residual spraying coverage by year, 2000-08**



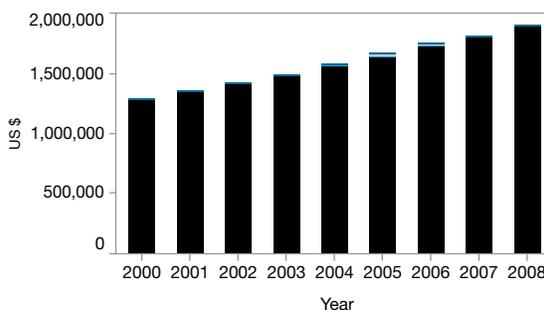
**Figure 32. Number of LLINs distributed by year, 2000-2008**



**Figure 33: Number of ITNs distributed by year, 2000-2008**



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



**Financing sources**

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