

8 | Ecuador

Overview of the situation

Figures 1-5

A total of 4,986 cases of malaria, with an API of 0.4 per 1,000 population, were reported in Ecuador in 2008. This was the lowest rate reported among Amazon countries. Furthermore, the country reported the lowest number of cases by *Plasmodium falciparum* of any endemic Amazon country. The annual parasite index (API) was similar to that of several Central American countries.

Malaria in Ecuador has been endemic, particularly along the coast, where the *Anopheles albimanus* species has been the main vector of infection, and where shrimp farms provide suitable habitats for the species. Malaria transmission is also focalized in the country's Amazon region, where the species *Anopheles darlingi* is the vector of transmission. The number of cases reported in the Amazon region, however, is historically much lower than the number reported along the Pacific coast.

During the past decade, the country's burden of disease was highest in the northern Province of Esmeraldas, on the Colombian border. However, case distribution has changed over the past two years. Cases in Esmeraldas have decreased markedly, while transmission levels in southern Colombia remain high.

The main focus of transmission in 2008 was in southern Ecuador, in the Province of El Oro. There, the Huaquilla canton reported 719 cases, 15% of the national total, almost all by *Plasmodium vivax*. Because this area borders Peru, the dynamics of its transmission are influenced by human migration and the activities of the border communities.

The Orellana canton in Pichincha Province had second highest in morbidity, with 466 cases of infection, almost all by *P. vivax*

Morbidity and mortality trends

Figures 4 – 9

In recent years, Ecuador's trend towards reducing malaria has been among the sharpest in the hemisphere. After reporting over 100,000 cases at the beginning of the decade, of which almost 50,000 were by *P. falciparum*, the country reported only 491 cases by the species in 2008, the lowest annual number in the past decade. The number of cases of *P. falciparum* malaria fell by 99% between 2000 and 2008, and by 92% for cases by *P. vivax*. In addition, the decrease in cases reported between 2007 and 2008 was sharper than the one between 2006 and 2007. The small number of cases of *P. falciparum* malaria is also reflected in the low mortality from the disease. The country reported only one death from malaria in 2008.

Geographical distribution

Figures 1, 12-19

During 2008, malaria in Ecuador was more focalized than in other countries of the Amazon Basin. The cantons of Huaquillas and Orellana together accounted for almost 25% of the country's cases of malaria, and the cases in six cantons comprised 50% of the burden of disease. A map of cases reported in the same period shows foci of transmission in various regions of the country, but these are generally localities with very few cases. On the other hand, 93 cantons reported one or more cases of malaria, but of these, only 27 reported over 50 cases. Similarly, only three cantons reported more than 50 cases each of *P. falciparum* malaria.

Some of the municipalities reporting far fewer cases than Huaquillas and Orellana reported particularly high proportions of *P. vivax* malaria. This was the case in San Lorenzo, in Esmeraldas Province, which had 99 malaria cases, 63% of which were by *P. vivax*, and also in La Mana and Pangua in Cotopaxi, which reported fewer than 60 cases, 80% of them by *P. vivax*.

Although there are localities with a significant number of cases of malaria, the API calculated using the total population of the cantons was low. Ecuador's API is much lower than that in other countries, such as Brazil and Colombia, even in those cantons with the largest number of cases. Huaquillas reported the highest API, followed by Aguarico and Putumayo in the provinces of Orellana and Sucumbios, respectively.

The population considered at risk of contracting malaria in Ecuador has fallen sharply as a result of the steady decrease in the number of cases over the last six years.

Malaria in specific groups

Figures 25-28

In 2008, children under the age of 5 years accounted for 9% of all malaria cases, a percentage similar to that in other Amazon countries. This proportion is symptomatic of a predominantly indoor transmission dynamic. Ecuador's malaria information system is based on individual case reports, with database management that allows for follow-up at the local level. Malaria can only be classified as either urban or rural when localities are properly classified, but this information was not available for 2008. The information system also does not record ethnic origin.

The proportion of pregnant women with malaria relative to the number of women of childbearing age with malaria was much lower than that reported in Brazil and Guyana. This apparent underreporting of malaria in pregnancy is at odds with the achievements of recent years in the Esmeraldas Province. The low proportion of such cases in Esmeraldas in 2008 could have resulted from improvements in healthcare in this province that are not reflected in overall country figures.

Diagnosis and treatment

Figures 20-24, 29-30

Ecuador's slide positivity rate (SPR) in 2008 was 1.3%, its lowest in a decade. In 2000, the SPR was 19%. The number of blood slide examinations performed has remained relatively unchanged since 2002, but the proportion of positive slides has fallen by more than 99%. This is a result of efforts made by the control program to continue active case detection activities and implement testing among febrile patients. The search for febrile cases was particularly important in the

Province of El Oro, which reported the largest number of cases and had an SPR of 2.4%.

Changes in the malaria situation like those seen in Ecuador, where there are very few cases in several provinces, require that malaria programs modify their surveillance strategy. Early case detection through active search and efforts to improve access to blood slide examinations for febrile patients must be both efficient and sustainable.

In 2008, 56% of cases were diagnosed within 72 hours of the onset of symptoms. This means that access to diagnosis and treatment was delayed for a large percentage of symptomatic individuals, which could be contributing to the perpetuation of malaria transmission in some areas.

Ecuador, like most countries in the Region, is still in an early stage of implementing rapid diagnostic tests. A total of 2,758 such tests were performed in 2008, but only 0.7% of parasitological diagnosis resulted from this testing method.

Prevention and vector control

Figures 31-33

More than many countries in the Region, Ecuador has had significant experience with local-level use of insecticide-treated mosquito nets. Nonetheless, the implementation of long-lasting insecticidal nets is still incipient. Advances were made in LLIN implementation in 2008, with assistance from the Amazon Malaria Initiative

(AMI) financed by the United States Agency for International Development (USAID) and from the PAMAFRO project funded through the Global Fund. Ecuador has also counted on technical support from the PAHO.

A total of 383,390 people were protected in 2008 through indoor residual spraying with insecticides. Despite a sizeable reduction in the number of cases, spraying coverage remained at levels similar to those reached in 2002, when the number of cases was far greater. The sustained intensity and coverage of diagnosis and vector control activities may have been instrumental in reaching and maintaining the current epidemiological situation.

Financing of malaria control

Figure 34

In Ecuador, malaria control activities are heavily dependent upon the availability of government funds, which increased until 2006. Three years ago, the country joined the Global Fund's PAMAFRO Project, which helps with malaria control in border zones. Technical cooperation in several areas has been funded since 2001 by USAID, with coordination by PAHO. In 2008, the Global Fund approved funding for proposal for malaria control in Ecuador.

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

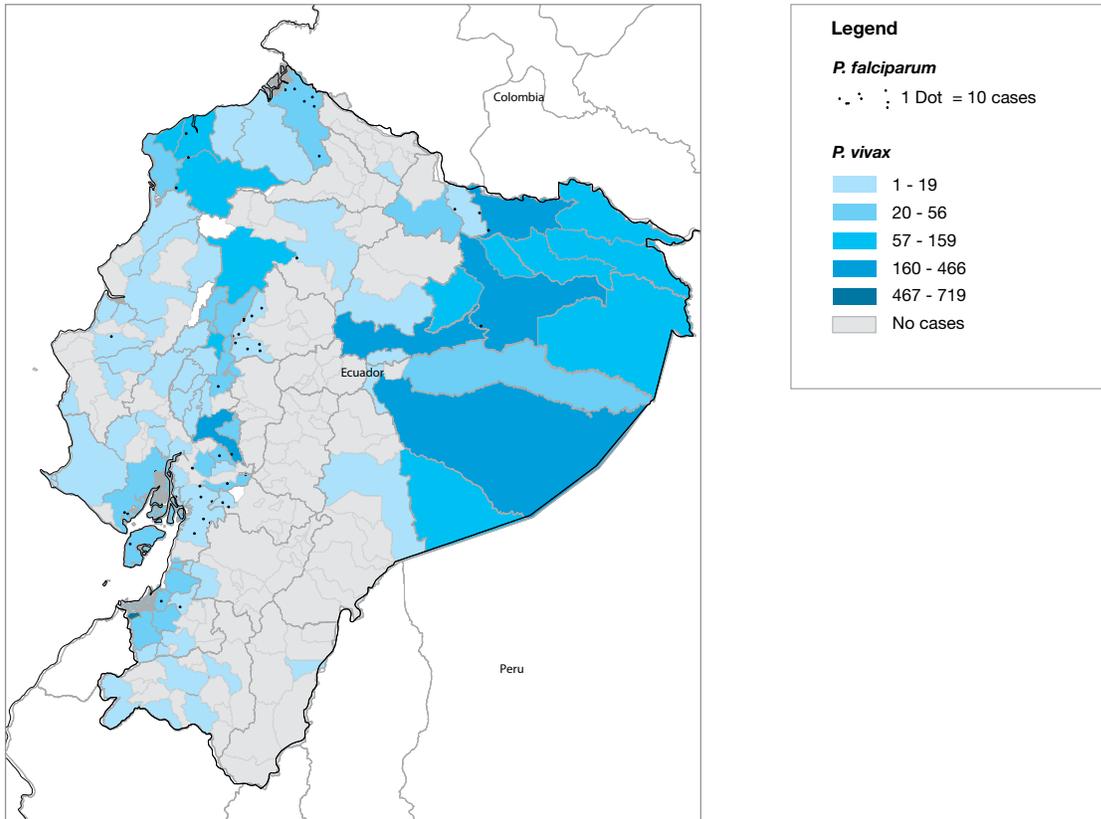
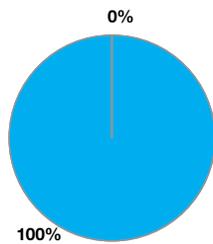


Figure 2. Proportion of cases by species, 2008



Plasmodium species

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

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

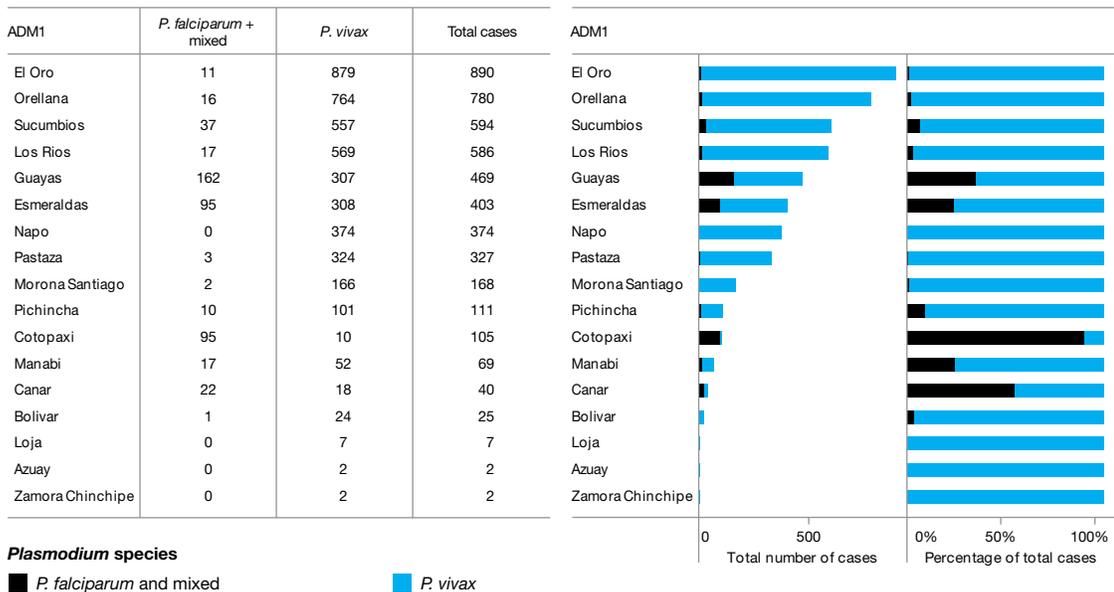


Figure 4. Number of cases by species, 2000 - 2008

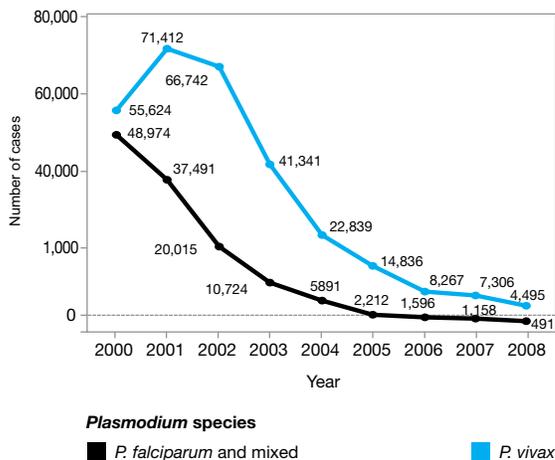


Figure 5. Number of malaria cases, 2000 - 2008

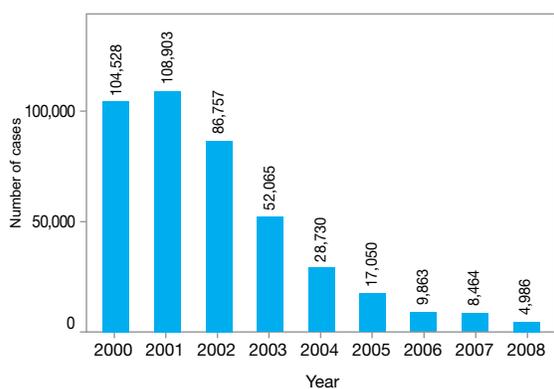


Figure 6. Number of malaria deaths, 2000-2008

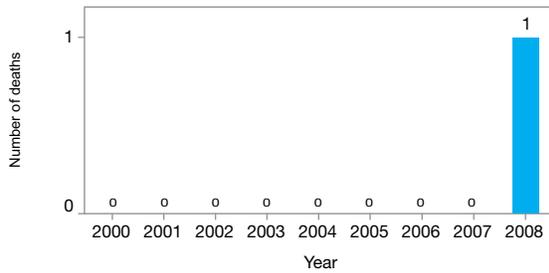


Figure 7. Number of hospitalized malaria cases, 2000 - 2008



Figure 8. Annual variations in number of cases

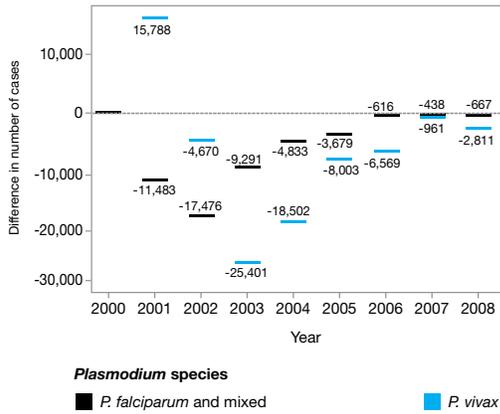


Figure 9. Percentage difference in number of cases compared to 2000

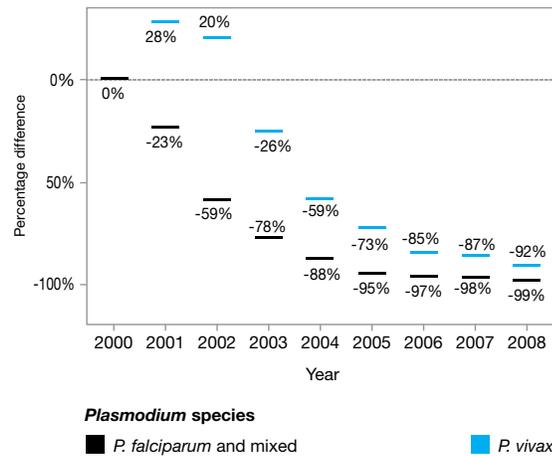


Figure 10. Number of cases and RBM / MDG targets for 2010 and 2015

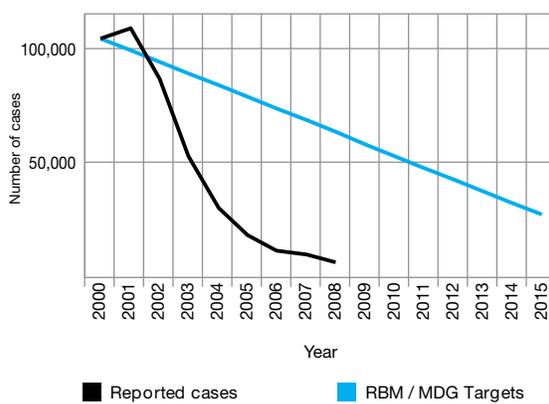
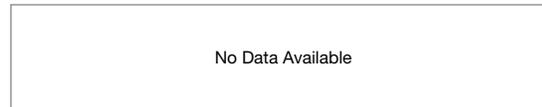
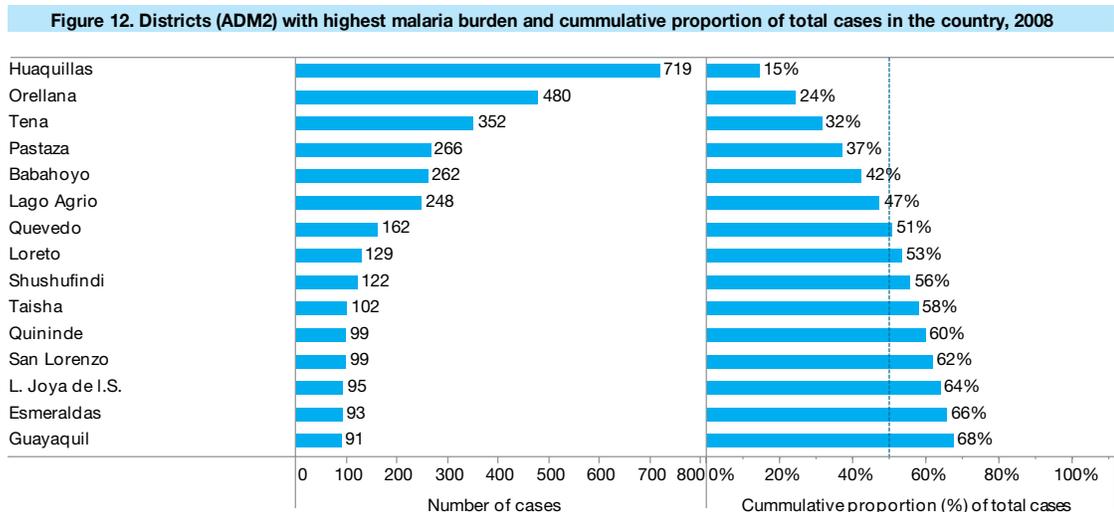
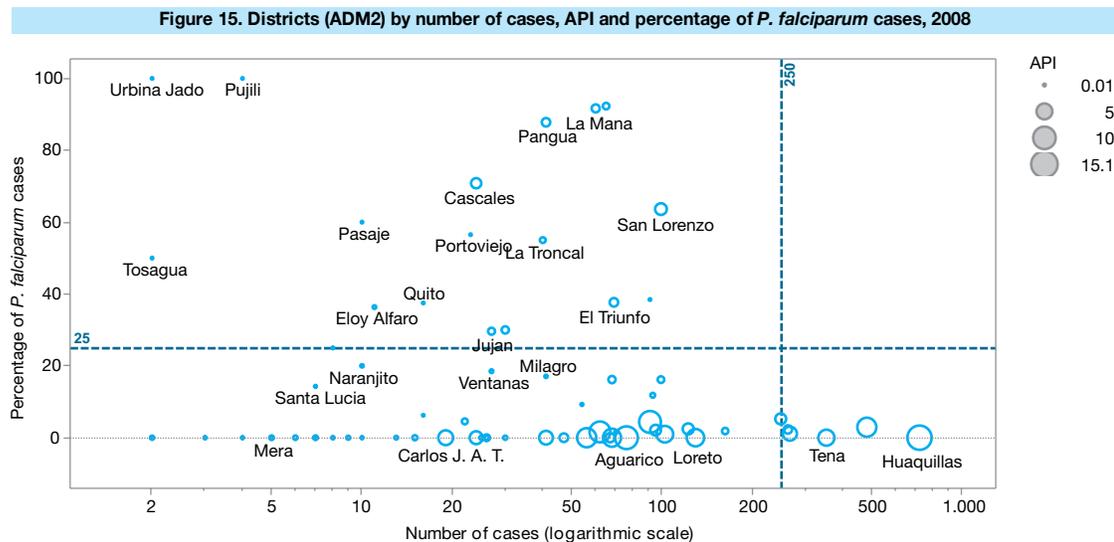
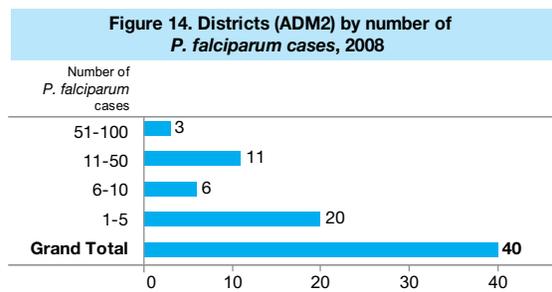
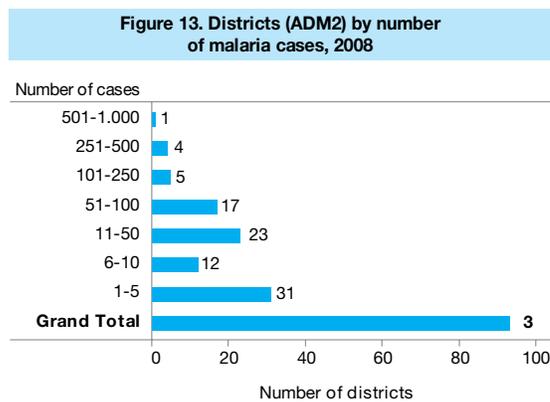


Figure 11. Percentage of hospitalized cases, 2008





* See Annex A for a complete list.



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

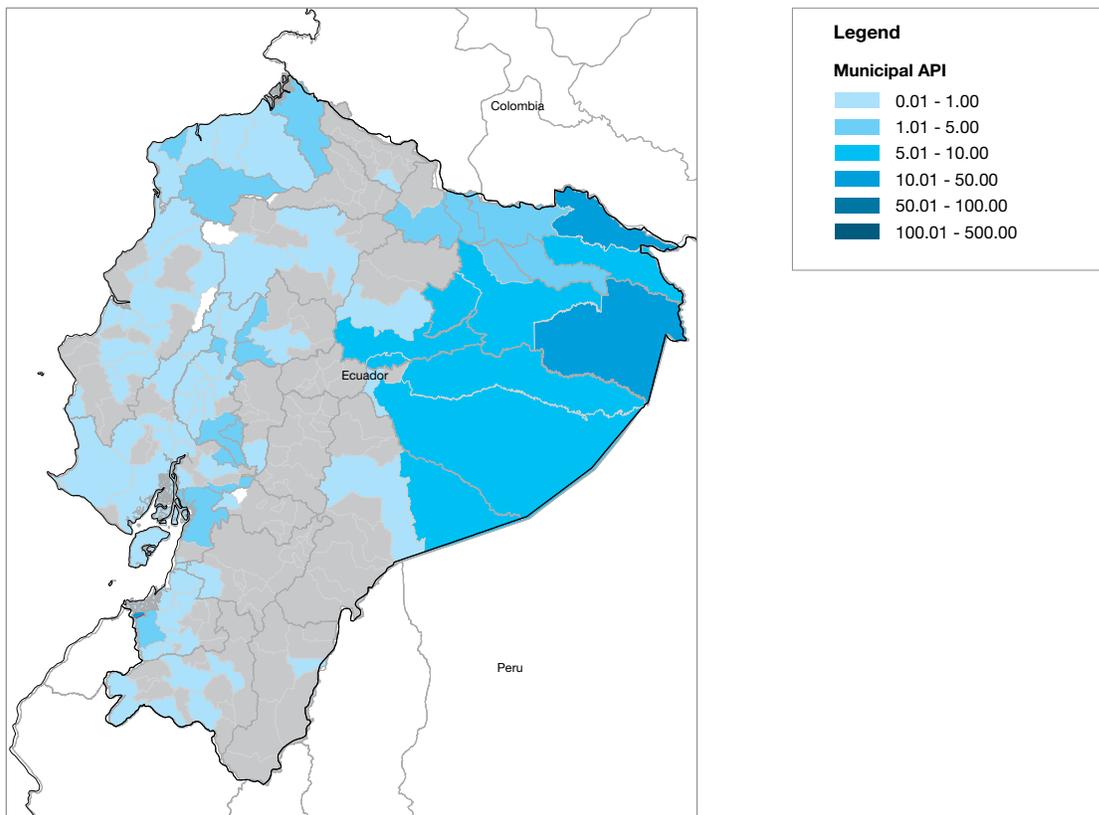
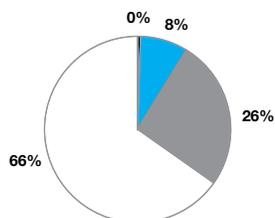


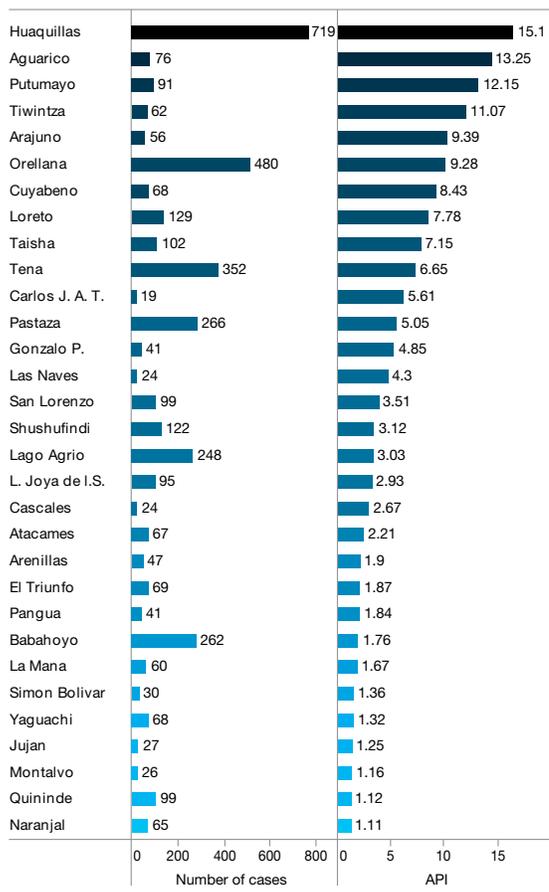
Figure 17. Population by malaria transmission risk, 2008



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 0.51

* 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	3,271,000	400,000	3,836,000	5,139,000
2001	2,542,000	1,383,000	3,931,000	4,567,000
2002	2,131,000	1,056,000	4,717,000	4,571,000
2003	1,659,000	587,000	5,708,000	4,599,000
2004	1,158,000	1,317,000	5,145,000	5,034,000
2005	376,000	2,060,000	4,687,000	5,033,712
2006	883,000	2,070,000	4,680,000	5,341,025
2007	59,758	140,103	7,595,085	5,362,296
2008	66,443	1,130,533	3,540,387	8,887,605

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

Year	Number of slides examined	Number of slides positive	Slide Positivity Rate (%)
2000	544,646	104,528	19.19
2001	538,757	108,903	20.21
2002	403,225	86,757	21.52
2003	433,244	52,065	12.02
2004	357,633	28,730	8.03
2005	358,361	17,050	4.76
2006	318,132	9,863	3.1
2007	352,426	8,464	2.4

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

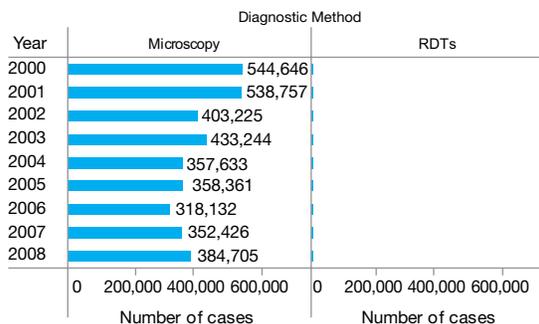
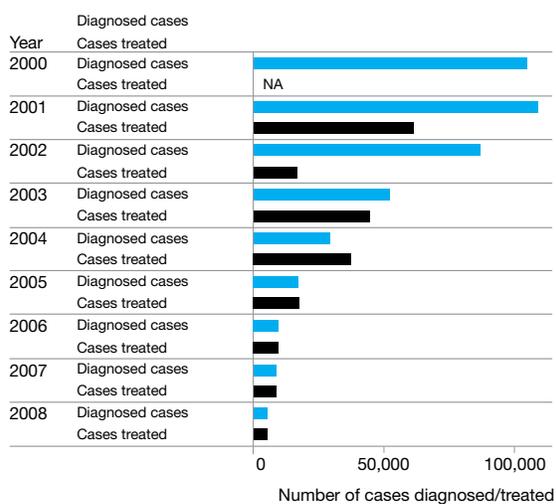


Figure 22. Number of cases diagnosed and cases treated, 2000-2008

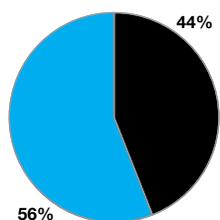


NA- No Data Available

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

ADM1	Examined	Total cases	SPR (%)
El Oro	37,284	890	2.39
Orellana	10,600	780	7.36
Sucumbfos	18,367	594	3.23
Los Rfos	47,413	586	1.24
Guayas	118,193	469	0.4
Esmeraldas	75,752	403	0.53
Napo	2,735	374	13.67
Pastaza	2,421	327	13.51
Morona Santiago	4,360	168	3.85
Pichincha	22,649	111	0.49
Cotopaxi	1,056	105	9.94
Manabf	38,244	69	0.18
Canar	1,041	40	3.84
Bolfvar	2,171	25	1.15
Loja	1,222	7	0.57
Azuay	174	2	1.15
Zamora Chinchipe	393	2	0.51
Chimborazo	125	0	0
Galapagos	5	0	0
Tungurahua	7	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

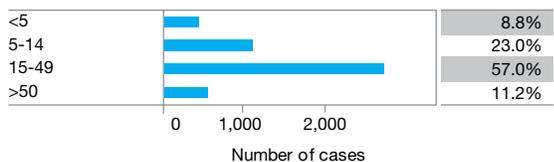


Figure 26. Number and percentage of cases by locality type, 2008

No Data Available

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

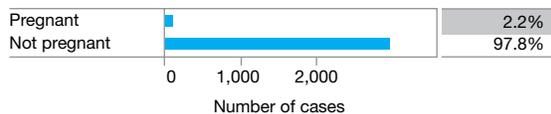


Figure 28. Number and percentage of cases in indigenous population, 2008

No Data Available

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

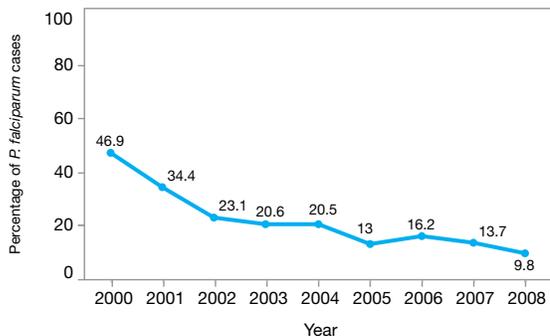


Figure 30. Number of ACT treatments distributed by year, 2000-08

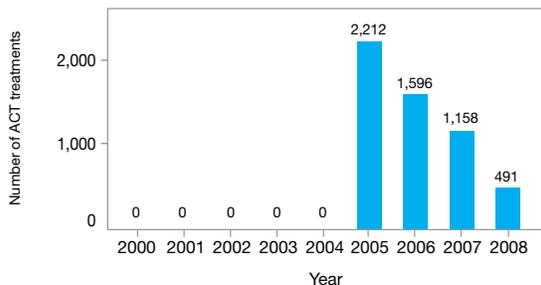


Figure 31. Indoor residual spraying coverage by year, 2000-08

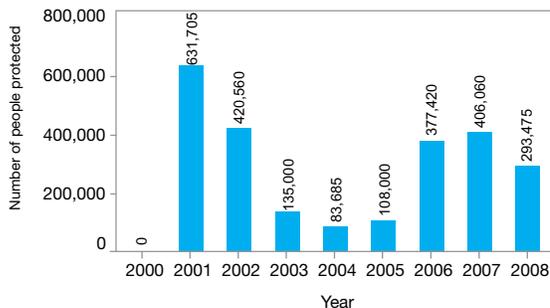


Figure 32. Number of LLINs distributed by year, 2000-2008



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

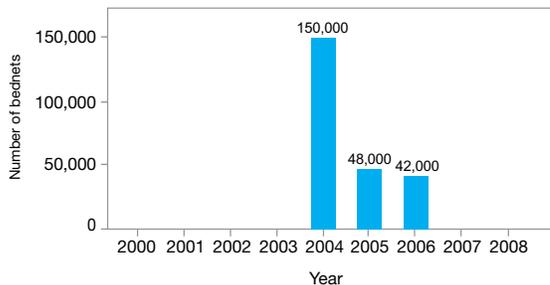
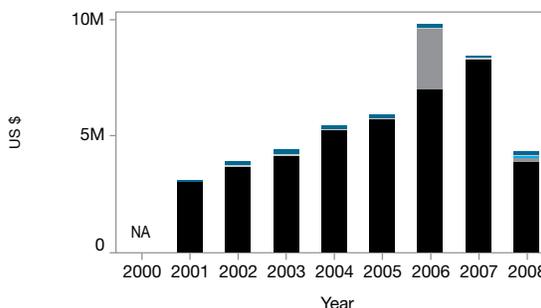


Figure 34. Sources for malaria control funds by year, 2000-08



Financing sources

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

NA - Data not available