EID WEEKLY UPDATES

**Emerging and Reemerging Infectious Diseases,
Region of the Americas**

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Dengue in the Americas: 2007 Summary

Current Situation to Date

Up to 26 September 2007 (Epidemiological Week/EW No. 39), the following has been reported:

- 630,356 registered cases of dengue
- 12,147 cases of dengue hemorrhagic
- 183 deaths
- Fatality rate: 1.5%
- Countries That Reported Dengue Outbreaks to the PAHO Regional Program on Dengue:
  - Costa Rica
  - Guadeloupe
  - Guyana
  - Honduras
  - Martinique
  - Puerto Rico

Current Situation

On 6 February 2007, PAHO/WHO issued a technical note to the entire Region predicting that this would be a "complicated year" for dengue epidemiology in the Region of the Americas. In turn, it recommended increasing preventive measures and existing resources to respond to this problem.

For 2007, up to Epidemiological Week (EW) 39, the number of dengue cases in the Region stands at 630,356; while in 2006, there were a total of 560,354 reported cases. This represents 70,002 (+11%) additional cases, surpassing the total reported for the year 2006.

Regional Situation

The epidemiological situation of dengue in the Region continues to be one marked by high complexity, forcing us to double our efforts in implementing the *Strategy of Integrated Management* and to respond globally to a problem that exceeds the borders of the health sector. In the period from 2001 to 2006, 3,419,919 cases of dengue were reported in the Americas, including 79,664 cases of dengue hemorrhagic and 982 deaths, with a case-fatality rate of 1.2% and the circulation of all four serotypes (DEN 1, 2, 3, 4)—which increases the risk for the appearance of the most serious forms of the disease.

Up to EW 39, which ended on 29 September 2007, of the 630,356 cases of dengue, of which 12,147 were cases of dengue hemorrhagic. There have been 183 deaths from dengue, yielding a case-fatality rate of 1.5%. All four serotypes (DEN 1, 2, 3, 4) are currently circulating in the Region. Up to September 2007, the countries in Central America and the Caribbean with the highest incidence rates per 100,000 inhabitants are French Guiana (1731.76), Guadeloupe (898.84), Costa Rica (585.17), and Honduras (360.61).

Outbreaks in the Region

Situation in Central America & Mexico

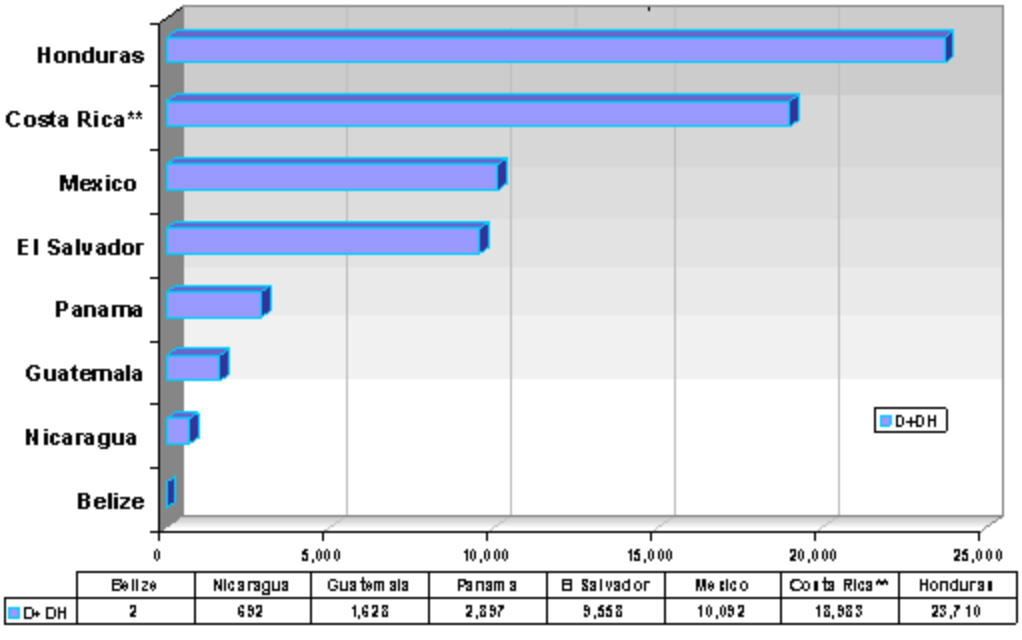
In Central America and Mexico, from 2001 to 2006, there were 413,446 cases of dengue, of which 23,076 were dengue hemorrhagic, with 159 deaths. All four dengue serotypes are in circulation, with a predominance of DEN 1 and 2. Furthermore, up to September 2007, 67,562 cases have been reported, which represents 10% of all dengue cases in the Region. Moreover, 5,212 cases were dengue hemorrhagic, accounting for 42.9% of all cases of dengue hemorrhagic fever in the Region, with 17 deaths (9.2% of all the deaths in the Region). It is important to point out that although the number of deaths has increased 142% from 2006 to 2007, when a mere 7 deaths from dengue were reported in 2006 compared to 17 deaths this year, the case-fatality rate for Central America has remained low, at only 0.32%.

Dengue outbreaks have been reported in **Honduras, Costa Rica**, and **Mexico**. In Costa Rica, DEN 2 is in circulation; while in Honduras, current serotypes are DEN 2 and 4. The number of cases of dengue hemorrhagic has increased considerably in the three countries, by 5,081 cases, or 97% of the cases in the Subregion—thus reaching a figure similar to the 2006 total (5,495 cases) for all the countries of Central America.

Situation in the Caribbean

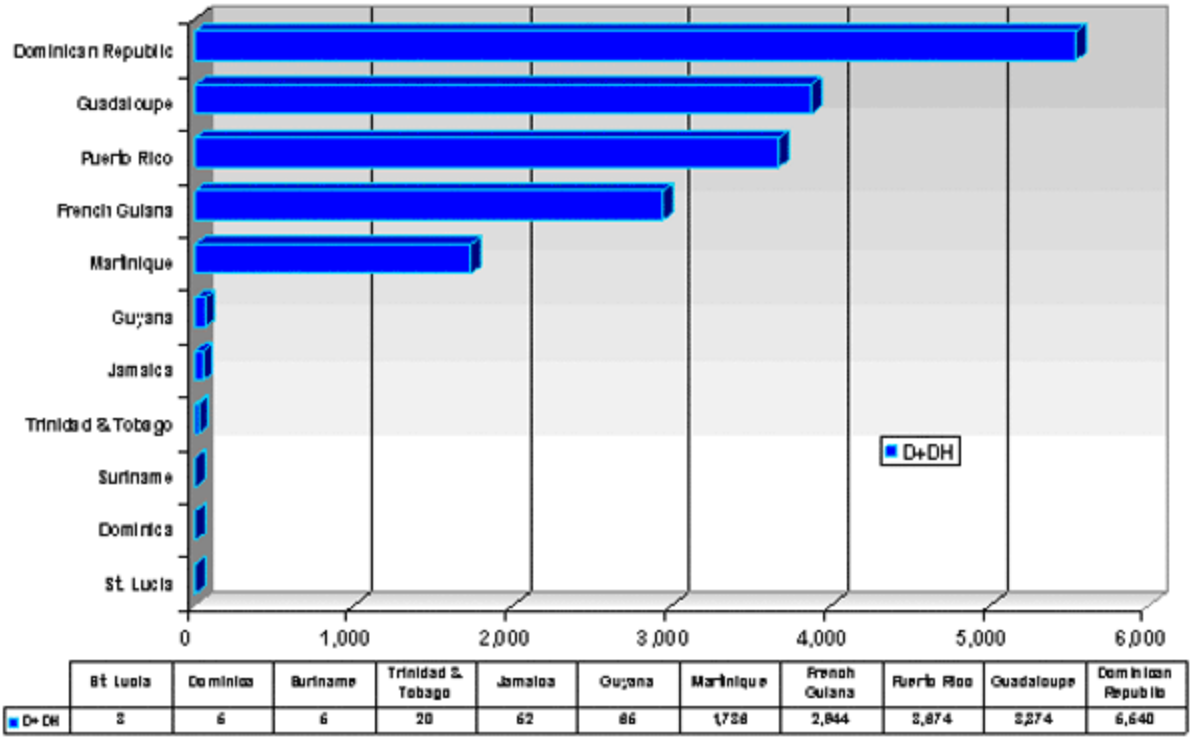
In the Caribbean, from 2001 to 2006, 137,164 cases of dengue were reported, including 1,674 cases of dengue hemorrhagic and 220 deaths. Thus far this year, the Caribbean has reported 17,918 dengue cases, which represents 2.84% of all the cases in the Region. For dengue hemorrhagic, there have been 143 cases and 26 deaths, of which 96% occurred in the Dominican Republic. The case-fatality rate from dengue is high in the Caribbean, reaching a high of 18.8%.

Figure 1: Cases of Dengue and Dengue Hemorrhagic Reported in Central America and Mexico, September 2007



	Belize	Nicaragua	Guatemala	Panama	El Salvador	Mexico	Costa Rica**	Honduras
D+DH	2	692	1,628	2,897	9,558	10,092	18,983	23,710

Graph 2: Cases of Dengue and Dengue Hemorrhagic Reported in the Caribbean, September 2007



	St Lucia	Dominica	Suriname	Trinidad & Tobago	Jamaica	Guyana	Martinique	French Guiana	Puerto Rico	Guadaloupe	Dominican Republic
D+DH	3	6	6	20	62	86	1,738	2,844	3,874	3,874	6,640

In 2006, dengue outbreaks were reported in **Cuba**, the **Dominican Republic, Martinique, Guadeloupe,** and **French Guiana**. Currently, dengue outbreaks are ongoing in **Puerto Rico, Martinique,** and **Guadeloupe**. In the current Puerto Rican outbreak, all four serotypes (DEN 1, 2, 3, 4) are in circulation; while in the Dominican Republic and Guadeloupe, DEN 1 and 2 predominate.

The Dominican Republic continues to be the most affected country in terms of mortality from dengue. In 2007, with 25 deaths have been reported. However, there has been a reduction when compared to previous years; for example, last year the Dominican Republic reported 53 deaths.

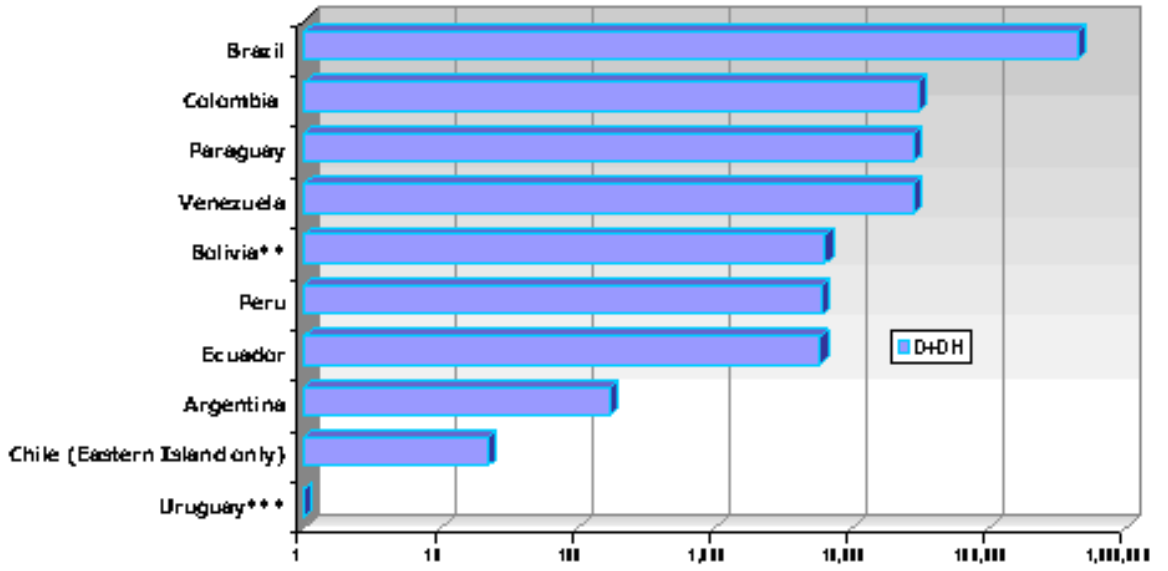
Situation in the Andean and Southern Cone Subregions

During 2007, the Andean subregion (Bolivia, Colombia, Ecuador, Peru, and Venezuela) reported 76,626 cases of dengue, 5,821 of dengue hemorrhagic, and 25 deaths. For the Southern Cone (Argentina, Brazil, Chile, Paraguay, and Uruguay), 468,250 cases have been reported thus far this year; 94% of these cases are concentrated in Brazil (439,875 of them). The Andean subregion has reported 48% of all cases of dengue hemorrhagic in the Americas, though it maintains a low case-fatality rate of 0.42%. In contrast, the Southern Cone has a high case-fatality rate of 11.7% and currently reports 63% (115) of all deaths due to dengue.

The state of Yaracuy in Venezuela has combatted dengue outbreaks, with nearly 39 weekly cases of dengue. In Brazil, compared to 2006, an increase of 136,488 dengue cases was observed in the country, showing the greatest number of reported cases in March. It is important to point out that this increase is related to epidemic outbreaks and high incidence rates in the states of Mato Grosso do Sul, Paraná, and Rio de Janeiro. These outbreaks occur mainly during the months from January through May, when climatic conditions favor the transmission of the mosquito vector, *Aedes aegypti*.

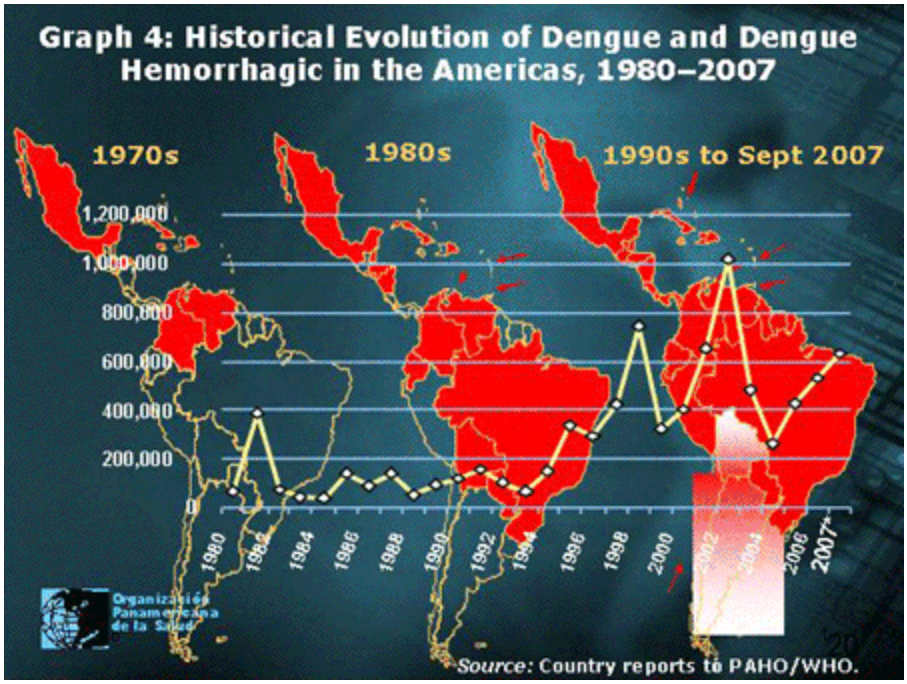
Contributing Factors

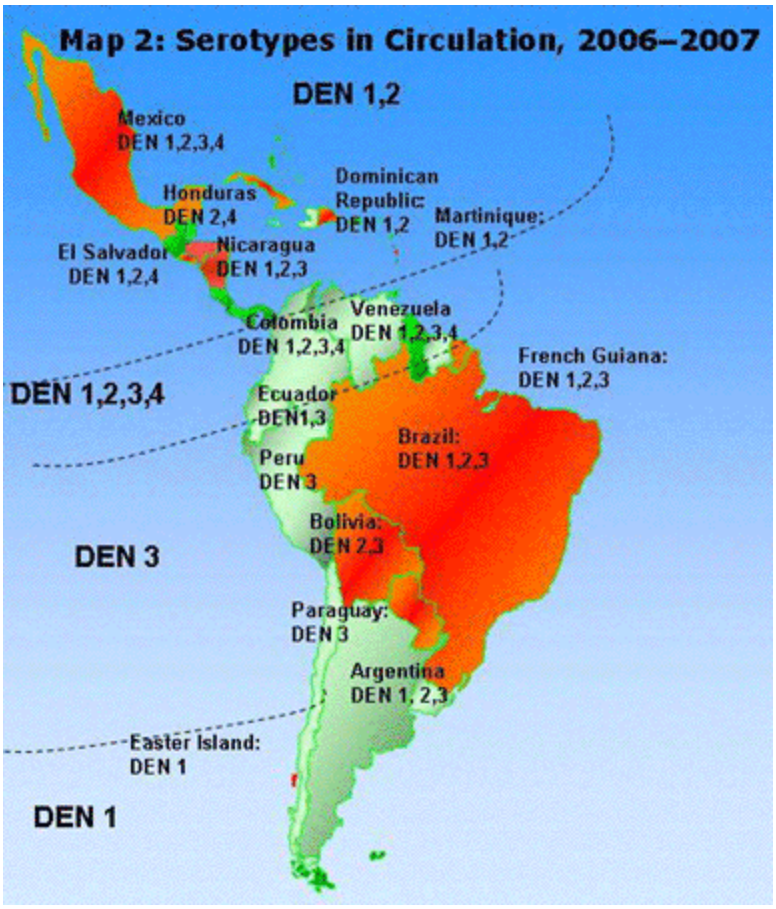
Graph 3: Cases of Dengue and Dengue Hemorrhagic Reported in South America, September 2007



	Uruguay***	Chile (Eastern Island only)	Argentina	Ecuador	Peru	Bolivia**	Venezuela	Paraguay	Colombia	Brazil
D+DH	0	22	172	5,798	6,020	6,390	28,119	28,181	30,309	439,875

Graph 4: Historical Evolution of Dengue and Dengue Hemorrhagic in the Americas, 1980–2007





Over the past 22 years, the incidence of dengue in all subregions of the Americas has shown a rising trend, with ever-growing epidemic peaks repeated regularly every 3 to 5 years. The year 2007 is one of these epidemic years and is expected to be a record-breaking year with the greatest amount of reporting in the history of dengue over this whole period.

In the Caribbean, several serious dengue epidemics have been reported. This includes the Cuban outbreaks of 1977, with 477,440 cases of DEN 1, and later of 1981, with an epidemic of dengue hemorrhagic with 344,000 cases of DEN 2 and 158 deaths, of which 101 were children. The figures show the severity of these outbreaks and the great economic and social impact that these outbreaks have. In addition, other outbreaks have been reported in Curaçao, Jamaica, and Puerto Rico, among other countries.

Among the most important **macro factors** that coincide with the increased number of cases is climate change—for example, global warming, El Niño / Southern Oscillation and La Niña, both of which influence the intensity and duration of the rainy seasons and hurricanes or induce intense droughts and damage to biodiversity. These climatic changes induce alterations in ecosystems and create ideal conditions to facilitate the expansion and dissemination of pathogens and vectors. Another macro factor is the unprecedented population growth in the Region, often accompanied by an inadequate sanitary infrastructure and uncontrolled and unplanned urbanization. This in turn induces the growth of cities with belts of poverty and a lack of basic services—especially concerning safe water supply and the elimination of liquid and solid wastes; and migration and population movements, which facilitate the movement of infected people and disease over large distances and over very short time periods. All these factors contribute to the spread of dengue transnationally.

There is a need to point out explicitly that there are many factors that contribute to dengue outbreaks. The improper disposal of tires and plastics, which remain in the environment over long periods without being degraded, contribute to mosquito breeding sites. These solid wastes collect water during the rainy seasons, given the existence of open-air patios and garbage dumps without adequate refuse treatment. Furthermore, given the problems with water supply and ensuing shortages, improper water storage plays a role as well. Water is inadequately cleaned and protected and thus becomes the main source of reproductive foci for *Aedes aegypti,* the main vector transmitting the dengue virus.

On the other hand, **micro factors** exist that are dependent on the agent (virus) and the vector (mosquito)—which at times exhibits a growing resistance to insecticides—and the host, all of which closely influence the manifestation of the disease and its more serious forms.

Subregional Activities: PAHO/WHO Technical Cooperation in 2007

Facing this regional panorama, PAHO/WHO promotes the development and implementation of the *Strategy of Integrated Management for Dengue Prevention and Control* (EGI-Dengue) in the countries of the Region. In parallel, there are efforts for a roadmap of activities and response to this major threat, integrating key areas of action such as epidemiology, entomology, laboratory, mass communication, patient care, and environment. The greatest efforts are being made to respond to a global health problem that exceeds the borders of the health sector and that should involve many other actors, governmental and otherwise, as well as society itself, for the purpose of stopping the growing dengue trend and fatalities from dengue hemorrhagic and reducing the social, economic, and political burden that it imposes in the countries of the Region.

At present, 13 countries of the Region have developed their own EGI-dengue plan and are in the process of implementing it. In addition, two subregional EGI-dengue plans, in Central America and MERCOSUR, have been prepared. Efforts are continually being made to extend EGI-dengue to the entire Region.

Technical Cooperation Provideded by the Regional Program on Dengue during the 2007–2007 Outbreaks: In coordination with the health authorities of each country in which dengue outbreaks have been reported, the Regional Program on Dengue has coordinated technical cooperation activities to help cope with the emergency.

Dengue Outbreak in Paraguay

Since the beginning of 2007, different types of technical assistances have been provided in Paraguay:

1. Advisory services in mass communications, focused on information management to mobilize both the community and key actors and aimed at the elimination of breeding sites. It also tries to encourage people to avail themselves of health services when showing the early symptoms of the disease.
2. Two (2) consultations on dengue patient care: The *International Dengue Task Force* went on three missions at crucial times to deal with patient care issues. The purpose was to share their experiences in managing dengue hemorrhagic outbreaks and, in turn, provide support in the adequate development and application of clinical processes.
3. Collaboration in the National Day of Mobilization against Dengue ("D-Day", on 26 January 2007) in Paraguay, to encourage family involvement in searching for and destroying mosquito breeding sites in the fight against dengue.
4. Advisory services in health service organization.
5. Technical assistance during the dengue epidemic outbreak in Paraguay through a visit from the Regional Advisor on Dengue, with the objective of advising the Minister of Health and technical personnel on how to respond to and manage the outbreak.
6. A workshop on lessons learned during the recent dengue outbreak in Paraguay, scheduled for September 2007 but suspended until further notice due to a national emergency (forest fires).

Dengue Outbreak in Honduras: During the months of August and September 2007, the Regional Program provided support to Honduras with the following:

1. Advisory services and training for medical and nursing staff on dengue patient care and observation visits to several healthcare centers in Tegucigalpa and San Pedro Sula.
2. Advisory services in mass communications focused on social mobilization and press relations.
3. 3. Facilitating the obtaining of reagents for dengue diagnosis from the PAHO/WHO Collaborating Center at the "Julio Maiztegui" Institute for Human Viral Diseases (INEVH) in Pergamino, Argentina.
4. A mission by the Regional Advisor on Dengue to collaborate in updating the comprehensive strategic plan for dengue management, scheduled for 6–8 November 2007.

Dengue Outbreak in Guyana: PAHO/WHO also provided technical cooperation to Guyana to help cope with the significant increase in dengue cases and prevent an epidemic of dengue hemorrhagic in the country. From 17 to 21 September 2007, PAHO/WHO sent two advisors from the International Dengue Task Force who are specialized in two key disciplines: patient care and entomology / vector control. The purpose of their visit was to train physicians, nurses, and other health personnel in dengue diagnosis and clinical management and in entomology, regarding activities related to vector control and environmental management.

Dengue Outbreak in Costa Rica

1. In coordination with the Minister of Health, a work-related mission was conducted from 18 to 21 September 2007, headed by the Regional Advisor on Dengue accompanied by a group of national and international PAHO/WHO experts in mass communications and vector control. Its objective was to collaborate in evaluating the current situation of an increased number of cases. The areas most affected were visited, in coordination with the National Dengue Task Force, to evaluate the Strategy of Integrated Management for the Prevention and Control of Dengue in Costa Rica and measures currently being applied to control the outbreak.
2. PAHO/WHO facilitated, through its Collaborating Center at the "Julio Maiztegui" Institute for Human Viral Diseases (INEVH) in Pergamino, Argentina, and of the "Pedro Kourí" Institute of Medicine Tropical (IPK) in Cuba, the obtaining of reagents for dengue diagnosis in the country's National Reference Center.

Dengue Outbreak in Brasil

Since the beginning of the year, the Ministry of Health of Brazil has been responding intensely to the increase in cases that has been witnessed in the country, with a view to improving response whenever possible. The Minister of Health began a process of self-evaluation of its *National Strategy for Dengue Control*, with support from PAHO/WHO experts. They held the *International Seminar to Evaluate the Dengue Control Program* from 18 to 21 July 2007, as the beginning of a process that will conclude with the strengthening of the National Strategy.

Members of the International Dengue Task Force participated, along with national experts from the Brazilian states, who acted as external evaluators and who would be responsible of the process of self-evaluation.

During the month of October, an international symposium on new tools for dengue control will be organized, as well as the *IVth International Course on Integrated Management* for municipal directors.

Other Prevention and Control Activities

Argentina & Peru: Peru and Argentina prepared their Strategies for the Integrated Management of Dengue Prevention and Control during the months of March and June 2007, respectively. They included within their strategies a Contingency Plan for Outbreaks and Dengue Epidemics, with the collaboration of the International Dengue Task Force. Officials from various local health services also participated. These plans serve the need for an integrated instrument that will give the country a jump-start to respond to dengue outbreaks and epidemics.

MERCOSUR: From 28 May to 1 June 2007, a workshop was held in Asunción, Paraguay, to prepare the Strategy of Integrated Management for Dengue Prevention and Control for MERCOSUR. The International Dengue Task Force participated in this event. This participation brought about results in the form of a *Strategy of Integrated Management for Dengue Prevention and Control* for MERCOSUR Member States and Affiliates as well as a *Contingency Plan for Outbreaks and Epidemics.* The latter emphasizes the prevention of dengue outbreaks in border areas of MERCOSUR Member States and its Affiliates.

Priorities and Recommendations

- Reactivitate the integral work in process with the *Strategy for the Integrated Management of Dengue Prevention and Control* (EGI-dengue), one developed by the countries with the goal of setting up an integrated and timely surveillance system. Promote additionally the implementation of Contingency Plans for outbreaks and epidemics.
- Given the profound and destabilizing climate change that is occurring today—e.g. global warming, El Niño / Southern Oscillation, and La Niña, all of which influence the intensity and duration of rainy seasons and hurricanes—the countries of Central America should plan to the extent of their capabilities to train human resources and have at their disposal the necessary materials for dengue prevention and control.

Source: Information compiled by the PAHO Regional Program on Dengue, based on information received from the countries.