Even before the isolation of DEN-3, the Ministry of Health of Nicaragua had begun a multifaceted campaign to control *Ae. aegypti*, in response to the increased numbers of dengue cases in Managua. Insecticide was used against adult mosquitoes and larvicide against immature forms, and a national, community-based campaign, supported by public education efforts, was mounted to eliminate breeding sites ("source reduction"). By the last week in November, the weekly number of reported cases had decreased substantially. However, on 25 November the Ministry announced the isolation of DEN-3. An international team sponsored by PAHO went to Nicaragua in late November to help reinforce laboratory capabilities, obtain epidemiologic information, evaluate the severity of the disease caused by DEN-3, and assist national authorities in their efforts to control the outbreak.

At about the same time (23–24 November), the Project Advisory Committee of the Caribbean Cooperation in Health/Government of Italy Project on Integrated Control of *Aedes aegypti* was meeting in Kingstown, Saint Vincent. The Committee advised that because of high *Ae. aegypti* infestation rates in the Caribbean subregion, a greater sense of urgency regarding dengue prevention and control was needed. That recommendation was reinforced by the announcement of DEN-3 activity. Over the next year, the project will help countries accelerate community participation initiatives for source reduction.

In recognition of the rapid change in the dengue situation that has occurred in the Region in recent years, PAHO has published updated guidelines for the prevention and control of dengue and DHF. During the 1992–1994 period, these guidelines were presented by PAHO to national representatives of *Ae. aegypti*-infested countries in the Americas, and during 1994, PAHO teams reviewed national dengue control programs in selected countries and assisted national authorities in preparing or updating contingency plans to deal with outbreaks. It is hoped that this preparation will limit the impact of the renewed circulation of DEN-3 in the Americas.

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Bolivian Hemorrhagic Fever Reappears

An outbreak of seven cases of Bolivian hemorrhagic fever (BHF) occurred in July–August 1994 in El Beni Department in northeastern Bolivia. These cases followed several suspected cases of BHF earlier in the year, two of which were confirmed serologically by the U.S. Centers for Disease Control and Prevention (CDC). Two other unrelated cases were subsequently identified and confirmed in September. With the exception of one fatal case in 1993, the disease had not been identified in Bolivia—the only known endemic area—since 1975.

Bolivian hemorrhagic fever was first described in 1959. It is caused by the Machupo virus, for which the reservoir in nature is the rodent *Calomys callosus*. The

Sources: (1) CDC. Bolivian hemorrhagic fever—El Beni Department, Bolivia, 1994. *Morb Mortal Wkly Rep* 1994;43(50):943–946. (2) Re-emergence of Bolivian hemorrhagic fever. *Epidemiol Bull* [*PAHO*] 1994;15(4): 4–5.

virus is believed to be passed to humans through aerosolized mouse urine. A nosocomial outbreak in 1971 suggested that human-to-human transmission is also possible. The disease in humans begins with an influenza-like illness that may be followed by hypotension, hemorrhagic manifestations, and neurological symptoms.

The index case of the recent outbreak was a 29-year-old man who had spent a month working on a cattle ranch before returning to his home in the town of Magdalena, where he fell ill. He is thought to have served as the source of the virus that ultimately infected four members of his immediate family and two other relatives. Six of the seven patients died. Laboratory studies performed on serum and tissue specimens from five of the fatalities confirmed the diagnosis of BHF by isolation of Machupo virus and detection of viral antigen. The survivor was shown to have developed IgM and IgG antibodies to Machupo virus by enzyme-linked immunosorbent assay.

Two subsequent patients, both males, were presumably infected while traveling and working in rural areas in El Beni Department; one died and the other recovered. Both cases were confirmed by viral isolation and detection of viral antigen.

National and local health authorities launched a compaign to trap and poison rodents and to clean the inside and outside of dwellings in the cases' communities and some nearby ranches. The campaign was carried out with community participation; emergency committees were organized and health education was provided. An intensive rodent-trapping effort during August and September yielded very few *C. callosus*. However, since rodent control measures were instituted following the family outbreak, the small number of captures of this mouse species may either reflect the effect of the rodent control effort or a naturally low population level at that time. Previous trapping in Bolivia had shown that the populations of *C. callosus* fluctuate, as does the prevalence of Machupo virus infection among them. The factors that cause these fluctuations are not known.

The family outbreak coincided with a visit by a group of experts sent to Bolivia by PAHO to collaborate in strengthening the national BHF control program. As part of their technical assistance, the advisers drew up a plan of action, which includes training in clinical diagnosis and case management, health education, laboratory diagnosis, epidemiologic surveillance, and epidemiologic and ecological studies. In late August, three experts from CDC (supported by the United States Agency for International Development) were sent to Bolivia to provide cooperation on clinical, epidemiologic, and ecological aspects of the disease. From 26 to 30 September, a PAHO consultant conducted a workshop on clinical diagnosis and patient management in the city of Trinidad (where the last patient had been identified). National BHF control program authorities actively collaborated with the experts from PAHO and CDC.