

Dengue is not just a tropical disease

by N.C. Thompson

The dengue epidemic now engulfing most of the United States' neighbors in the Western Hemisphere, has reached alarming proportions in Puerto Rico. Dengue fever has now spread to 50 out of 78 municipalities on the island, according to an Aug. 8 Spanish News Agency (EFE) wire reprinted in *El Nuevo Día*, the leading Spanish-language newspaper in Puerto Rico. The source for this startling information is Puerto Rico's Secretary of Education, Carmen Feliciano de Melicio, who has announced a campaign of prevention.

"There is no vaccine against the dengue that blankets the island," she said. "The only 'vaccine' is to kill the mosquitoes [that transmit the disease], and the only ones that can do that and control the spread of the epidemic are the citizens and the actions of communities." She called on citizens to wage war on the areas that spawn the carrier, the *Aedes aegypti* mosquito, in their homes, backyards, and communities.

In 1994, an epidemic of the virus in Puerto Rico had 25,000 reported cases. In the current outbreak, the number of cases reported for June, July, and August 1998 was higher than those reported for the same months in 1994. The Health Department of Puerto Rico has announced that 7,636 cases of dengue have been reported so far this year, and there have been three deaths.

Fumigation for the mosquito, using the pesticide malathion, was ordered by the island's Civil Defense authorities.

A pan-American epidemic

The Pan American Health Organization (PAHO), which tracks diseases throughout the continent, has published figures on the rate of dengue infection for the Americas. **Table 1** reports PAHO's figures for 1996 (see also **Figure 1**); the numbers for 1998 are still being compiled.

The total number of reported cases of dengue and dengue hemorrhagic fever for the entire South American and Caribbean region in 1996 was 276,691; there were 46 deaths in 1996.

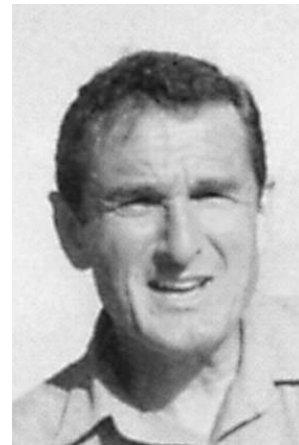
The statistics on rates of infection are closely guarded by some countries. For example, the *Miami Herald* recently reported that Cuba expelled a priest from the island who had commented on the serious nature of the outbreak in Cuba, and in another incident, a scientific researcher reportedly was sentenced to eight years in jail for merely telling other scientists about the disease spread.

The accompanying interview describes the course of the disease, and gives an indication of how quickly dengue could spread through *any* southern urban area—including the United States—where the *Aedes aegypti* mosquito is allowed to breed.

Interview: Paul Reiter

A little funding could help a great deal

Dr. Reiter, Ph.D., is chief of the entomology section of the U.S. Centers for Disease Control's Dengue Branch, DV-BID, CID, in San Juan, Puerto Rico, and is on the front lines of the battle to control the dengue epidemic. He is president of the American Society of Tropical Medicine and Hygiene's medical entomology committee. The author of 52 publications, he has received numerous awards for distinguished public service and for scientific endeavors and investigations. He holds a Ph.D. in medical entomology from the University of Sussex. He was interviewed by N.C. Thompson.

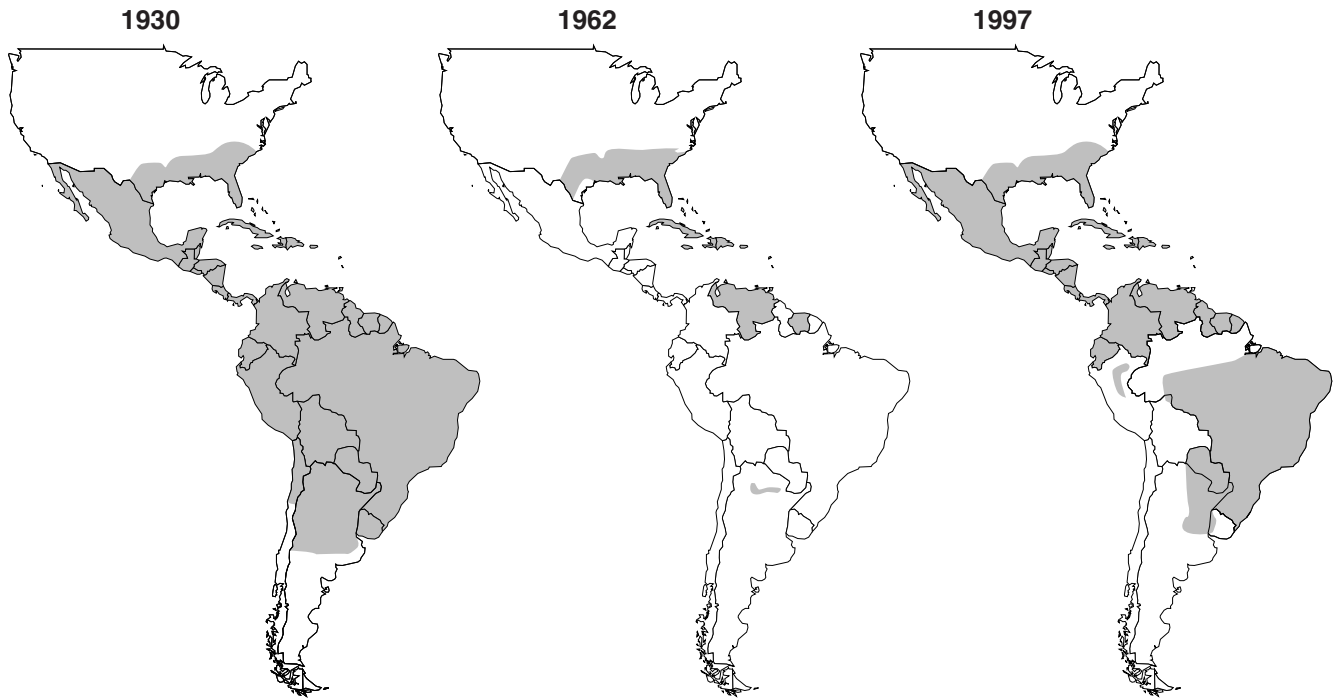


EIR: People normally think of dengue as a tropical disease. What is the history of dengue in the Western Hemisphere and in so-called advance sector countries? How is the disease spread?

Reiter: Dengue is a mosquito-borne disease of primates. It circulates among monkeys in tropical woodland, transmitted by a number of species of mosquito. The disease arrived in

FIGURE 1

Distribution of *Aedes aegypti* in the Americas, 1930, 1962, and 1997



the Americas with the slave trade, together with the principal urban vector, *Aedes aegypti*, a mosquito that lives in close association with people. *Aedes aegypti* is a mosquito common throughout the southern United States.

The first major epidemics were recorded in the United States in the 18th century. At least eight pandemics of the disease have occurred in this country since the start of the last century. For example, 500,000 cases are estimated to have occurred in Texas in 1922. The disease swept eastwards. Savannah, Georgia had an estimated 32,000 cases, of which about a third had hemorrhagic symptoms.

EIR: Why will some people get dengue and others get dengue hemorrhagic?

Reiter: Dengue can cause a wide range of symptoms of varying severity, ranging from the almost inapparent, to dengue hemorrhagic fever/dengue shock syndrome, a serious condition that can be fatal if not managed correctly.

EIR: How will a compromised immune system deal with the infection?

Reiter: To date, we have little information on the effect of dengue on persons with a compromised immune system.

EIR: Can a mosquito infect others after it bites an infected

person? Tell us how the transmission of the illness works?

Reiter: Yes, that is how the disease is transmitted: When a mosquito bites a person in whom virus is circulating, the virus infects the mosquito. After a period of about 10 days, the

TABLE 1

Number of cases of dengue and dengue hemorrhagic fever in selected Ibero-American nations, 1996

Country	Total cases	Virus serotype	Number of cases, DHF (deaths)
Brazil	175,751	(1,2)	2
Colombia	33,155	(1,2,3)	1,757 (11)
Venezuela	9,180	(2,4)	1,680 (13)
Peru	6,395	(2,4)	
Mexico	20,687	(1,2,3,4)	884 (13)
Central America			
El Salvador	2,307	(1,3)	
Honduras	5,047	(3)	
Guatemala	3,679	(1,2,3,4)	19
Nicaragua	2,792		49

Source: Pan American Health Organization

salivary glands of the insect contain large amounts of virus. Subsequently, every bite by the mosquito injects virus into the host. If the person bitten is susceptible, the virus can take hold and cause a new infection.

EIR: To what do you attribute the current high rates of dengue? Is it due solely to a natural cycle?

Reiter: There are many factors: *Aedes aegypti* is a common mosquito in urban areas from Tennessee to Argentina. There was a time when the mosquito was under control, even eradicated, from many countries in the Americas. For various reasons, the mosquito has returned.

Urban areas are much larger, offering greater opportunities for the dissemination of the virus.

International travel is an important factor: Virus travels readily in persons moving from one infected region to another. Thousands of infected persons enter the United States every year.

EIR: Have other factors contributed to the rise of cases within the last decade? Have declines in people's standard of living and health care contributed?

Reiter: In many senses, an *increase* in living standards is responsible. The mosquito breeds in water held in small, man-made containers (old tires, discarded cans, blocked roof-gutters, etc.). In our throw-away society, such containers have become ubiquitous, even in poorer societies.

EIR: How was this illness dealt with in the past?

Reiter: Mosquito control was successful in controlling another *Aedes aegypti*-borne disease, yellow fever, at the start of the century. The main measure was the elimination of the infested containers that harbored the mosquito. After World War II, a massive campaign to eliminate the mosquito,

mainly by the use of DDT, was very successful. Twenty-two countries were declared free of the species in the early 1960s. Resistance to the insecticide, and a number of other factors, led to the gradual recolonization of all the treated regions.

EIR: What can be said about current methods to contain the spread of this disease?

Reiter: There is no curative treatment; most patients overcome the virus, just as flu patients overcome influenza. After recovery, the patient is immune to the disease, or rather, to one serotype of the disease. There are four serotypes, so theoretically anyone can have four dengue infections in a lifetime.

Many countries spend significant amounts of money on expensive fumigation campaigns. Insecticide aerosols are dispensed from road vehicles or even aircraft. In a long series of studies, the Centers for Disease Control have unequivocally shown that such fumigation has very limited impact on the adult mosquito population, no effect on the immature stages of the insect, and no impact on disease transmission. The only effective method of preventing transmission is to eliminate the breeding sites.

EIR: Some experts in the United States, among them Dr. Don Roberts, from the Uniformed Services University of Health Sciences, have called for the return use of DDT in house spraying to control mosquitoes for malaria. How would spraying deter the spread of dengue?

Reiter: DDT was a cheap, safe, and effective insecticide for mosquito control. The quantities of DDT used in public health were minuscule compared to the quantities used for agricultural and veterinary purposes. Many (perhaps most) specialists in malaria control agree that the cessation of use of DDT

Dengue in Asia

Although dengue fever is endemic in the Americas, it is most prevalent in Asia, the Indian subcontinent, and Pacific island countries (**Table 2**). In Asia, the Philippines, Laos, Indonesia, Malaysia, and Myanmar all had significant increases in dengue fever cases during 1991-95, as compared to the early 1980s. India and Sri Lanka both had serious outbreaks of dengue fever in 1996. Dengue fever is also circulating in Africa, but reporting is very erratic; epidemics were reported in Kenya, Mozambique, Somalia, and Djibouti in the 1990s.

—Colin Lowry

TABLE 2

Number of dengue fever cases for selected Asian countries, 1981-85 and 1991-95

Country	1981-85	1991-95
Philippines	4,657	18,731
Vietnam	294,112	342,193
Laos	2,287	10,847
Cambodia	2,771	22,292
Myanmar	1,984	25,301
Malaysia	5,389	27,366
Indonesia	50,747	110,043
India	None reported	35,440
Thailand	227,322	263,252

Source: World Health Organization *Statistics Quarterly*, Vol. 50, No. 3/4, 1997

Surgeon General warns that U.S. is unprepared

As a result of the breakdown of public health measures, sanitation, and insect-vector control programs, deaths caused by preventable diseases are rising globally. The public health infrastructure in the United States is no exception. U.S. public health programs are currently inadequate to deal with emerging infectious diseases, as U.S. Surgeon General David Satcher noted in remarks, excerpted here, before the Senate Labor and Human Resources Subcommittee on Public Health and Safety, on March 3, 1998.

Emerging infectious diseases are a continuing threat to the health of U.S. citizens and of people around the world. They cause suffering and death, and impose an enormous financial burden on society. The recent outbreak of a new and virulent strain of influenza in Hong Kong raised the specter of a pandemic. It again illustrated the need for the U.S. to work closely with other countries and the World Health Organization to assure there is adequate

global capacity to detect and address such outbreaks.

In the past century, we have made tremendous strides in medicine and science. Antibiotics and vaccines, along with improvements in urban sanitation and water quality, dramatically lowered death and disability from infectious diseases and nearly doubled life expectancy in this country. Progress has been so great, some predicted three decades ago we would soon see the end of infectious diseases.

Our optimism then was premature. We are seeing a global resurgence of infectious diseases, including the identification of new infectious agents; the re-emergence of old infectious agents, such as tuberculosis; and the rapid spread of antimicrobial resistance. In the United States, the death rate from infectious diseases, excluding HIV/AIDS, rose by 22% between 1980 and 1992. Throughout the world, infectious and parasitic diseases remain the leading cause of death.

In 1995, I chaired a work group of the National Science and Technology Council, which was charged with conducting a government-wide review of our ability to protect our citizens from emerging infectious diseases. We concluded that existing mechanisms to survey, respond to, and prevent outbreaks of new and re-emerging infectious diseases were inadequate, both at home and abroad.

has been a major factor in the alarming increase in malaria morbidity and mortality in many countries.

This is not the whole picture; resistance to the insecticide is also a problem. DDT resistance is widespread in *Aedes aegypti*. For example, in Puerto Rico, there is 100 to 200 times more resistance in the local mosquitoes. In many countries, therefore, DDT could not be used for dengue/yellow fever control.

EIR: Where are most people bitten, inside or outside the home?

Reiter: The mosquito lives in and around the home. Most biting activity occurs in the first hours of daylight, and in the afternoon, until about an hour before sunset. The mosquito goes to people, wherever they are at during those times. It happily enters indoors.

EIR: How could people protect themselves?

Reiter: Screens help prevent contact with the mosquito. Air-conditioning is also a protective factor.

The best means of protection is elimination of the breeding sites, a simple task in most cases.

EIR: Are health officials putting too much emphasis on indi-

vidual responsibility? How bad would the situation have to get to have this viewed as a health emergency? Who is more at risk?

Reiter: Large-scale control campaigns were possible in the past, when cities were more compact. Today, they would be prohibitive in cost.

Even in highly organized countries, such as Singapore, sustainability has proven to be a major factor: When the job appears done, funds are diverted to other projects. The last hope is to be able to persuade the population to take the problem to task, as a matter of personal hygiene, so to speak.

EIR: Why is there no substantial treatment? The United States was able to wipe out malaria. Why can't we develop a vaccine? Is there one in the works? *El Nuevo Día* alluded to the work of Edmundo Kraiselburd to discover a vaccine.

Reiter: Malaria is a parasitic disease. Natural substances (e.g., quinine, derived from the bark of a tree) can kill the parasite. Viruses are much more difficult to eliminate.

At present, the only hope [for dengue] is a vaccine. Several laboratories around the world are working on this, but the problem is complex, and funds are scarce. Unfortunately, much of the current awareness of the emergence of dengue as a major public health problem is ill-informed. Many people

attribute the phenomenon to irrelevant factors, such as climate change. We are still a long way from a cheap, safe, usable vaccine. A little money in this direction could help progress a great deal!

EIR: What program could you propose for a resolution to the current epidemic?

Reiter: We are trying hard to inform the public that fumigation (which many demand from the government) is ineffective against this mosquito. Quite simply, the insecticide hardly penetrates indoors, and so does not interact with the mosquitoes. Fumigation, though a major expenditure in many countries, is money thrown into the wind.

The only way to prevent transmission is to eliminate the breeding sites. In theory, this is a simple measure, and has been very successful in the past. In practice, we are trying, but results are not encouraging to date.

EIR: Is aspirin really the only recourse once infection strikes?

Reiter: Aspirin should never be used for dengue. The anti-coagulant effects of aspirin can exacerbate the risk of hemorrhagic manifestations, as can other drugs, such as ibuprofen. CDC recommends the use of acetaminophen-based products, such as Tylenol.

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Bring back DDT to save lives!

by Marjorie Mazel Hecht

Dengue is one of many insect-borne killer diseases that could be eradicated with the proper combination of mosquito control (including spraying of house walls) and public health programs. By the mid-1990s, it was taken for granted that this is what governments should do to protect their populations, and in the early 1960s *Aedes aegypti*, the mosquito species that carries dengue, was eradicated from many countries, including those in South America and the Caribbean.

But budget cuts, the international monetary police agencies, and so-called environmentalism intervened, to stop both mosquito control and public health programs, especially in the tropical areas of the world, whose people were considered expendable, or relatively more expendable, by the Malthusians. The swift return of both *Aedes aegypti* and killer diseases, therefore, was no surprise. According to the World Health Organization, today dengue is endemic in all continents except Europe, and an estimated 80 million people are infected annually.

DDT and mosquito control

One of the primary tools in mosquito control following World War II was DDT, which is responsible for saving more millions of human lives than any other man-made substance. For this very reason, it still comes under fierce attack.

Spraying the inside of houses with DDT twice a year is an effective, inexpensive way to stop the spread of malaria and other insect-borne killer diseases, with no harm to the environment. The field tests and research show that even if mosquitoes have become resistant to DDT, they will stay away from houses sprayed, because of DDT's excito-repellant effect. In fact, excito-repellency has been shown to be the main way that DDT controls mosquitoes, rather than killing them on contact.

House spraying involves relatively small amounts of pesticide, compared with agricultural uses, and the pesticide on walls stays put. The resistance to DDT in the mosquito population occurred in areas where there was widespread use of DDT on cropland. Those few mosquitoes that survived the DDT, because of some natural ability to resist DDT's killing mechanism, then propagated, so that the local mosquito population became mainly resistant to DDT.

The insect resistance that developed during the early malaria control programs is often cited by the World Health