disease prevention news

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Dengue Fever

Dengue was endemic in parts of the United States, including Texas, until 1945, when improved sanitation and the use of pesticides dramatically reduced the incidence of this disease. Only sporadic, travel-related dengue cases were reported through 1979, but outbreaks with some indigenous transmission occurred in 1980 and 1986.[1,2] Indigenous cases were again reported, from Hidalgo and Cameron Counties, in 1995. Understandably, interest in dengue is once again high. The first section of this report is a brief retrospective of dengue's history, characteristics, and current status in this hemisphere. The following section contains Texas morbidity and mortality data for 1995.

Dengue Retrospective

Among the newly emergent and re-emergent diseases in the Western Hemisphere is dengue fever, a mosquito-borne viral disease characterized by high fever, headache, myalgias, and a maculopapular rash. There are four virus serotypes: DEN-1, DEN-2, DEN-3, and DEN-4, all of which are transmitted primarily by *Aedes aegypti* and possibly by *Ae. albopictus* mosquitoes. Both species lay their eggs in open containers of water.

Due in part to the disappearance of mosquito eradication programs, dengue has once again swept Latin America and now threatens the US. According to the Pan American Health Organization (PAHO), 274,922 cases of dengue and 7,715 cases of dengue hemorrhagic fever (DHF), with 104 deaths, occurred in the Americas in 1995.[3] In response to the current situation, PAHO has drafted an emergency action plan, focusing on education of at-risk populations, international cooperation in surveillance, and reactivation of vector control programs.

A Brief Stateside History of Dengue

Nearly two centuries ago Benjamin Rush, a doctor in Philadelphia, wrote what may have been the first clinical report of dengue. Describing an epidemic that occurred in Philadelphia in 1789, he called the illness "breakbone fever."[4] During a West Indies epidemic 30 years later, the word dengue was coined to describe the symptoms outlined by Rush. This word derives from the Swahili description of the disease: ki denga pepo, meaning "cramp-like seizure caused by an evil spirit."[5]

Outbreaks widely affected Texas residents during every decade from 1885 to 1941, primarily due to the rapid expansion of the shipping industry.[6] Ships transported infected mosquitoes and people to unaffected areas, leading to pandemics of dengue in the western hemisphere as early as 1827 and every 20 or 30 years for the rest of the century. As commercial ports in Texas flourished, the disease was imported along with more desirable cargo into Galveston, Brownsville, and Houston, often reaching as far inland as Austin.

In the late 1800s, the diagnosis of dengue was still confusing; some practitioners considered it to be a form of yellow fever. Doctors earned their patients' ire by, "charging them two yellow fever bills, whilst contending that the disease attacks but once."[7] Yellow fever was not the only source of confusion in diagnosis. Throughout the 19th century arthritic symptoms were associated with what was then called dengue. In hindsight, this situation

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suggests that an agent other than dengue was at work. Until the laboratory isolation of the etiologic agent itself, practitioners had to rely on clinical findings to define these and other illnesses easily mistaken for dengue (eg, typhus, rubella, and measles). By the close of the century, healthcare providers in Texas began to realize that textbook descriptions of dengue did not correspond to the disease as it appeared in this state.[6]

By 1906 dengue had been well defined clinically, and T. L. Bancroft had shown the etiologic agent to be an ultramicroscopic organism transmitted by *Ae. aegypti* mosquitoes.[5] He conducted his experiments using human subjects. Bancroft's discovery is particularly interesting in light of the fact that the dengue virus was not isolated in the laboratory for another 40 years.

In 1922 an epidemic of enormous proportions—one million people are estimated to have been affected—began in Galveston and spread as far as Georgia.[8] Although the initial cases were most likely imported, the majority of subsequent cases were locally acquired. The mosquitoes that year had bred in unprecedented proportions, and no eradication efforts had been made. According to a clinical report of the Galveston outbreak,

> Unscreened houses of the poorer classes, situated near or around the dumping grounds, swarmed with these mosquitoes. They gained entrance to practically all screened houses, invaded automobiles, and countless numbers were present in the grass of overgrown gutters and lawns.

The dumping grounds mentioned were swamps used as a garbage dump by the citizens. Many observations of the incubation period were made during this time, increasing knowledge of the disease. Diagnosis in 1922 was based on signs still used today: sudden onset, fever, headache, body aches, and rash.

Outbreaks also occurred in Texas in 1934 and 1941. As was likely during antecedent outbreaks, the virus was probably imported from the Caribbean. The subsequent decline in endemic cases resulted from improved sanitation in the US and from *Ae. aegypti* eradication programs initiated by PAHO in 1947.[9] By 1962 the mosquito was believed to be confined to a few relatively small areas, which included parts of the US, the coasts of Mexico, all of Colombia, and northern Argentina. Ten years later, due to waning interest and political unrest, almost all programs had been discontinued. Today the range of *Ae. aegypti* includes most of Central and South America, Mexico, and the Southeastern United States (including Texas). (See Figure 1.)

Ae. albopictus is another mosquito considered to be a dengue vector. Introduced into the Americas by 1985, probably in tires shipped from Asia, this vector has since spread. It can be found throughout the eastern two-thirds of Texas.[10]

Dengue Hemorrhagic Fever

In 1954 dengue hemorrhagic fever (DHF), which had been frequently described but was still unnamed, appeared in the Philippines. Since then, DHF has emerged as a deadly and epidemic problem in the Americas and Asia.[11] DHF is characterized by high fever, like classic dengue, but has more serious complications: hemorrhagic phenomena, pain, and circulatory failure. Easy bruising, fine petechiae, epistaxis, and mild gastrointestinal bleeding are, in decreasing order of frequency, DHF symptoms caused by increased capillary permeability. The fatality rate for DHF is about 5% in most countries. One third of DHF cases progress to dengue shock syndrome (DSS), a short (12 to 24 hour) stage of illness that may lead to widely disseminated hemorrhage and coma. The case-fatality rate for untreated DSS is 20%.

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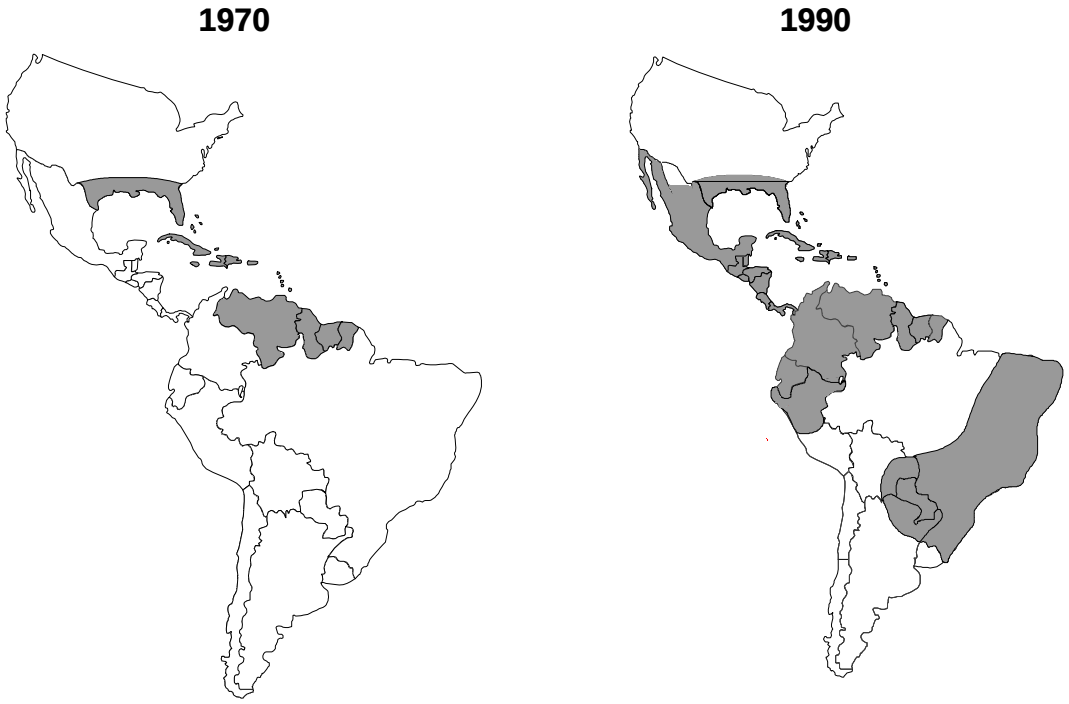
Figure 1. Distribution of *Aedes Aegypti* mosquitoes: North and South America, 1970 and 1995



Shaded areas show large mosquito populations.

The risk of developing DHF is 100 times greater with a second heterotypical infection.[9] Although the precise mechanisms affecting the development of DHF are not fully understood, the second infection is thought to trigger an immunopathologic process involving non-neutralizing antibodies from the previous infection.

The Current Situation

DEN -2, -1, and -4 have spread, in that order, throughout Latin America after having vanished almost completely during the mosquito eradication programs of the 1950s and 1960s. DEN-3 was introduced to the Americas recently and is spreading,[12] bringing with it an increased incidence of both DHF and DSS.

A 1980 study found that there was a median of 40 days between the onset of dengue and the diagnosis of disease, suggesting the need for earlier diagnosis of dengue infection and implementation of active surveillance systems.[1] These findings, combined with the rapid spread of dengue, also imply that greater efforts should be made to educate practitioners in the diagnosis and control of dengue, especially in high risk areas. In addition, PAHO recommends mosquito surveillance, evaluation of vector control programs, and development of public education programs.[9]

Education programs must include basic information about the breeding habits of mosquitoes and the necessity for community efforts in removing breeding containers such as aluminum cans, buckets, and used tires from areas of human habitation. According to PAHO, dengue is "basically a problem of domestic sanitation."[9] The community, therefore, holds the key to the control of mosquitoes, and community efforts determine whether control programs succeed or fail.

Prepared by Greg Brown, Student Intern, Infectious Disease Epidemiology and Surveillance Division

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Dengue in Texas: 1995

TDH was notified of an ongoing dengue fever outbreak in Reynosa....

On August 25, 1995, the Texas Department of Health (TDH) was notified of an ongoing dengue fever outbreak in Reynosa, Tamaulipas, Mexico, approximately 10 miles from McAllen, Texas. By the end of December, 2,361 cases were reported. An additional 430 cases of dengue were reported from Matamoros, Tamaulipas, Mexico, which is adjacent to Brownsville, Texas. The proximity of these outbreaks and the fact that the mosquito species that transmit dengue are commonly found in the eastern two-thirds of the state, increased the likelihood of both imported and autochthonous cases occurring in Texas. Therefore, TDH immediately implemented an educational campaign that stressed prevention and an active surveillance system to monitor the situation. (See DPN Vol. 55, Nos. 15 and 21 and Vol. 56, No.1)

TDH reported 29 cases of dengue in 1995: 9 from Hidalgo County, 5 from Harris County, 4 from Cameron County, 4 from Dallas County, 2 from Fort Bend County, and 1 each from Bell, Collin, Hays, Tarrant, and Waller Counties. Dengue virus was isolated from 3 patients. The first isolate, from a patient residing in Hidalgo County, was DEN-2; the second, from a patient in Cameron County, was DEN-4; and the third, from a Dallas resident, was DEN-3. Neither the patient with DEN-2 nor the patient with DEN-4 had a travel history.

Four cases from Hidalgo County and 3 from Cameron County were locally acquired.

Four cases from Hidalgo County and 3 from Cameron County were locally acquired. The remaining 22 patients had travel histories. Twelve persons had been to Mexico. The others had been to the Caribbean (4), El Salvador (2), Honduras (2), or Guatemala (1), areas where dengue was epidemic. The patient with DEN-3 drove through Mexico and Guatemala to El Salvador.

Two patients had onset of illness in March, 2 in July, 5 in August, 9 in September, 7 in October, 2 in November, and 2 in December. Symptoms included fever (29 patients), arthralgias/bone pain (26), headache (24), chills (21), myalgias (18), anorexia (18), severe malaise (17), rash (16), lumbosacral pain (12), nausea/vomiting (12), dysgeusia (11), retro-orbital pain (9), dysesthesia (7), respiratory symptoms (7), petechiae, purpura, or epistaxis (3), and lymphadenopathy (4).

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People can eliminate dengue vector breeding sites by removing, emptying, or covering containers of water. Therefore, health officials in Mexico and Texas are attempting to avert an outbreak in 1996 through public health education campaigns. In May bilingual pamphlets, *Prevent Dengue by Stopping the Mosquito Life Cycle*, were distributed to children attending public schools in South Texas. In addition, a slide presentation detailing the epidemiology of dengue will soon be available through TDH regional offices and the TDH film library.

Since most dengue cases occur from August through December, the 1996 season is imminent. Healthcare workers should consider dengue in the differential diagnosis of all patients who have symptoms similar to those of dengue, particularly when they also have a history of recent travel to areas associated with risk. The TDH Laboratory performs viral isolation and serologic tests. Whole blood, serum, or CSF (collected within 5 days of onset) should be placed on dry ice and shipped overnight for viral isolation. Single serum specimens may be submitted at ambient temperature for antibody detection. Convalescent sera (collected 10 to 14 days after the acute specimen was drawn) may be required to confirm recent infection. Send specimens to Texas Department of Health, Bureau of Laboratories, 1100 West 49th Street, Austin, Texas 78756.

For further information contact Julie Rawlings, Infectious Disease Epidemiology and Surveillance Division, at (512) 458-7228.

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A Pot of Shigella at Rainbow's End

The Missouri Department of Health (MDH) has notified all other state health departments about a *Shigella sonnei* outbreak among individuals attending the 25th annual Rainbow Gathering, held June 28 through July 7 in Oregon County, Missouri. The gathering was attended by 15,500 people from all over the United States and at least 2 other countries. The Rainbow Gathering in Missouri this year is the second to be associated with a shigella outbreak. Of approximately 12,000 persons who attended the gathering held in North Carolina, July 1987, an estimated 1,200 became ill with shigella.

The gathering was attended by 15,500 people from all over the United States ....

The first *S.sonnei* case was culture confirmed on July 8. As of July 26, the Missouri Public Health Laboratory (MPHL) had confirmed 21 cases, with additional suspected cases still under investigation. The organism is resistant to ampicillin, piperacillin, and trimethoprim-sulfamethoxazole. The home residences of these 21 case-patients are as follows: Missouri (3); California, Connecticut, Florida, Michigan, and Oregon (2 each); Georgia, North Carolina, Oklahoma, Michigan, Pennsylvania, South Dakota, and Tennessee (1 each); and Germany (1). The standard treatment protocol being used at this time is ciprofloxacin, 500 mg, twice a day for 3 days (for a total of 6 doses). Of the estimated 500 Rainbow Gathering participants who remain, 30%-40% are reportedly ill. As of July 26, 2 giardia cases also have been confirmed. (One of the giardia cases was in an individual who also had culture-confirmed *S. sonnei).* The MDH investigation and laboratory testing is still in progress.

Self-described as a "disorganization of nonmembers," the Rainbow Family has gathered on public land in different locations every year since July 4, 1972. For the week-long festival, participants refuse to sign permits, citing their First Amendment right to assemble peaceably. Organizers began setting up camp in Missouri's Mark Twain National Forest on June 12. Participants camped in the forest and ate communally. Drinking water was obtained from nearby springs and creeks that were also used for bathing.

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In light of health problems connected with previous Rainbow Gatherings, the large number of participants at this event, and their nonstandard approach to public hygiene, MDH initiated the following control measures. Active surveillance was begun at local hospitals on June 23, hospital staff were asked to report all health conditions treated in Rainbow Family members, and laboratory testing was included in evaluation of diarrheal cases.

Shigella in Texas

S. sonnei accounted for 1,555 (52%) of the 3,017 shigella cases reported in Texas in 1995. Texas law requires that shigellosis be reported to the Texas Department of Health on a weekly basis. For a variety of reasons, however, many *S. sonnei* cases probably are not reported.

S. sonnei infection causes an acute diarrheal disease that often lasts only 1 to 3 days; many individuals do not seek medical care for this type of illness. When they do, many are treated empirically, and stool cultures are not obtained.

Because a large number of people from all over the US and 2 other countries attended the Rainbow Gathering in Missouri last month, and because the *S. sonnei* strain responsible for this outbreak is multidrug resistant--TDH recommends that physicians obtain stool specimens from patients with diarrheal illness. Cases possibly associated with the Missouri outbreak should be reported by calling (800) 252-8239. All other shigella cases should be reported to the local health authority by calling the statewide number, (800) 705-8868.

Note: As of August 1, 1996, cryptosporidium infections and ehrlichiosis were added to the list of reportable diseases. In addition TDH has limited the reporting of invasive *Haemophilus influenzae* infections to *H. influenzae* type b infections only.

Measles Outbreak in Harris County Area

It takes 2 doses of measles vaccine to assure protection against measles.

As of July 26, 1996, investigation continues of a measles outbreak that began in Harris County; 1 case has also been confirmed in Liberty County. Rash onset for the first culture-confirmed case was May 9, and for the most recent case was July 22. The clinical case definition of measles is as follows: generalized rash lasting 3 or more days **PLUS** temperature of 101°F or higher **PLUS** cough **or** coryza **or** conjunctivitis. The rash usually breaks out on the face and spreads to the chest, arms, and legs.

To date, 16 cases have been confirmed. Of the 16 case-patients, 9 were children 7 to 9 years of age, 1 was 13 years old, and 6 were younger than 4 years of age. Seven case-patients had received 1 dose of measles/mumps/rubella (MMR) vaccine. Two boys, brothers 8 and 9 years of age, were unvaccinated due to invalid contraindications. An additional 5 patients, aged 9 to 18 months were also unvaccinated. Two of these patients were below the minimum age for MMR.

TDH recommends that infants 6 to 11 months of age **residing in the Harris County area** be vaccinated with the single-antigen measles vaccine, if available. If not, MMR may be given. Children aged 1 to 4 years should have 1 dose (preferably 2) of MMR vaccine. Persons in other areas of the state should follow TDH standard recommendations: a first dose of MMR at 12 months of age and a second dose at 4 years of age. All persons 4 years of age or older born on or after January 1, 1957 should have at least 2 doses of a measles-containing vaccine, preferably 2 doses of MMR. Report all suspected cases of measles **IMMEDIATELY** by calling (800) 252-9152.

Perspectives in Public Health: Texas Department of Health (TDH) Quarterly CME Conference

On September 20, 1996, from 8:30 AM to 4:00 PM, the Texas Department of Health (TDH) will present its Perspectives in Public Health: TDH Quarterly CME Conference. Designed for public health and primary care physicians, the conference will be held at the TDH Headquarters in Austin, Texas. The program will consist of lectures supplemented by audiovisual slide presentations.

After attending this conference, the participants will be able to

- prevent, detect at an early stage, treat, control, or take remedial action against specific medical conditions that may adversely affect the health of individuals and populations in Texas;
- identify policies, processes, and products that promote and protect the health of people and preserve environmental quality; and
- establish relationships with other physicians concerned with public health and preventive medicine issues through dialogue with presenters and other participants.

Topics covered at the upcoming conference include

- Religion: The Forgotten Factor in Physical & Mental Health
  David B. Larson, MD, MSPH, President, National Institute for Healthcare Research, Rockville, Maryland
- Putting Prevention into Practice: Workplace Upper-Extremity Injuries: Hazards of Jackhammers, Chainsaws, and Computers
  Bruce P. Bernard, MD, MPH, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, Cincinnati, Ohio
- Medical Newsdesk
  Kate Hendricks, MD, MPH & TM, Director, TDH Infectious Disease Epidemiology and Surveillance Division, Austin, Texas
- The Differential Diagnosis of the Febrile Patient with Altered Mental Status
  Sankar Swaminathan, MD, Assistant Professor, Division of Infectious Disease, Department of Internal Medicine, Sealy Center for Oncology and Hematology, UTMB, Galveston, Texas
- A Practical Guide to Computer Networks in Medicine for the Nontechnical Physician
  John Vindekilde, MD, MPH, MBA; FACOG, FACPM, Medical Manager, Houston Department of Health and Human Services, Houston, Texas

The Texas Department of Health designates this educational activity for up to 6 hours in Category 1 credit towards the AMA Physician's Recognition Award. Each physician should claim only those hours of credit that he/she actually spent in the educational activity.

The Texas Department of Health is accredited by the Texas Medical Association to sponsor continuing education for physicians.

This program has been reviewed and is acceptable for 6 prescribed hours by the American Academy of Family Physicians.

For further information call: Public Health Professional Education - (800) 252-8239, press 4, or (512) 458-7677. To register, complete and return the registration form located on the back page of this issue.

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To register for the Texas Department of Health Quarterly CME Conference, complete and return the registration form below to **Texas Health Foundation-Professional Education, P.O. Box 650257, Austin, Texas 78765-0257**, or contact the Texas Department of Health's Public Health Professional Education Program at (512) 458-7677 or (800) 252-8239, press 4.

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Registration Form DPN

Perspectives in Public Health: Texas Department of Health Quarterly CME Conference
Friday, September 20, 1996 8:30 AM - 4:00 PM

Lunch is included with all registration fees

☐ *Enclosed is my $40 registration fee* ☐ *Please call me regarding special needs*

☐ *Enclosed is my $20 registration fee and with verification letter from Training Program (for Residents/Fellows)*

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