

## Public Health

# West Nile fever in New York City

### Epidemiology

West Nile fever is caused by a member of the flavivirus family, which includes the viruses that cause Japanese encephalitis, St. Louis encephalitis and a variety of similar illnesses. On Aug. 23, 1999, an infectious disease physician reported 2 cases of encephalitis to the New York City Department of Health. The department initially identified a geographic cluster of 6 patients, all of whom had encephalitis. Subsequent testing, including DNA sequencing, showed the source to be West Nile virus.<sup>1</sup> It had never before been isolated in the Western Hemisphere, although sporadic outbreaks had been reported in Western Europe.<sup>2</sup>

Before and concurrently with these cases, health department officials had begun to investigate an increase in the number of dead birds in New York City. Crows were particularly affected, and officials at the Bronx Zoo had noted the deaths of a cormorant, 2 captive flamingoes and a pheasant. All were subsequently confirmed to have died of West Nile fever.

A total of 61 human cases of the fever were reported during the New York outbreak, which resulted in 7 deaths.

One of the cases involved a Canadian visitor to New York, who contracted the virus in late August and died Sept. 5. None of the patients involved had travelled to Africa during the incubation period, and many of them had never ventured far from New York City.

West Nile fever is transmitted predominantly by *Culex* mosquitoes, which feed mainly on birds. During this outbreak, these mosquitoes were found in

New York City and its surrounding counties; the West Nile virus has subsequently been found in many bird species in the area. Most of the birds have been crows, but the virus has also been isolated in the ring-billed gull, yellow-billed cuckoo, rock dove, sand-hill crane, fish crow, blue jay, bald eagle, laughing gull, black-crowned night heron, mallard duck, American robin, red-tailed hawk and broad-winged hawk. Horses were also affected and had high death rates.<sup>3</sup>

The virus is thought to have been introduced to New York by an infected human traveller or through the importation of infected birds.

### Clinical management

The illness begins after a 3- to 6-day incubation period. It is marked by the abrupt onset of fever and influenza-like symptoms that include headache, sore throat, backache, myalgia and arthralgia. Five of the 6 initial patients had profound muscle weakness, with axonal neuropathy revealed by electromyogram, and 4 of them required respiratory support. About half of patients have a maculopapular or roseola-type rash that spreads from the trunk to the extremities.<sup>2</sup> Hepatitis, pancreatitis and myocarditis have been described.

The median age of presentation among the initial patients was 71 years (range 15–87). Most of the severe cases and all of the fatalities involved older people. The disease can also present in a milder form. Viral encephalitis is suspected when typical symptoms occur and the cerebrospinal fluid (CSF) is clear with a predominantly mononuclear pleocytosis and normal CSF glu-

cose concentrations. Confirmation of the specific virus requires close collaboration with the laboratory.

### Prevention

Preventive efforts in New York City were directed at controlling the mosquito vector. This included enhanced surveillance for cases of human encephalitis, monitoring of mosquitoes and birds, insecticide application to reduce mosquito populations and distribution of DEET-based mosquito repellent. As well, public health messages urged residents to wear long-sleeved shirts and long pants and to limit outdoor activity during the evening hours, when mosquitoes are most active.<sup>3</sup> These preventive efforts continued until the first frost.

With global warming, increased foreign travel and the globalization of trade, it is likely that other exotic infectious diseases will find their way to distant and previously uninvaded territories. Just as the infectious disease physician in New York did, physicians should report unusual cases of any disease to public health authorities. Viral encephalitis is a notifiable disease, and all suspected cases should be reported to the local medical officer of health.

Written by John Hoey.

### References

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