

Case histories

Dengue

In 1780 Benjamin Rush—a physician and a founding father of the USA—noted the appearance of an alarming epidemic in his home city of Philadelphia. Rush was familiar with the intricate nosologies of fevers generated by his late-Enlightenment colleagues, but this outbreak had a distinctive symptom: “the pains which accompanied this fever were exquisitely severe in the head, back and limbs”. He deployed the usual purging, soothing, and strengthening remedies, but with little success, and he observed that “its general name among all classes of people was the break-bone fever”.

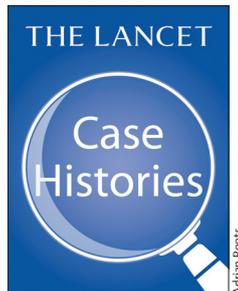
Within a decade this outbreak was followed by others in the Atlantic world, mirroring the movement of European colonists and their African slaves, and the transmission of the disease from its origins in Africa to the New World. The name “dengue fever” seems to have emerged on slave plantations in the Caribbean in the 1820s but, as historian Mary Dobson has noted, the term’s origins are obscure. Does it derive from the Swahili *Ka-dinga pepo*, a seizure caused by an evil spirit, or is it a corruption of “dandy” or the Spanish *denguero*, “affected”, both referring to the stiff, painful gait of those infected?

Dengue was a late beneficiary of the 19th-century bacteriological revolution and the ecological tropical medicine established by the Scottish physician Patrick Manson. In the 1870s, the physician Joseph Bancroft established a research station in Brisbane, investigating the relationships between mosquitoes and microscopic parasites. Bancroft’s son, the naturalist Thomas Lane Bancroft, showed, in 1906, that the *Aedes aegypti* mosquito—already known to be the vector of yellow fever—was responsible for spreading dengue.

As is so often the case, novel forms of knowledge did not lead directly to new and effective treatments. In an age of magic bullets, dengue was not immediately susceptible to specific chemotherapeutics or a vaccine and, like malaria, the major 20th-century campaigns against dengue were directed at the vector. Efforts to eradicate mosquito-borne diseases in Cuba and the Panama Canal Zone proved successful, backed up by the widespread use of DDT until its environmental consequences were publicised in the early 1960s. Paradoxically, the development of an effective vaccine for yellow fever in the 1930s hindered post-war attempts to eradicate dengue. As clinical attention shifted to vaccination, by the late 1960s many mosquito control programmes were neglected and ineffective, allowing *A. aegypti* to re-infest areas from which it had been driven out. This, along with parallel demographic and economic developments, led to a dramatic resurgence of the disease in the late 20th century.

Dengue was one of the first infectious diseases to be linked to a virus, now known to be a flavivirus with at least four serotypes. Though a single infection is not usually fatal, recent work has shown that infection with more than one serotype increases susceptibility to the others, and multiple infection—severe dengue, also known as dengue haemorrhagic fever—can be fatal. Although the aetiology is unclear, it seems to be an autoimmune reaction, and severe dengue has become the subject of increased interest since the outbreaks of Ebola virus disease in the DRC in 1976 and in west Africa in 2014 raised the global profile of haemorrhagic fevers. Dengue is today, in Dobson’s words, “the classic twenty-first-century disease driven by an urban, adapted mosquito and easily transported by infected people or the vector through increasing trade, changing land use and expanding urbanisation”. Since 2016 a partially effective vaccine has been available, and work continues on a vaccine for all four serotypes. Endemic in more than 100 countries, mostly in southeast Asia and the western Pacific, dengue has been identified as a neglected tropical disease by WHO, and is thought to be the most rapidly spreading mosquito-borne viral disease in the world.

Richard Barnett
richard@richardbarnettwriter.com



For more on Case histories see
Comment *Lancet* 2016; **387**: 211
and **Perspectives** *Lancet* 2017;
390: 928

DESTROY THE ENEMY THAT STALKS BY NIGHT
For Greater Comfort and Health's Sake

THE "GREY" MOSQUITO
known to science as *Culex fatigans*, is able to transmit Filaria from man to man. Some years ago the percentage of infection amounted to about 10 in every 100. Since then the percentage has been reduced through successful control, but the infection is still sufficiently high to warrant the destruction of this mosquito.

It is in the best interests of every householder to help us to get rid of this pest.

The civilised world demands the destruction of mosquitoes. Will you help to see this carried out and to make Brisbane the healthiest and most comfortable city in the world to live in?

CLEAN UP
AND
Keep On Cleaning Up.

The "Grey" Night-biting Mosquito, the carrier of Filaria.

THE MOSQUITO THAT CARRIES FILARIA
is a domestic mosquito and is found usually in polluted waters: household waste water produces such pollution, so that houses properly drained seldom breed this mosquito. Liquid manure is a favorite breeding place, and unless regularly dealt with once a week will breed thousands of mosquitoes.

ONLY THE FEMALE BITES.
The male is provided with beautiful ornate head plume and is quite harmless.

Clean up—puncture all tins and destroy all water-holding rubbish, induce your neighbours to do the same, and **develop a pride in your city.**

CLEAN UP
AND
Keep On Cleaning Up.

This Mosquito Needs Watching—it is our worst Mosquito: it breeds in foul gully-traps, sewers, and drains; it frequents all kinds of water-holding rubbish; and above all it is one of the principal mosquitoes which breed in cemeteries, in vases left standing on the graves. Get rid of all stagnant water in and around your house and in your backyards. **Drain your premises properly.**

Clean Up—and Keep on Cleaning Up.

THE COMPLETE LIFE CYCLE OF THIS MOSQUITO.
Eggs are laid in rafts of about 300 eggs at a time on dirty, filthy, polluted water for choice. These hatch within three days, the resultant larvae, or wrigglers, then feed for about eight or ten days, when they turn into pupae, or tumblers, which within three days change into the perfect adult: insect capable of laying eggs within two or three days.

This mosquito is the only one which breeds in unscreened septic tanks.

Published by the Department of Health, Brisbane City Council. Price, per set, 3s. Postage paid.