

Los Angeles Pediatric Society E-Newsletter

Volume 3 No. 1

April 2016

SPECIALISTS' CORNER



"Z is for Zika"

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As the summer travel season approaches, along with the Western Hemisphere's first Summer Olympics in twenty years, the Zika Virus has brought attention like never before to the potential menace of mosquitos. **But how anxious should parents be about this threat, and what can be done to stop it?**

Zika is a small RNA virus related to the Yellow Fever virus, and is also a distant cousin of Hepatitis C. All three reside in the *Flaviviridae* family that also includes Dengue and West Nile. Apart from HCV, these other viruses can be spread by aggressive tiny black-and-white-striped Yellow Fever mosquitos (*Aedes aegypti*) and Asian Tiger mosquitos (*Aedes albopictus*) that bite both day and night.

These mosquitos do reside in Los Angeles County. Asian Tiger mosquitos first came to California in 2011 and Yellow Fever mosquitos in 2013. Both species spread widely during 2015, and are currently found in pockets around Whittier, East Los Angeles, Boyle Heights, Silver Lake, and La Canada/Flintridge. However, for these mosquitos to spread Zika, they have to bite someone who became Zika-infected in an endemic area – usually in Brazil or other parts of Latin America and the Caribbean.

Is Zika dangerous? Since it was discovered 60 years ago, Zika was thought to cause only a self-resolving one week syndrome in 20% of those infected, manifested by fever, rash, joint pain, headache and conjunctivitis. Yet Brazil has witnessed an explosion of babies with microcephaly born in the past year. The infection is also associated with Guillain-Barre syndrome, an ascending paralysis of peripheral nerves, and more recently with cases of Acute Disseminated Encephalomyelitis (ADEM)— a CNS demyelinating disease that mimics Multiple Sclerosis and can leave people symptomatic for six months or longer.

Early studies now show that Zika targets neural stem cells in the developing brain. This raises the startling specter of a mosquito-borne disease causing permanent damage to cells, which decades later may be responsible for new memory formation in the hippocampus or to maintenance of the coordination centers in the cerebellum. For the first time, Zika poses questions about the possibility that mosquito bites early in life could contribute to conditions like dementia and ataxia in the elderly.

What other diseases are spread in Los Angeles by mosquitos?

The Dengue virus causes more overt illness in affected people, including children. High fever, severe headache and eye pain, arthralgia/myalgia and rash can be particularly terrible in teens. Over the last six months, a Dengue outbreak on the big island of Hawaii sickened 263 people, about 10% of them visitors.

West Nile virus is also transmitted by these mosquitos, and by the more common *Culex* mosquitos, and has now been documented in every state except Alaska and Hawaii. Human West Nile infections cause arthralgia/myalgia, chronic fatigue, and sometimes encephalitis, and were reported in more than 800 Californians in 2014.

Mosquito bites are generally viewed as a benign rite of passage in childhood. But the rise of these diseases and the potential unknown long-term consequences have raised the stakes for prevention, necessitating DEET-containing repellent use, long-sleeved pants and shirt wear in the summer, and extra care to avoid water pooling around the house – or even indoors (e.g. with cut flowers in vases). Zika can also be sexually transmitted, and the new California law implemented April 9 that makes contraceptives available without a prescription is a reminder that effective contraception may bring more benefits than just prevention of unintended pregnancy.

Although Hepatitis C is not transmitted by mosquitos like its sibling viruses, HCV may be a key to overcoming Zika and these other, similar epidemics. One of the new anti-HCV drugs, which inhibit the viral RNA polymerase, appears in early experiments to have activity against Zika replication in infected cells. Although a vaccine could be years away, the success treating HCV is promising as society faces the dramatic consequences of emerging threats like Zika.