

STANDARD DEVIATIONS: March Madness – Out of Sight, Out of Mind?

Greetings,

Where did Zika go?

Zika created quite a hullabaloo in early 2016. It sprang up out of the blue as some super-spreading mosquito virus, creating a surge in microcephaly and GBS. It created a lot of “buzz” (sorry, poor mosquito pun) for a year and then disappeared.

Alarms blared. A PHEIC (Public Health Emergency of International Concern) was declared. The CDC threw everything, even the kitchen sink, at it. The State lab began testing, epidemiologists started public awareness and some folks nearly wet themselves when Utah had the first US case of local transmission. Let’s face it, Zika broke the glass and punched the big red button.

And today? Zika is a footnote. What gives?

With another virus grabbing headlines, it is easy to forget the health panic of 2016, when Zika was linked to severe birth defects in thousands of Brazilian newborns whose mothers were infected while pregnant, striking fear across the country and much of the Americas.

Range of Microcephaly Severity

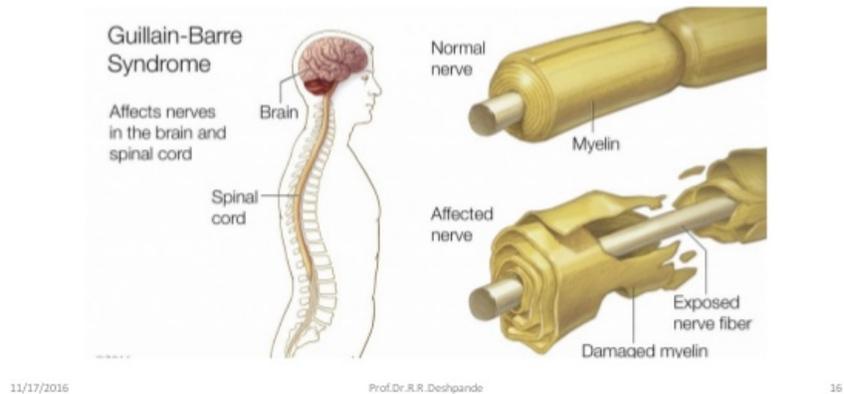


{Thousands of Zika related birth defects were seen during 2015-17.}



The virus causes neurological disease in adults, as well. Zika has been linked to the paralyzing Guillain–Barré syndrome that can kill or disable patients for years. Guillain–Barré syndrome (GBS) is a rapid-onset muscle weakness caused by the immune system damaging the peripheral nervous system. The underlying mechanism involves an autoimmune disorder in which the body's immune system mistakenly attacks the peripheral nerves and damages their myelin insulation.

GB Syndrome Pathology



{Zika is associated with a range of neurologic conditions.}

Zika galloped through Latin America and the Caribbean that 2016 spring and summer and eventually reached the United States, sickening people in Florida, Texas, and Puerto Rico and prompting countless travelers to cancel travel. Finding transmission with sexual contact only fanned the flames.

Then, seemingly overnight, the epidemic evaporated. Case numbers dropped off the charts and so has our attention.

Zika cases	2015	2016	2017	2018	2019	2020
U.S.	62	5168	452	74	28	3
US Territory	10	36512	666	148	74	57

{Zika is not a threat today. Will it ever be again? cdc.gov}

Sharp people with sharp pencils say the sharp decline in Zika cases is due, at least in part, to herd immunity. When enough people become immune to a virus, whether through vaccination or natural immunity, then that disease can't easily travel from person to person.



The range and effort to control the *Aedes* vector has also been seen as a mitigation that helped stem the spread of Zika.

There is no vaccine for Zika and so the thinking is that herd immunity is driven by a large number of people that now have immunity due to infection and the limited range of the *Aedes spp.* that carry virus.

Because the disease is mild for most, the outbreaks of 2015-17 infected enough people to create a herd immunity. Greater than 80% of infections are undetected or present as mild cold-like symptoms. Millions of people have immunity; mosquitoes bite but don't find virus.

Aedes spp. don't survive the cold and are limited to ranges that allow them to breed year-round. Disease won't spread without the mosquito to bite folks. Problem solved!

But Zika, it turns out, did not vanish.

The virus is likely still spreading in communities that have not been exposed to Zika yet and therefore lack herd immunity. Angola saw a spike in Zika and birth defects in 2018 in areas that had been naïve to the virus, before.

Over time, the benefits of herd immunity will wane as more children are born, providing fresh tinder for the next epidemiological wildfire. Plus, we just don't know whether those infected with Zika are immune for life, or just for a period of time.

And, there's the growing problem of climate change and the expanding range of *Aedes aegypti*.



{*Aedes*, a vixen in striped high-heels.}



Climate change is likely to intensify and expand vector-borne disease. Zika may be the least of our worries if Dengue, chikungunya, West Nile, and malaria broaden their endemic ranges, too.

Zika infections have calmed down in Brazil and the rest of the Americas — which scientists attribute to a combination of herd immunity, household-level mosquito elimination efforts, and broader mosquito control programs. Results of our awareness and mitigations.

But, the virus is still a threat. The disease can cause complications or abnormalities in pregnancies and can increase the risk of neurological complications in children and adults. The CDC reminds us that 8 percent of pregnant women with symptoms of Zika during pregnancy delivered a baby with Zika-associated birth defects. In pregnant women without symptoms of Zika infection, 12 percent delivered a baby with Zika-linked birth defects. Infection earlier in pregnancy appears to increase risk of birth defects.

Viruses are tricky devils, and Zika will likely resurface again at some point.

And so, dear reader, here is my biosafety spiel.

Risks don't just disappear.

Laboratory acquired infections are extremely rare. Results of our awareness and mitigations. But, we still use every tool in the box to be safe. We use biosafety cabinets, splash shields, and sharps containers. We follow SOP. We wear PPE. We understand that risk is right there, hiding in plain sight.

Our biosafety awareness is like herd immunity; it works when everyone has it. Risk, on the other hand is like the mosquito; it breeds in places where people are, and thrives without our controls.

Anne Schuchat, MD, Deputy Director at CDC, reminds us, "Zika is here to stay." We know the same is true for laboratory risk.

We can mitigate risk into obscurity, but if we stop our vigilance, it will come back to bite us.

Have a great week and be safe,

Bryan



Aedes aegypti mosquitoes



Mosquitoes' ability to live and reproduce

