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The Zika Virus Fight on Social Media

Kadri SM[1*] and Melissa Trapp-Petty[2]

[1]Directorate of Health Services Kashmir, India

[2]Walden University, Minneapolis, Chemist, Par Pharmaceuticals, Huntsville, USA

Corresponding author: Kadri SM, State Surveillance Officer (SSO), Directorate of Health Services Kashmir, India, E-mail: kadrism@gmail.com

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The Zika Virus Fight

One of the biggest challenges of public health is getting the right information into the hands of the population that it would serve. With so many messages and means to deliver them, cutting through the noise to deliver timely, relevant information on a health topic becomes a fierce competition. Further, misinformation on health topics, particularly in social media, is abundant. Messages that are wild, sexy, or conspiracy-laden can often garner more attention than messages that can inform and possibly save lives. It is just this sort of dichotomy between the carefully crafted, well-researched health advice and the less rigorous, specious theories that is happening with the Zika virus epidemic, recently declared a Public Health Emergency by the World Health Organization (WHO).

Zika virus is a flavivirus spread primarily through the bite of Aedes mosquitoes. The disease itself is a mild febrile illness, presenting with a macropapular rash, and lasting about 2-7 days. 80% of those infected show no symptoms. Primates, especially humans, are the best-known reservoir for Zika virus. However, it has been serologically proven that many other species may support Zika viral infection, including forest-birds, horses, goats, cattle, ducks, and bats [1].

Although it normally presents as a mild or barely perceptible dengue-like illness of relatively short duration, its complications and potential for spread have made it the subject of international concern for WHO. The Pan Am Health Organization (PAHO) expects that the Aedes mosquito will spread Zika virus throughout all of the Americas.

Its complications include possible links to Guillain-Barre Syndrome (GBS), a disorder where the immune system attacks the peripheral nervous system causing weakness and tingling until possible paralysis. GBS can strike anyone of any age, and there is no known cure. Another possible complication is microcephaly. Reported have been cases of babies and aborted fetuses having microcephaly that have had either Zika infection or Zika RNA sequences in neural tissue. This suggests a potential causal link between maternal infection with ZIka virus during pregnancy and microcephaly [2]. Microcephaly is a relatively rare condition that can cause severe brain damage and birth defects and possibly lead to stillbirths.

This is particularly unusual because many closely related flaviviruses such as dengue or Japanese Encephalitis (JE) have only rarely been associated with some type of birth defect [3]. Further, although the pathogen for Zika virus was first isolated in 1947, there is actually very little known about its mechanism.

Microbiologically, what is known about Zika is that there are two documented virus lineages, one African and one Asian. It is the Asian lineage that has emerged in the Pacific and the Americas. Viral RNA of the Zika virus has been detected in urine, saliva, semen, blood, amniotic, and cerebrospinal fluids. In one major study of note, scientists found Zika virus throughout the brain tissue of an aborted fetus of a woman infected in her first trimester, but nowhere in other tissues. Given the nature of the blood-brain barrier during development, this allowed them to conclude that the Zika virus is drawn to the growth medium of the brain cells. This team was also able to harvest the genome of Zika in a way that allows it to be sequenced comprehensively [4,5].

Since there is no cure or vaccine for Zika virus currently, these and other scientists are working on several fronts. With a complete genome in hand, the current strains can be compared to earlier outbreaks to determine their evolution, journey, and path, and how vaccines could work with our human immune system. Further, with so little known about the mechanism of the temporal microcephaly link, scientists can also determine if the virus that potentially causes the birth defect is indeed the same that is circulating in the community. But even with the “all hands on deck” approach that many public health agencies have taken to developing a vaccine, it may still be a few years off. This makes prophylactic measures that much more necessary and appealing.

One such measure is the technology of the Genetically Modified Mosquito (GMM). A company called Oxitec is developing and testing male “autocidal” mosquitoes for release. These non-biting male mosquitoes pass along a “dominant lethal genetic system” that depends upon the dietary supplement tetracycline, which is not available in nature. When the mutated males breed with natural females, their offspring die before becoming adults. A huge release of these males into the area of concern pressures the females to mate with them, and the population is successfully controlled.

According to Oxitec's reports to date, they have seen a 90% suppression of local mosquito populations in the areas where they have released their technology. Lastly, since the Aedes mosquitoes are not native to the Americas, there is little evidence that controlling their populations will have a deleterious impact on the environment they are released in, which is why the social media reception to them is so shocking.

All over social media sites, flagrant conspiracy theories are usurping the information on the benefits of GMMs. Instead of careful research and well-crafted advice on protecting yourself from the bites of the Aedes mosquitoes, Twitter, Reddit, and Facebook enthusiasts are screaming that Oxitec is solely responsible for spreading the Zika virus. While scientists and public and private health agencies are scrambling to develop vaccines and targeted pest control treatments, there is a growing population that prefer to confuse the general public with "reports" of intentional human population control through Zika virus delivery with "proof" in the form of maps with mismatched dates and locations of release and infection.

While this type of fear mongering and anti-science platform is not new, the newer platforms of social media allow the conditions for reaching the masses to flourish. These conditions include the overall dearth of information that even scientists have about Zika virus, and the concern that officials are not doing enough or communicating well enough to protect the public. Taken together with the very real fear and powerlessness felt by the general public, there is fertile ground for misinformation and a sense of structure even in the wackiest of theories. What is also different about social media is that it allows even the least educated and interested in truth a platform to spread their opinions, where once upon a time true journalists had to fact check before they printed in the newspapers and chatted on television.

The power of social media is that is a real-time generator of "facts" and opinions. As scientists, government officials, and repositories of health information, it is our responsibility to ensure we tell the true story-as quickly, clearly, and responsibly as we can. Although it is still critical to add to the body of knowledge with methodical, peer-reviewed publications and research, it is also incumbent on us to have our knowledge and recommendations front and center on social media sites, and in easy-to-access and easy-to-understand ways. We have an obligation to protect and educate the population, even in the face of criticism. Our stories may not be sexy and laden with conspiracies, but they can still save lives.

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